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Mortgage refinancing during the Great Recession: The role of credit scores

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This article examines whether deteriorating credit scores may have posed a barrier to mortgage refinancing during the Great Recession of 2008–09 and its immediate aftermath. The authors find that in general, as long as borrowers kept up with their mortgage payments, their credit scores did not fall significantly over this period. Hence, credit scores are not likely to explain why certain borrowers with sufficient home equity did not refinance their mortgages.

For much of the decade preceding the Great Recession, the U.S. mortgage refinancing market ran like a well-oiled machine. But the deep and long downturn dramatically altered this market. Many households had taken advantage of opportunities to extract equity (in the form of cash-out refinancing and home equity loans) during the housing boom, and the severe declines in home prices during the recession left them with little or no equity in their homes. Mounting job losses further impaired households' access to refinancing, as lenders were unable to underwrite new mortgages in the absence of a documented stream of income. Job losses also damaged households' ability to service their existing debt obligations. The resulting mortgage payment delinquencies adversely affected borrowers' credit scores—in some cases pushing them below credit qualification thresholds.
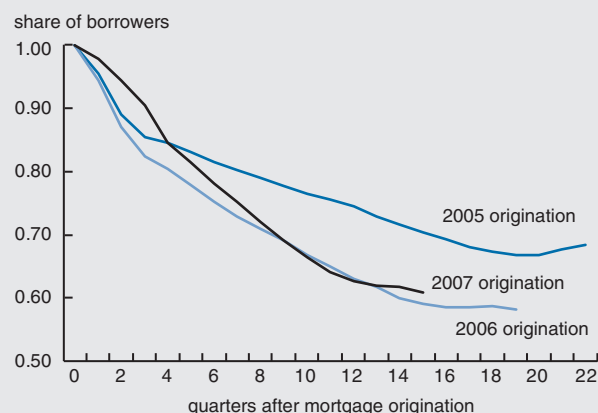
These developments presented a potential hurdle for the effective conduct of monetary policy. Because refinancing represents the easiest way for borrowers with fixed-rate mortgages to take advantage of declines in market interest rates, it is considered one of the primary channels for the transmission of accommodative monetary policy actions. When this refinancing channel is blocked—whether because of erosion in borrower credit quality, falling collateral values, or shrinkage in the supply of credit—lower interest rates provide less stimulus to household consumption.

This *Chicago Fed Letter* examines whether the deterioration in credit scores prevented mortgage borrowers from taking advantage of sharply lower interest rates during the Great Recession and its immediate aftermath. We are able to address this question thanks to a unique panel data set that combines information on mortgage ownership and performance with contemporaneous credit scores. As such, it allows us to track credit developments for a specific subset of borrowers who were qualified to refinance, but who,

1. Share with FICO scores at or above deterioration threshold

share of borrowers

2005 origination

2007 origination

2006 origination

quarters after mortgage origination

NOTE: This figure shows the share of borrowers with FICO scores at or above the significant deterioration threshold according to the year of mortgage origination (see note 5 for further details).
SOURCE: Authors' calculations based on data from Equifax, Credit Risk Insight Servicing McDash (CRISM).

2. Share of borrowers in credit score category in December 2010, by score at origination

FICO score at origination	A. All loans, LTV<90%, never missed a payment			B. GSE-backed, LTV<125%, HARP-eligible payment history		
	Share with FICO score at or above significant deterioration threshold	Share with FICO score above 680 (prime)	Share with FICO score above 760 (super prime)	Share with FICO score at or above significant deterioration threshold	Share with FICO score above 680 (prime)	Share with FICO score above 760 (super prime)
681–700	81.5	76.3	24.6	74.8	69.1	21.8
701–720	78.1	80.1	36.6	78.0	79.2	37.3
721–740	74.0	83.1	40.1	71.4	81.3	40.3
741–760	72.0	88.9	52.3	71.2	86.7	53.9
761–780	74.4	93.3	64.2	72.7	92.6	61.2
781–800	76.9	95.7	78.6	74.3	93.9	75.8
801 and above	79.3	99.3	88.7	79.2	98.6	88.3
Total	76.4	90.7	62.2	74.6	88.4	59.9
Number of loans	4,066			4,251		

Notes: This figure is for the sample of loans originated in 2005 and 2006. LTV means loan-to-value ratio. GSE means government-sponsored enterprise; being GSE-backed indicates the mortgage is guaranteed by a GSE. HARP means Home Affordable Refinance Program. See the text for further details on these terms. See note 5 for the authors' definition of a significant deterioration in FICO score. All values are in percent except those in the final row.

Sources: Authors' calculations based on data from Equifax, Credit Risk Insight Servicing McDash (CRISM); and CoreLogic Home Price Index (HPI).

for some reason, retained their original mortgage contracts. This data set also allows us to rule out insufficient home equity and tightening lender credit standards as explanations for why these mortgage borrowers failed to refinance.

By tracking household credit scores, we are also able to evaluate the credit quality of mortgage borrowers eligible for the Home Affordable Refinance Program (HARP)—the largest federal policy action aimed at facilitating refinancing.[1] In an attempt to streamline refinancing opportunities, HARP did not require credit scores for borrowers looking to refinance under the program. However, HARP did require such borrowers to have stayed current on their mortgages during the previous six months and to have not missed more than one payment during the preceding year. Thus, another aim of our article is to assess whether these restrictions succeeded in channeling HARP refinancing opportunities to creditworthy borrowers, thereby mitigating credit risk to the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac.[2]

Data

We use Equifax's Credit Risk Insight Servicing McDash (CRISM) data set—which merges McDash Analytics mortgage-servicing data with Equifax credit file data. This data set contains 79 million consumers and 93 million mortgages in a monthly panel beginning in June 2005. From this data set, we select a 1% random sample of mortgages and further limit it to loans originated during the 2005–07 calendar years. The key features of this data set are that it contains monthly FICO scores[3] of mortgage borrowers and allows us to identify the refinancing status of individual mortgages.

Because we want to investigate the role of credit scores in refinancing, we focus on households for which insufficient home equity is not a barrier to refinancing. To do so, we construct measures of current loan-to-value (LTV) ratios by combining data on the outstanding loan balance and the estimated value of the house. We derive the latter by multiplying the original appraisal value of the house by the cumulative change in the CoreLogic Home Price Index (HPI) from mortgage origination to the given month. HPI data are available at the zip code level for 57.3% of the U.S. population. For observations for which zip-code-level data are not available, we use data at the Core Based Statistical Area (CBSA) level,[4] which are available for 83.9% of the U.S. population.
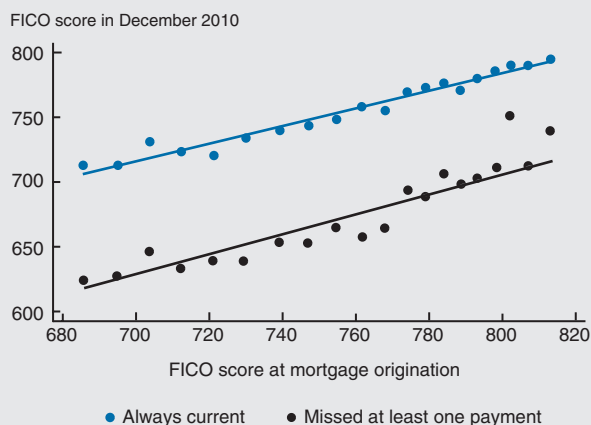
Evolution of mortgage borrowers' credit scores

How did FICO scores of mortgage borrowers change over time? We first approach this question by tracking FICO scores of all borrowers, regardless of their mortgage performance or the evolution of their LTV ratios. We observe that within the first five quarters after origination, approximately 15% of borrowers in our sample experienced significant deterioration of their credit scores (see figure 1 on front).[5] This pattern is similar across all three origination years—i.e., the 2005, 2006, and 2007 "vintages." As mortgages matured, a larger fraction of 2006 and 2007 vintage borrowers experienced a significant deterioration in their FICO scores relative to 2005 vintage borrowers. Three years (12 quarters) after origination, more than a third of 2006 and 2007 vintage borrowers experienced significant declines in their FICO scores.

A substantial portion of these negative trends in FICO scores is likely due to missed mortgage payments. As shown in research by Demyanyk and Van Hemert,[6] mortgage delinquencies were particularly prevalent among the 2006 and 2007 vintage loans, which undoubtedly affected borrowers' FICO scores. In order to track the importance of missed mortgage payments in our subsequent analysis, we create two performance measures. One measure flags loans that became 30 days or more past due at any point between origination and December 2010 (which also identifies borrowers who remained current on their mortgages throughout this period). The other (stricter) measure flags loans that became 60 days or more past due (i.e., missed two or more consecutive payments) at some point in this time frame.

Credit scores of borrowers who did not refinance

To answer the question of whether deteriorating credit quality posed a barrier to refinancing, we need to impose a number of additional sample restrictions. In particular, we study fixed-rate mortgages for owner-occupied single-family homes that were originated in 2005 and 2006 and did not get refinanced before 2010.

3. FICO score transition, by payment status

FICO score in December 2010

FICO score at mortgage origination

● Always current   ● Missed at least one payment

NOTES: The regression sample consists of mortgages originated in 2005 and 2006 that have an estimated loan-to-value ratio below 90% in December 2010. Each point represents the average of December 2010 FICO scores for a given five-point FICO score bin at origination. Separate averages are computed and presented for mortgages that remained current and mortgages that defaulted. Each line represents regression relationships estimated with loan-level data. See the text for further details.

SOURCES: Authors' calculations based on data from Equifax, Credit Risk Insight Servicing McDash (CRISM); and CoreLogic Home Price Index (HPI).

To abstract from subprime lending, which was nearly extinguished after 2007, we limit the sample to borrowers with FICO scores above 680 at origination, who had easy access to credit markets, and mortgages that were not guaranteed by the Federal Housing Administration (FHA). To assuage concerns about insufficient home equity, we impose one final restriction: considering only mortgages with an estimated December 2010 LTV ratio under 90%. Among these loans, 4,066 never had a missed payment, while 1,084 had at least one missed payment (498 of these loans became 60 days or more past due at least once).

We then create 20-point bins for FICO scores at origination and summarize FICO scores as of December 2010 for each of these bins. In particular, we compute the share of loans that remained at or above our significant deterioration threshold for each mortgage origination year (see note 5). We then compute the share of borrowers whose FICO scores remained prime (above 680) and the share whose scores were super prime (above 760) as of December 2010.

Panel A of figure 2 presents the results of this exercise for borrowers who never missed a single loan payment. About a quarter of such borrowers experienced a significant decline in their FICO scores,

with the decreases fairly evenly distributed across the bins for FICO score at origination. Yet, fewer than 10% dropped out of prime FICO score range. This suggests that credit scores were not a likely candidate for explaining the failure of these borrowers to refinance their loans.

As a check, we repeat this exercise for borrowers who missed at least one mortgage payment (not shown). The results change dramatically: Two-thirds of these borrowers experienced a significant decline in their FICO scores, and a little over half had their scores drop out of prime FICO score range. Among those who experienced a delinquency of 60 days or more, over 80% suffered a significant deterioration in FICO scores and almost 75% dropped out of prime FICO score range.

An alternative way to analyze these patterns is by performing a regression analysis—i.e., a statistical exercise estimating the degree of correlation between FICO scores at origination and in December 2010. Figure 3 presents a graphical summary of this exercise for borrowers who always stayed current on their mortgages (the blue line) and borrowers who missed at least one payment (the black line). We observe a strong positive relationship between FICO scores at origination and FICO scores in December 2010 for both groups, but with a substantial drop in scores over time for the latter group.[7]

One potential concern about the results in panel A of figure 2 is the sample's under 90% LTV ratio restriction. In particular, households in areas hardest hit by the recession were likely to have higher LTV ratios and, thus, be excluded from the sample. If being in a location hard hit by the downturn is generally correlated with worsening credit, the results from

using the LTV-restricted sample might overstate the persistence of credit scores for households that maintained their mortgage obligations. To test the sensitivity of the results to the LTV ratio threshold, we rerun the analysis on a set of loans with LTV ratios under 80% in December 2010. These mortgages are associated with borrowers who made more substantial principal paydowns or with borrowers living in areas relatively less affected by housing price declines.

We find that loans with this tighter LTV ratio restriction did marginally better, but the differences were minor. Among loans that remained current through December 2010, 77% had FICO scores remaining at or above the significant deterioration threshold (compare this to 76% of borrowers in the original sample), and 91% had FICO scores stay in prime range (the same as in the original sample). Among loans with at least one missed payment prior to December 2010, 33% had FICO scores at or above the significant deterioration threshold, and 45% had FICO scores in prime range (quite close to the corresponding values for the original sample).

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HARP eligibility, mortgage payments, and credit scores

Two of the primary "reunderwriting" requirements for determining eligibility for the HARP program were related to the recent history of mortgage payments. In this section, we explore FICO score patterns on the basis of these eligibility standards. To match the other key HARP eligibility requirements in December 2010, we restrict the sample to GSE-backed loans with LTV ratios under 125%.

Recall that HARP did not require credit scores for participation; it required only that borrowers made regular payments over the six months prior to refinancing and missed at most one payment in the previous year. Nevertheless, as shown in panel B of figure 2, among HARP-eligible households in our sample, 88% had FICO scores in the prime range (above 680) and 60% had scores in the super-prime range (above 760) in December 2010. We still observe a general deterioration in their FICO scores (more than one-quarter of the HARP-eligible households fell below our significant score deterioration threshold), but these scores were still much better than those of households that failed to meet HARP's reunderwriting requirements. Of those, only 28% would be considered prime and 11% super prime in December 2010. In summary, although HARP did not require FICO scores, the vast majority of its eligible borrowers remained creditworthy.

Conclusion

Our findings suggest that as long as mortgage borrowers were making their payments, their credit scores generally remained quite high during the Great Recession and afterward. Over 90% of borrowers who had never missed a payment and whose FICO scores had been above 680 at mortgage origination retained their prime scores as of December 2010. Thus, the challenges that households faced in refinancing do not appear to be driven by credit quality reasons. Instead, other behavioral factors, such as inattention and inertia, have been posited as alternative explanations for households' failure to refinance.[8]

Policymakers responded to barriers to refinancing mortgages through a variety of measures, the efficacy of which is assessed by a growing literature.[9]

The findings here suggest that using recent mortgage performance as a proxy for creditworthiness was generally accurate; however, about a quarter of borrowers who remained current on their mortgages experienced deteriorating credit scores due to poor performance on other forms of credit and other financial obligations (e.g., rental and utility payments). The mortgage-payment-related requirements of HARP effectively screened out the low-FICO-score borrowers who may have been mostly likely to subsequently default, but who may also have needed the federal assistance most acutely.

Finally, our results shed new light on the persistence of credit scores over time. Recent industry reports have highlighted this persistence over various periods.[10] Our findings show that even during the Great Recession, high-score borrowers remained as such on average and that those who successfully made payments on their mortgages were especially likely to keep their scores out of subprime territory. Indeed, mortgage performance appears to be an especially strong indicator of score persistence.

[1] For details on HARP, which began in March 2009 and is now set to expire in December 2016, see http://www.harp.gov/About. In particular, HARP eligibility was limited to mortgages backed by Fannie Mae and Freddie Mac (see note 2).

[2] For more details on these two GSEs, see http://www.fhfa.gov/SupervisionRegulation/FannieMaeandFreddieMac/Pages/About-Fannie-Mae—Freddie-Mac.aspx.

[3] The FICO score—which ranges from 300 to 850—is the standard measure of consumer credit risk in the U.S. The higher the score, the more likely the borrower is to pay back his or her debt. For more details, see http://www.myfico.com/CreditEducation/CreditScores.aspx.

[4] For the definition of a CBSA, see http://www.census.gov/geo/reference/gtc/gtc_cbsa.html.

[5] Because FICO scores might go up or down a few points from month to month, a strict definition of FICO score deterioration as a score falling below what it was at mortgage origination would overstate the downward trend in FICO score. Hence, we define a significant deterioration/decline as a score dropping below what it was at origination by more than one standard deviation of the distribution of $(FICO_{t+1}/FICO_t)$, where t denotes the quarter of origination. This standard deviation allowance is calculated separately for each origination year.

[6] Yuliya Demyanyk and Otto Van Hemert, 2011, "Understanding the subprime mortgage crisis," *Review of Financial Studies*, Vol. 24, No. 6, pp. 1848–1880.

[7] In terms of regression estimates, a coefficient for a dummy that identifies those with missed payments suggests an average drop of 83 points in the FICO score. Including this dummy also doubles the explanatory power of the regression, with the R^2 increasing to 0.39. These results further highlight the importance of uninterrupted mortgage payments in explaining the evolution of borrower credit scores.

[8] See Benjamin J. Keys, Devin G. Pope, and Jaren C. Pope, 2014, "Failure to refinance," National Bureau of Economic Research, working paper, No. 20401, August, available at http://www.nber.org/papers/w20401, and Steffen Andersen, John Y. Campbell, Kasper Meisner Nielsen, and Tarun Ramadorai, 2015, "Inattention and inertia in household finance: Evidence from the Danish mortgage market," National Bureau of Economic Research, working paper, No. 21386, July, available at http://www.nber.org/papers/w21386.

[9] See, e.g., Sumit Agarwal, Gene Amromin, Souphala Chomsisengphet, Tomasz Piskorski, Amit Seru, and Vincent Yao, 2015, "Mortgage refinancing, consumer spending, and competition: Evidence from the Home Affordable Refinancing Program," National Bureau of Economic Research, working paper, No. 21512, August, available at http://www.nber.org/papers/w21512.

[10] See, e.g., http://www.equifax.com/assets/WFS/busting_cs_myths_wp.pdf and http://www.fico.com/en/blogs/risk-compliance/fico-score-distribution-remains-mixed.