

HARP Significantly Reduced Mortgage Default Rates

BY JUN ZHU

This commentary discusses the impact of the federal government's Home Affordable Refinance Program (HARP) on mortgage loan default rates between April 2009 and November 2011. We analyze a unique borrower-level data set from Freddie Mac and conclude that HARP more than halved the default rate, a material and significant improvement.

HARP was launched in April 2009 to stem the tide of mortgage loan defaults by helping borrowers refinance their mortgage loans. According to the Federal Housing Finance Agency's (FHFA's) May 2014 Refinance Report, about 3.2 million loans were refinanced through HARP from the program's inception to May 2014.¹ HARP was aimed at helping responsible borrowers with a high loan-to-value ratio (LTV) at the time of refinance move to a lower mortgage rate and, accordingly, lower monthly payments. Our analysis compares loans not assisted by the HARP program with HARP loans to estimate the impact of the HARP program.² Over the 30-month period, June 2009 to November 2011, the unadjusted default rate of eligible non-HARP loans was 3.88 percent and the unadjusted default rate of HARP loans was 1.52 percent over an average 15-month performance, resulting in an unadjusted "default improvement" of 2.36 percent. A logistic regression shows that HARP refinances decreased the estimated default rate from 3.25 percent to 1.52 percent, resulting in a logistic-model based "default improvement" rate of 1.73 percent, a 53 percent reduction in the rate of default in these loans.

Overview of the HARP Program

HARP was announced by the U.S. Department of the Treasury in 2009 as part of the federal government's housing relief programs. At that time,

mortgage rates had been dropping sharply. Typical mortgage credit policies, however, impose eligibility criteria that prevent borrowers whose loan amount exceeds the value of their property from refinancing without a significant pay-down of the loan balance. In response, the HARP program was devised to help borrowers with high LTV ratios and strong payment histories refinance their mortgages, typically lowering their monthly payment. The HARP program's aim was to stimulate the housing market and reduce default rates.

The original HARP program established in 2009, referred to as HARP I, included the following eligibility criteria: (1) Loans had to be owned or guaranteed by Fannie Mae or Freddie Mac; (2) loans had to be current for 12 months prior to the month of observation; (3) loans had to have a current LTV between 80 percent and 125 percent as of the month of observation; and (4) loans had to be purchased by Fannie Mae or Freddie Mac before June 2009.

Enhancements to HARP were announced October 24, 2011, to increase access to more underwater borrowers. The second version of the program, referred to as HARP II, modified two requirements: (1) The 125 percent current LTV ceiling was removed; and (2) the borrower was allowed one late payment in the prior 12 months, as long as it did not occur within 6 months prior to the refinance.³

According to the FHFA Refinance Report, as of May 2014, about 3.2 million refinances were completed through HARP. Of these 3.2 million HARP refinances, about 13 percent had LTVs greater than 125 percent at the time of refinance.

In the first five months of 2014, the total number of refinances with Fannie Mae and Freddie Mac was 595,000, with 113,000 loans refinanced under the HARP umbrella. While HARP participation has declined with rising interest rates, HARP significantly decreased default rates among those borrowers most apt to default, aiding a highly distressed housing market.

HARP Loans and Eligible Non-HARP Loans

Our empirical analysis is based on Freddie Mac loan-level data, which contain detailed information about loan and borrower characteristics at mortgage origination and monthly performance. We analyzed a data set consisting of HARP loans as well as eligible non-HARP loans. The HARP sample included Freddie Mac HARP I loans originated from June 2009 to November 2011. To construct the eligible non-HARP sample, we took a random subsample of Freddie Mac loans that satisfied the HARP I requirements in each month from June 2009 to November 2011. For instance, eligible non-HARP loans observed as of June 2010 had to be current each month from June 2009 to June 2010, and have a current LTV ratio between 80 and 125 percent as of June 2010.

Table 1 shows the origination year distribution for the examined HARP loans. The majority of loans refinanced through HARP were originated in 2004–08.

Table 1: Origination Year Distribution of Loans Refinanced through HARP

Year	Number of HARP Loans	Percent of Examined HARP Loans by Year of Origination
2000 and before	370	0.1
2001	1,106	0.2
2002	4,240	0.9
2003	14,019	3.1
2004	22,315	5.0
2005	58,847	13.1
2006	99,820	22.1
2007	126,329	28.0
2008	108,555	24.1
January–May 2009	15,131	3.4
Total	450,732	100.0

Table 2 shows the geographic distribution of all the loans in the sample. For both HARP and eligible non-HARP loans, concentrations were highest in California, Florida, Michigan, and Illinois. Of the top 10 states, New Jersey, Washington, and Virginia are on the HARP list but no loans from these states appear on the eligible non-HARP list.

Table 2: Top 10 States Based on Frequency of HARP and Eligible Non-HARP Loans

Rank	Eligible Non-HARP Loans		HARP Loans	
	State	Percent	State	Percent
1	CA	8.86	CA	12.09
2	FL	7.62	IL	7.75
3	MI	6.40	MI	5.62
4	IL	5.85	FL	5.17
5	OH	5.49	MN	5.08
6	GA	5.38	WA	4.99
7	TX	3.85	OH	4.44
8	MN	3.76	AZ	3.55
9	NC	3.42	NJ	3.27
10	AZ	3.20	VA	3.27

Table 3 compares sample averages of select variables for HARP and eligible non-HARP loans. To avoid confusion, variables determined at loan origination will be prefixed with the term “Original.” For HARP loans, variables determined in HARP participation months will be prefixed with “Current.” For eligible non-HARP loans, variables prefixed with “Current”

Table 3: Sample Means of Select Variables

	Eligible Non-HARP Loans	HARP Loans
Original Note Rate (%)	6.01	6.17
Original LTV (%)	81.11	78.42
Original UPB	\$190,000.00	\$230,000.00
Original FICO	723.00	729.00
Original Payment	\$1,111.91	\$1,409.49
Current DTI	36.90	38.00
Current UPB	\$180,000.00	\$220,000.00
Current LTV (%)	95.00	92.05

Note: This table compares the sample means of different variables of HARP and eligible non-HARP loans. DTI is the debt-to-income ratio. UPB is the unpaid principal balance. LTV is the loan-to-value ratio. FICO is the borrower’s credit score. Variables determined at loan origination are prefixed as “Original.” For HARP loans, variables determined in HARP participation months are prefixed with “Current.” For eligible non-HARP loans, variables prefixed with “Current” are determined at the time of observation, i.e., the month when they were added to the sample.

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Several things are worth noting. On one hand, HARP borrowers may be struggling more with their payments than the non-HARP borrowers: they have, on average, a higher payment, higher unpaid principal balance (UPB) and higher current debt-to-income ratio (DTI). For example, HARP loans have an average \$230,000 original UPB and \$220,000 current UPB, which are higher than those of eligible non-HARP loans. On average, the HARP borrower has a larger monthly payment than the eligible non-HARP borrower (\$1,409 versus \$1,112).

On the other hand, HARP borrowers may have a stronger base for recovery thanks to higher FICO scores and lower LTVs. HARP borrowers, on average, have a higher FICO score (729 versus 723) than that of eligible non-HARP borrowers. HARP loans also have a lower original LTV, compared with that of eligible non-HARP loans. Given that there are fixed costs with refinancing, it is not surprising that borrowers with higher UPBs are more apt to refinance.

Default Improvement for HARP Program

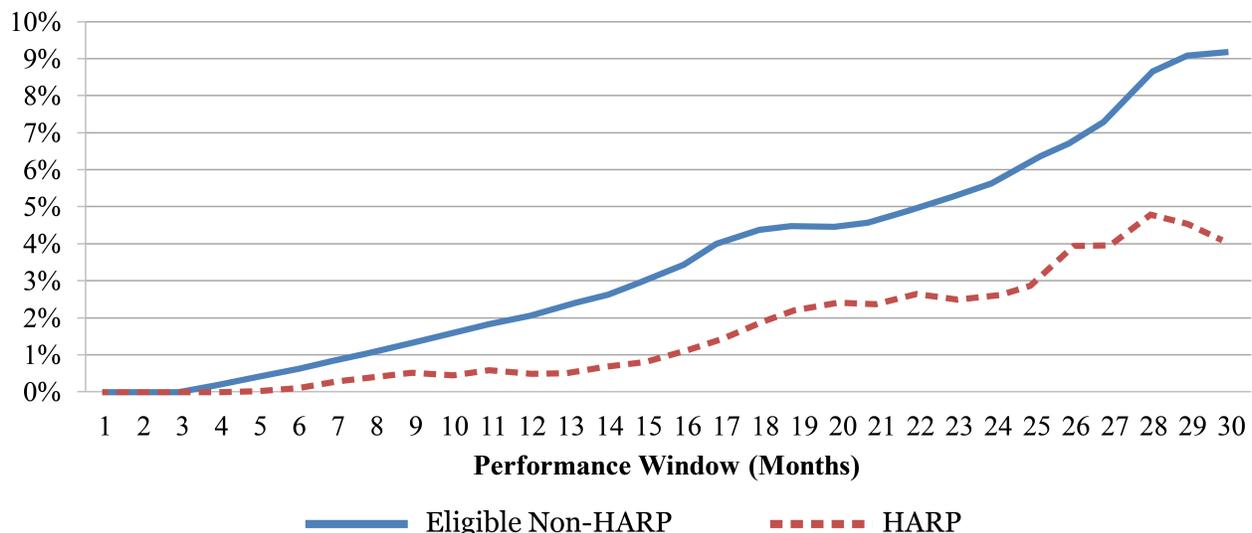
To better compare the default rates of HARP and non-HARP loans, we divided the samples into cohorts with comparable observed performance

windows. For example, loans that were refinanced under HARP or determined to be eligible for refinance in June 2009 were grouped as cohort 30, as they had a 30-month performance experience (from June 2009 to December 2011). Loans that were refinanced under HARP or determined to be eligible for refinance in November 2011 were grouped as cohort 1, as they had a 1-month performance experience. We divided the eligible non-HARP sample into 30 cohorts based on the month the loan was determined to be eligible. For both HARP and eligible non-HARP loans, we defined default as a borrower having experienced 3 or more cumulative months of missed payments, commonly referred to as “ever D90+.”

Figure 1 shows the default rates by performance cohort for both HARP and eligible non-HARP loans. Although default rates of both groups increase as the performance window lengthens, after two years the average default rate of HARP loans is between 3 and 5 percent, while the average default rate of eligible non-HARP loans is between 7 and 9 percent. It is clear that the HARP loans have materially lower default rates than the comparable non-HARP loans.

The average default rate for HARP loans is about 1.52 percent, and the average default rate for eligible non-HARP loans is about 3.88 percent. This yields a default improvement of 2.36 percent

Figure 1: Ever D90+ Rates by Performance Windows



(3.88 – 1.52). The default improvement is based on raw data without any adjustment.

To better understand the impact of the HARP program on default rates, we also ran a logistic regression on default rates, controlling for the effect of some of the other variables. Regression results are shown in table 4. First, notice that the HARP refinances indicator is negative and significant. That is, HARP loans are associated with a significantly lower probability of default, all else being equal.

Table 4: Basic Logistic Regression Result of Default

Parameter	Estimate	Standard Error
Intercept	-20.685	0.130
HARP	-0.810	0.013
Origination FICO	-0.005	0.000
Origination Units	0.079	0.009
Origination LTV	-0.002	0.000
Origination Note Rate	47.911	0.469
Origination UPB	-12.888	0.327
Current LTV	0.022	0.000
Current DTI	0.013	0.000
Current UPB	14.582	0.337
Current Unemployment	0.035	0.001
Cohort Dummies		Yes
Origination-Year Dummies		Yes
State Dummies		Yes
Mortgage-Type Dummies		Yes
Pseudo R-square		0.06

Second, these results also show that credit characteristics matter. For example, current LTV and current UPB are positively correlated with the probability of default. However, origination LTV and origination UPB are negatively significant. This may be a manifestation of loan characteristics' momentum. That is, for example, given current LTV, a borrower starting from a high LTV (and thus a borrower who has made improvements in LTV since origination) is less likely to default, whereas a borrower who has experienced increases in LTV from origination to the current period will be more likely to default. The current DTI ratio coefficient is positive and significant, consistent with conventional wisdom that a high DTI ratio is associated with greater difficulty making payments and greater likelihood of default. As expected, origination FICO is negatively associated with default probability. Higher FICO

tends to mean better credit history and a lower likelihood of default.

Based on these results, one can calculate a HARP treatment effect on the default rate; in other words, the predicted default rates if HARP loans had not been refinanced. The hypothetical default rate if HARP loans had not participated in HARP is 3.25 percent. The mean actual default rate of HARP loans is 1.52 percent, resulting in a model-based “default improvement” of 1.73 percent. Even though the model-based “default improvement” is lower than the raw “default improvement,” it still shows that HARP refinance significantly decreased default rates.

Conclusion

The HARP program was designed to help homeowners with high LTVs refinance their loans to a lower rate with hopes of reducing homeowner default rates. A close look at a unique data set of borrower-level mortgage information from Freddie Mac reveals that the HARP program more than halved the default rate, a material and significant improvement. The unadjusted default rate of eligible non-HARP loans is 3.88 percent and the unadjusted default rate of HARP loans is 1.52 percent over an average 15-month performance. The unadjusted “default improvement” is 2.36 percent. A logistic regression shows that HARP refinances decreased the estimated default rate from 3.25 percent to 1.52 percent, resulting in a logistic-model based “default improvement” of 1.73 percent. Overall, we find that HARP materially reduces default rates. The magnitude of the default reduction is large.

Endnotes

¹ See <http://www.fhfa.gov/AboutUs/Reports/Pages/Refinance-Report-May-2014.aspx> for more details.

² Jun Zhu (2012), “Refinance and Mortgage Default: An Empirical Analysis of the HARP’s Impact on Default Rates,” http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2184514&download=yes

³ Later enhancements augmented eligibility to include loans originated through May 31, 2009.



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