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# Evaluating the Benefits of a Streamlined Refinance Program

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## Summary*

Mortgage borrowers who have experienced employment disruptions as a result of the COVID- 19 pandemic are unable to refinance their loans to take advantage of historically low market rates. In this article, we analyze the effects of a streamlined refinance ("refi") program for government-insured loans that would allow borrowers to refinance without needing to document employment or income. In addition, we consider a cash-out component that would allow borrowers to extract some of the substantial housing equity that many have accumulated in recent years.

## Key Findings

1. Many borrowers could significantly lower their rates through a streamlined refinance program. As of June 19, 2020, the market rate for a 30-year fixed-rate loan was 115 basis points lower than the rate that the average Fannie Mae and Freddie Mac borrower pays and 91 basis points lower than the rate paid by the average Ginnie Mae borrower.

2. Most borrowers have accumulated substantial equity in their homes. The median Fannie Mae/Freddie Mac borrower has a mark-to-market loan-to-value (LTV) ratio of 50 percent, while the median Ginnie Mae borrower has an LTV of 65 percent.

3. A streamlined refi program that holds mortgage balances constant would lower monthly payments for the average Fannie Mae/Freddie Mac (Ginnie Mae) borrower by approximately $280 ($200) while decreasing default risk by 44 percent (38 percent).

4. A streamlined cash-out program that holds payments constant and allows loan balances to increase would generate an average of $54,000 ($35,000) for Fannie Mae/Freddie Mac (Ginnie Mae) borrowers while increasing default risk by 31 percent (26 percent).

5. A hybrid program that holds default risk constant would reduce average payments for Fannie Mae/Freddie Mac (Ginnie Mae) borrowers by $96 ($93) and generate approximately $38,000 ($23,000) in cash-out payments.

The COVID-19 pandemic has resulted in lower interest rates in general and lower mortgage interest rates in particular. The 3.15 percent 30-year fixed rate recorded in the Freddie Mac survey for the week of May 25, 2020, was the lowest since the survey began in 1971. Unfortunately, another effect of the pandemic has been unprecedented job losses: From February through May, employment fell by almost 20 million jobs, and the share of adults with jobs fell from 61.1 percent to 52.8 percent. Since a stable source of income is a key component of most successful loan applications, many American families cannot take advantage of low mortgage rates. However, American households are unusually well positioned for credit access with respect to another key underwriting variable: equity. As figure 1 shows, American households have almost $20 trillion in equity, or almost 1.2 times their annual disposable income. It is easy to see why a lender would be reluctant to make a loan to a new borrower who is furloughed or unemployed.

But doing so for an existing borrower, with a mortgage that is already on the books, is a different story. In fact, one can reasonably argue that as long as the new monthly payment drops, the new mortgage is at lower risk of default compared with the previous loan. Empirical evidence shows that indeed, a decline in monthly mortgage payments, all else being equal, significantly reduces the risk of mort- gage default (Fuster and Willen, 2017;

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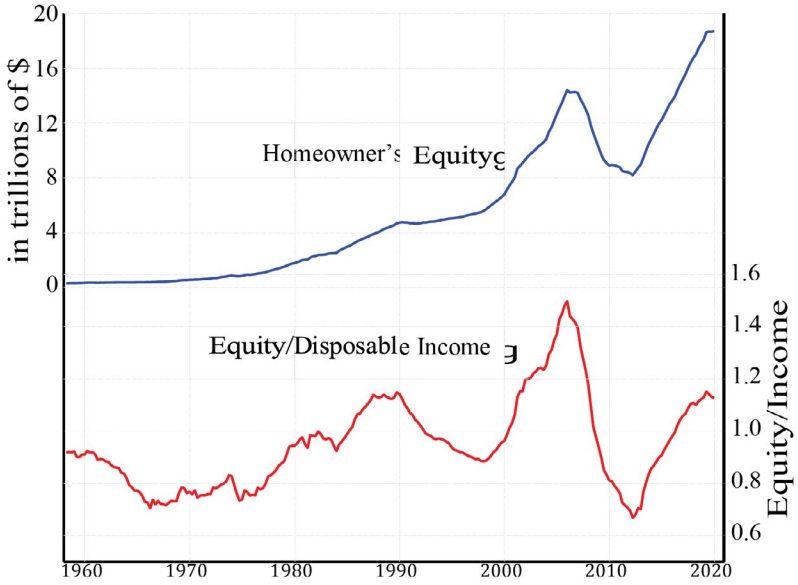
Di Maggio et al., 2017; and Abel and Fuster, 2019). This lower risk is especially true for loans insured by Fannie Mae/Freddie Mac, the Federal Housing Administration (FHA), orthe US department of Veterans Affairs (VA), organizations that are the focus of this paper. Since these agencies already provide insurance against default risk, allowing lenders to refinance existing loans and then purchasing and insuring the new loans would reduce the risk of their portfolios.

**FIGURE 1:**

*Aggregate Housing Equity*




*Notes: Homeowners' Equity is taken from the Flow of Funds, while disposable income here is Personal Disposable Income from NIPA.*

In this article, we analyze the potential effects of a streamlined refinance program with zero closing costs[1] that would allow borrowers with existing loans insured by the federal government to take advantage of lower rates and reduce their monthly mortgage payments, without needing to verify their employment and/or income. There is precedent for such a program. The Home Affordable Refinance Program (HARP), which was implemented by the Federal Housing Finance Agency (FHFA) in early 2009 in response to the global financial crisis, was predicated on similar logic. While not verifying employment or income might seem risky, as mentioned above, refinances are solely for existing borrowers who already present a default risk and for whom lower payments would reduce that risk. Furthermore, given that we do not know how long people will remain furloughed or unemployed, a refinance would have the additional benefit of reducing a borrower's mortgage payments for the remaining term of the loan, providing them with a more extended form of relief than a six- to twelve month forbearance.

We begin with a simple, streamlined refinance program, akin to HARP, and measure the change in mortgage rates, monthly payments, and default risk of borrowers with loans insured by Fannie Mae, Freddie Mac, and Ginnie Mae. Many of these borrowers, as of March 2020 (our most current month of data), had loans with interest rates well above current market levels. Assuming that Fannie and Freddie borrowers refinance into

1 HARP allowed borrowers without enough cash to cover closing costs to roll those costs into their new loan (see ***https://www.fhfaoig.gov/Content/Files/EVL-2013-006.pdf***). Assuming zero closing costs is a simplifying assumption, but it is not an unreasonable one since they are typically a relatively small percentage of the principal balance. Rolling closing costs into principal balances would slightly increase monthly payments and reduce potential cash-out payments by 2 percent to 5 percent.

loans with the same remaining maturity length as those of their current mortgages[2], we find that the median borrower would be able to lower their rate by more than 90 basis points, which would correspond to a decrease of approximately $80 in their monthly payment. Allowing borrowers to fully recast their loan terms would result in even larger effects, as the median payment would fall by about $230. The payment decreases are slightly smaller for the median Ginnie Mae borrower, at $58 and $162, respectively. We then use estimates from Fuster and Willen (2017) to map the payment changes into effects on the probability of default and find that the default hazard for the median Fannie Mae and Freddie Mac (Ginnie Mae) borrower would fall by 17 percent (14 percent) when the loan maturity is kept constant, and 37 percent (33 percent) if the maturity is recast.

While these payment reductions are nontrivial, they are unlikely to be of much assistance to borrowers experiencing severe income disruptions from job losses. Those borrowers likely need significantly more relief. One viable option for distressed borrowers would be to tap into their housing equity. The combination of large equity cushions and low interest rates should provide a cheap source of secured credit for financially distressed borrowers to smooth their consumption during the pandemic, either through cash-out refinances or home equity lines of credit (HELOCs). However, many borrowers face the same impediment to accessing home equity as they do to obtaining lower rates: the inability to show a stable source of income.

Therefore, we extend our analysis of a streamlined refinance program to include a cash out component. Specifically, we consider two types of cash-out schemes. The first scheme allows borrowers to withdraw housing equity subject to two limits: The monthly payment cannot increase, and the loan-to-value (LTV) ratio of the new loan cannot exceed 90 percent. We estimate that the median Fannie Mae and Freddie Mac borrower would be able to take approximately $13,000 in cash-out payments if the loan maturity is held constant at its current level and more than $45,000 if the loan maturity returns to its original level. The cash-out amounts are lower for Ginnie borrowers—$8,000 and $30,000, respectively since they do not have as much housing equity.[3] Although many financially distressed borrowers would undoubtedly benefit from the increased cash flow from such a policy, on average it would increase the default risk of the government's loan portfolio, as the increased loan balances would more than offset the interest rate declines, resulting in higher monthly mortgage payments. We estimate that under this plan default rates would increase about 30 percent (that is, by a factor of 1.3).

Thus, in a second scheme, we reduce the cash-out amount to ensure that the default risk of the new loan equals the default risk of the current loan (while also maintaining the 90 percent LTV cap). We refer to this as the "iso-default" cash-out level, since it is the amount of cash that can be extracted without changing the default risk of the loan. Under this policy, the median Fannie Mae and Freddie Mac (Ginnie Mae) borrower could take out approximately $9,000 ($6,000) if the loan maturity is held constant at its current value and more than $30,000 ($18,000) by recasting the maturity of the loan to its original level.

One way to view such a refinance policy is as an alternative to forbearance, the primary relief option currently available to borrowers. The Coronavirus Aid, Relief, and Economic Security (CARES) Act, which was passed by Congress in March 2020 to address COVID- 19 economic disruptions, gives homeowners with federally insured mortgages the option to forbear or defer their mortgage payments for as long as 12 months. Through the end of May 2020, more than 8 percent of mortgage borrowers had signed up for a forbearance plan[4], but substantially fewer had chosen to actually forgo making their monthly payment. According to the McDash Flash Forbearance Tracker, 46 percent of borrowers in forbearance in April and 22 percent of borrowers in May made their monthly payments.[5]

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2 This is not uncommon. For example, Quicken Loans offers a choice of term that allows borrowers to match their current remaining loan term. See ***https://www.quickenloans.com/home-loans/custom-mortgag e-yourgage***.

3 On average, Ginnie Mae borrowers have higher LTVs at origination. Of loans outstanding as of February 2020, the median origination LTV for Ginnie Mae loans was 96 percent, compared with 75 percent for Fannie Mae/Freddie Mac borrowers.

4 According to a weekly survey run by the Mortgage Bankers' Association (MBA), 8.5 percent of borrowers were in forbearance plans as of May 31: ***https://www.mba.org/2020-press-releases/june/share-of-mortgage-loans-in-forbearance-increases-to-853***. However, that includes forbearance on private market loans. Forbearance rates on Fannie Mae/Freddie Mac (Ginnie Mae) loans were 6.4 percent (11.83 percent).

5 See ***https://www.blackknightinc.com/blog-posts/number-of-forbearance-plans-falls-for-first-time-since-crisis-began/***.

A streamlined refi program has advantages and disadvantages compared with forbearance. Administrative costs of forbearance are minimal, whereas refinances can be expensive, although in theory the nature of streamlined refinance should reduce those costs. On the other hand, simply signing up for a forbearance plan can make it impossible for a borrower to refinance.[6] Borrowers in forbearance cannot take advantage of low interest rates until forbearance ends, meaning that they will accrue interest at a high rate and run the risk that when they are ready to refinance, rates will have returned to pre-crisis levels. A borrower who signs up for forbearance but chooses to continue making payments may get the worst of both worlds: no relief and no ability to take advantage of low rates. Another issue with forbearance is that borrowers appear to have a strong aversion to skipping monthly payments, even when it is in their interests to do so.[7] Some borrowers would do a cash-out refinance but eschew forbearance for moral reasons, even though the economic implications are similar.

# Background and Data

## HARP AND OTHER GOVERNMENT STREAMLINED REFINANCES

HARP was announced by the U.S. Department of Treasury in March 2009 and applied to loans that were guaranteed by Fannie Mae or Freddie Mac before June 2009. The purpose was to allow homeowners who had mark-to-market LTVs above 80 percent to take advantage of low prevailing mortgage rates. Before HARP, borrowers with LTVs between 80 percent and 100 percent could refinance into a Fannie Mae/Freddie Mac loan only by obtaining private mortgage insurance, while borrowers with negative equity (that is, LTVs above 100 percent) were unable to refinance at all. There were a few eligibility requirements of HARP. Borrowers had to be current on their payments, with no late payments in the previous six months, and no more than one late payment in the previous year. An LTV cap was initially set at 105 percent, but that cap increased to 125 percent in September 2009 and was completely eliminated in June 2012. Finally, borrowers were allowed to use the program only once.[8]

The underwriting process for HARP also evolved over time; manual underwriting requirements were eliminated, and documentation for borrower income was relaxed in 2012. In addition, Fannie Mae/Freddie Mac acquisition fees (loan-level pricing adjustments) were substantially decreased. Finally, representations and warranties were eliminated in January 2013, so the originator had no liability in the event of a subsequent default. Altogether, approximately 3.5 million loans were refinanced through HARP before the program ended in 2018. There is evidence that the program had beneficial effects by reducing mortgage default and increasing consumer spending (Agarwal et al., 2015; Karamon, McManus, and Zhu, 2017; and Abel and Fuster, 2019). Although HARP applied only to Fannie Mae and Freddie Mac loans, the two principal Ginnie Mae loan programs—the Federal Housing Administration (FHA) and Department of Veteran Affairs (VA)—have had their own streamlined refinance programs for some time. FHA began its Streamline Refinance (SLR) program in 1982.[9] Like HARP, the SLR does not place any limits on the borrower's mark-to-market LTV, so borrowers with negative equity can use the program. Unlike HARP, the SLR does allow borrowers to extract equity, however, the cash-out amount is capped at $500. The program traditionally did not require updated credit report information, verification of income and assets, or an updated property appraisal. However, a major policy change in 2009 required SLR borrowers to document employment and income.[10]

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6 See ***https://www.cnbc.com/2020/05/12/coronavirus-some-homeowners-getting-mortgage-bailouts-by- mistake.html***.
7 See Gerardi et al. (2018).
8 The official HARP announcement and links to additional program details can be found here: ***https:// www.treasury.gov/press-center/press-releases/Pages/200934145912322.aspx***.
9 See ***https://www.hud.gov/sites/documents/82-23ML.TXT*** for formal announcement of the program.
10 Another change prevented borrowers with high LTVs from rolling closing costs into the balance of the new loan. For more details on the SLR and an analysis of these policy changes on borrower outcomes, see DeFusco and Mondragon (2020).

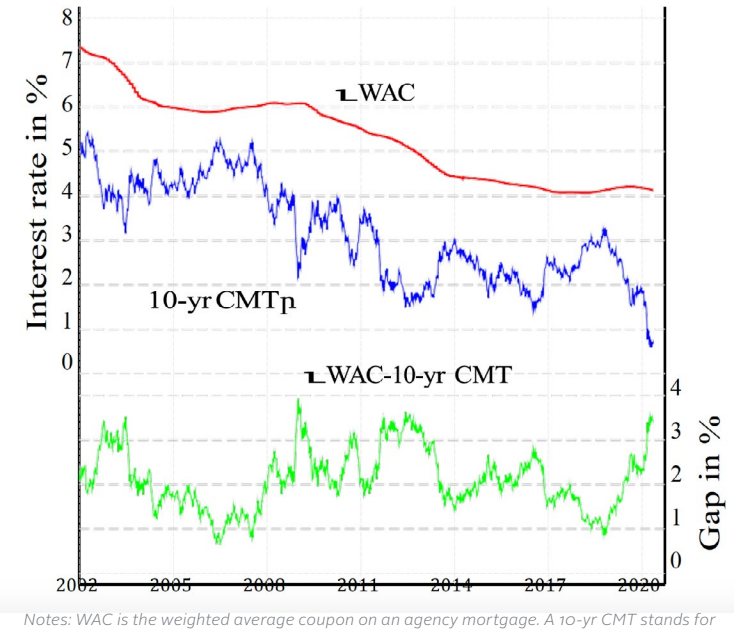
The VA streamlined refinance program is called the interest rate reduction refinance loan (IRRRL). The IRRRL program functions similarly to the SLR. It does not allow cash-out payments, but like the SLR, it allows borrowers to roll closing costs ("funding fee") into the loan balance.[11]

## CURRENT REFINANCE ENVIRONMENT

Figures 1 and 2 illustrate that borrowers have big incentives to refinance right now. Figure 2 shows that the weighted average coupon (WAC) on an existing agency mortgage is still over 4 percent, or more than 3 percentage points higher than the return on a 10-year constant- maturity Treasury (CMT) bond. The gap between the WAC and 10-year CMT has not been that big since early in the last decade, in the immediate aftermath of the financial crisis. In addition, Figure 1 shows that homeowners have almost $20 trillion in equity in their homes. Though large in absolute terms, equity is also high relative to income. To be sure, it has not reached the heights attained in the last cycle, however, homeowners have had this much equity relative to income on only a few occasions over the previous 60 years. Figure 3, displaying the MBA refinance index, shows that despite these large refinancing incentives, borrowers are not refinancing as much as they have in previous periods of low rates. At the beginning of March, borrowers did refinance at historically high levels, but they have since settled down to a rate considerably lower than the peaks observed in the early 2010s and nowhere near the levels observed in the early 2000s. As mentioned above, negative equity was the friction preventing borrowers from refinancing in the 2010s. In contrast, the current friction preventing many borrowers from refinancing and taking advantage of low rates is employment/income loss. However, the logic behind the original HARP still holds. Fannie Mae, Freddie Mac, and Ginnie Mae already hold the credit risk, so allowing borrowers to streamline refinance without documenting employment and income will decrease rather than increase credit risk.

**FIGURE 2:**

*Incentives to Refinance*

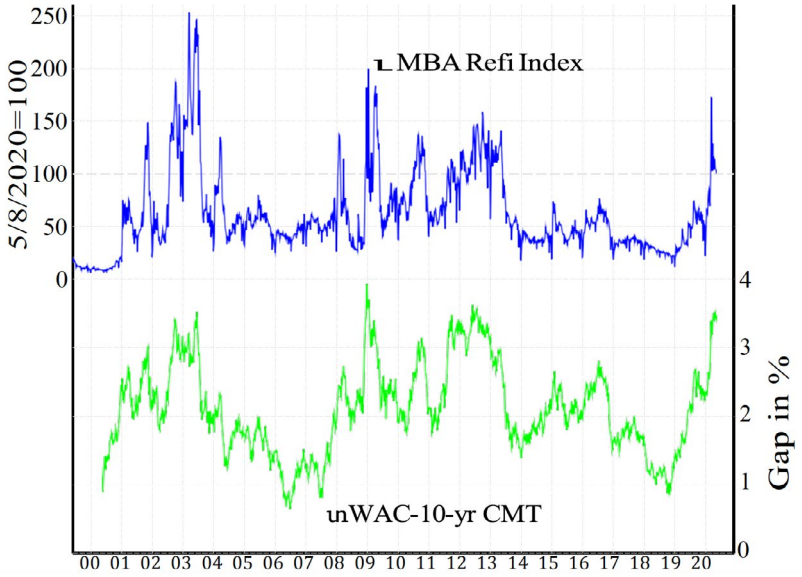



*Notes: WAC is the weighted average coupon on an agency mortgage. A 10-yr CMT stands for the 10-year Treasury constant maturity rate.*
*Source: JP Morgan*

11 Further details can be found at ***https://www.va.gov/housing-assistance/home-loans/loan-types/interest-rate-reduction-loan/.***

**FIGURE 3:**

*Refinances and WAC*




*Notes: Refinance index comes from the MBA and is normalized to 100 for the most recent observation. WAC is the weighted average coupon on an agency mortgage. 10-yr CMT stands for the 10-year Treasury constant maturity rate.*

## DATA AND SUMMARY STATISTICS

We conduct the analysis using a 1 percent sample of mortgages in the Black Knight McDash servicing database that are insured by either Fannie Mae, Freddie Mac, or Ginnie Mae, and that were reported to be active in February 2020 (the most recent month of data available to us).[12] The full force of the COVID-19 pandemic did not hit the United States until mid- to late March, and thus the equity distributions that we report below do not reflect any pandemic-related housing price dynamics, and the summary statistics do not account for borrowers who have refinanced since February.

Table 1 displays summary statistics for our mortgage sample. We separate Fannie Mae and Freddie Mac loans (Panel A) from Ginnie Mae loans (Panel B), as we conduct our analysis for the two loan types separately below. LTV is mark-to-market, which we calculate by using the most up-to-date reported loan balance and then updating the house value using the cumulative growth (since mortgage origination) in the corresponding CoreLogic county- level repeat sale price index.[13]

Three facts stand out in the table. First, most borrowers have significant equity in their homes. Both the Fannie Mae/Freddie Mac mean borrower and median borrower have LTVs of only 50 percent, while 90 percent have LTVs of less than 76 percent. The low LTV distribution reflects the fact that Fannie Mae/Freddie Mac LTVs are typically low at origination (FHA usually offers better rates for high LTV loans). In addition, as the bottom row in Panel A shows, the median borrower has enjoyed more than five years of strong house price appreciation.[14] While the mean and median Ginnie Mae borrowers have less equity relative to their Fannie/

12 After cleaning, we have 127,338 loans, of which 92,037 are Fannie Mae or Freddie Mac and 35,301 are Ginnie Mae.

13 So far, there is little evidence of any significant decline in house prices due to the COVID-19 pandemic. A decline in house prices would, of course, alter this calculation.

14 House price appreciation has, thus far, continued during the COVID-19 pandemic. For example, the Case-Shiller 20-City Composite Index increased from 219.86 in February to 222.21 in March (***https://us.spi ndices/indicators/sp-corelogic-case-shiller-20-city-composite-home-price-nsa-index#overview***.)

Freddie counterparts, they still have significant amounts in absolute terms (mean LTV of 64 percent and median LTV of 65 percent).

**TABLE 1:**

*Summary Statistics*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Panel A: Fannie Mae and Freddie Mac Loans** | | | | | | | |
| | **Mean** | **10%** | **25%** | **Median** | **75%** | **90%** | **95%** |
| Loan Amount in thousand $ | 184 | 65 | 101 | 162 | 246 | 336 | 386 |
| LTV in % | 50 | 25 | 36 | 50 | 64 | 76 | 82 |
| Interest Rate in % | 4.3 | 3.38 | 3.75 | 4.12 | 4.75 | 5.38 | 5.88 |
| 30 year | 4.45 | 3.62 | 3.88 | 4.25 | 4.75 | 5.5 | 6 |
| 15 year | 3.45 | 2.88 | 3 | 3.38 | 3.75 | 4.12 | 4.38 |
| Monthly Payment in $ | 1147 | 480 | 688 | 1026 | 1493 | 1957 | 2286 |
| Loan Age (in months) | 71 | 21 | 37 | 66 | 91 | 124 | 172 |
| **Panel B: Ginnie Mae Loans** | | | | | | | |
| | **Mean** | **10%** | **25%** | **Median** | **75%** | **90%** | **95%** |
| Loan Amount in thousand $ | 158 | 65 | 93 | 135 | 199 | 278 | 343 |
| LTV in % | 64 | 42 | 52 | 65 | 77 | 86 | 91 |
| Interest Rate in % | 4.24 | 3.38 | 3.75 | 4 | 4.75 | 5.38 | 5.75 |
| 30 year | 4.26 | 3.38 | 3.75 | 4.12 | 4.75 | 5.38 | 5.75 |
| 15 year | 3.42 | 2.88 | 3 | 3.38 | 3.75 | 4 | 4.25 |
| Monthly Payment in $ | 903 | 420 | 573 | 792 | 1109 | 1519 | 1834 |
| Loan Age (in months) | 73 | 22 | 40 | 72 | 98 | 124 | 139 |

*Notes: The underlying data is a 1 percent sample of active loans as of February 2020 in the Black Knight McDash servicing database. The sample is further restricted to 15- and 30-year fixed-rate mortgages with investor type equal to Fannie Mae or Freddie Mac (Panel A) and Ginnie Mae (Panel B). The LTV is mark- to-market, which is calculated using county-level CoreLogic repeat sale price indices. Source: Black Knight McDash Data, CoreLogic Solutions, authors' calculations.*

Second, Table 1 shows that borrowers are paying high interest rates relative to what is available in the market. The MBA May 29, 2020, application survey shows conventional (that is, Fannie Mae/Freddie Mac) rates of 3.37 percent and 2.85 percent for 30- and 15- year fixed-rate mortgages, respectively, and 3.46 percent for FHA 30-year fixed-rate loans, meaning that about 90 percent of the borrowers in our sample could get a lower rate and, for the median borrower, the reduction would be quite dramatic.[15] The median 30-year fixed-rate mortgage (FRM) borrower could get a rate almost 90 basis points lower than they currently pay.

## Results

We evaluate three potential refinance policies. The first is a HARP-like program that aims to minimize monthly payments while keeping loan balances constant. This program would unequivocally lower default risk. The

15 The MBA survey produces an index rate slightly different from the index rate produced by the Freddie Mac survey mentioned in the introduction, but we use the MBA here because it includes FHA loans. It is also important to note that there is no risk-based pricing in the FHA and VA programs. There are loan- level pricing adjustments (LLPAs) for GSE mortgages that borrowers with relatively lower credit scores and higher LTV ratios typically have to pay; however, we assume that these LLPAs would not be applied to the streamlined program that we consider below.

second aims to increase household liquidity by allowing cash-out refis with an LTV as high as 90 percent, which would raise default risk. The third program is a hybrid between the first two policies—cash-out payments and a reduction in monthly payments—that would hold the risk of default constant at pre-COVID-19 levels.

## MINIMIZING MONTHLY PAYMENTS

The first policy follows the original HARP program quite closely and seeks to minimize monthly payments by refinancing borrowers into lower rates while keeping the mortgage balances constant. Borrowers refinance into the same type of loan they had previously (15- year FRM to 15-year FRM) and do not receive any cash-out payment. We set the interest rates to $r_{30}$ = 3.3 percent and $r_{15}$ = 2.8 percent for 30-year and 15-year mortgages (roughly consistent with the Freddie Mac survey at the end of May 2020). We consider two different assumptions with respect to the maturity of the new loans. First, we assume that the maturity is reset to its original length, so that a 30-year FRM with a term of 22 years remaining is reset to 30 years. In a second set of calculations, we assume that the loan maturities are not recast but are instead set at the length of the remaining terms (that is, a 30-year FRM with a term of 22 years remaining is refinanced into a FRM with a 22-year maturity). Finally, we assume, as with the HARP program, that there are no closing costs, borrowers need not document income or assets, and there is no cap on the LTV ratio.

We display the effects of this refinance program on the distribution of monthly payments in the first row of Tables 2 and 3 in columns (1) through (3) for Fannie Mae/Freddie Mac and Ginnie Mae borrowers, respectively.[16] Panel A in each table assumes that the maturities are recast, while Panel B holds the maturities constant. In Panel A of Table 2, the mean Fannie Mae/Freddie Mac borrower receives a monthly payment reduction of just

**TABLE 2:**

*Summary of Streamlined Refinance Experiments: Fannie Mae and Freddie Mac Loans*

| | Payment Change (in $/month) | | | Cash Out (in thousands of $) | | | Default Hazard (relative to base) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: Assume Full Recast of Loan to Original Term** | | | | | | | | | |
| | **Mean** | **Median** | **90%** | **Mean** | **Median** | **90%** | **Mean** | **Median** | **90%** |
| (1) Minimum Payment | -283 | -229 | -522 | — | — | — | 0.56 | 0.63 | 0.78 |
| (2) Max Cash Out | — | — | — | 54.3 | 45.6 | 101.7 | 1.31 | 1.27 | 1.63 |
| (3) Iso-default | -96 | -80 | -174 | 37.8 | 30.4 | 73.0 | — | — | — |
| (3a) $r_{30}$ = 2.5%, $r_{15}$ = 2.0% | -136 | -117 | -244 | 50.8 | 43.1 | 93.2 | — | — | — |
| **Panel B: Assume No Change in Termination Date** | | | | | | | | | |
| | **Payment Change (in $/month)** | | | **Cash Out (in thousands of $)** | | | **Default Hazard (relative to base)** | | |
| | **Mean** | **Median** | **90%** | **Mean** | **Median** | **90%** | **Mean** | **Median** | **90%** |
| (1) Minimum Payment | -97 | -78 | -199 | — | — | — | 0.82 | 0.83 | 0.94 |
| (2) Max Cash Out | — | — | — | 16.5 | 12.9 | 35.4 | 1.09 | 1.08 | 1.21 |
| (3) Iso-default | -37 | -24 | -81 | 11.1 | 8.9 | 23.1 | — | — | — |
| (3a) $r_{30}$ = 2.5%, $r_{15}$ = 2.0% | -69 | -49 | -143 | 20.9 | 17.9 | 40.0 | — | — | — |

*Notes: In the baseline calculations, borrowers with 30-year fixed-rate mortgages refinance at $r_{30}$ = 3.3 percent and those with 15-year fixed-rate mortgages refinance at $r_{15}$ = 2.5 percent. For Panel B, no change in termination date implies that a borrower with* n *years left on their 30-year mortgage refinances into a new* n *year mortgage.*

*Source: Authors' calculations using Black Knight McDash Data.*

16 Details of a selection of the calculations are in Section 1 of the appendix.

**TABLE 3:**

*Summary of Streamlined Refinance Experiments: Ginnie Mae Loans*

| | Payment Change (in $/month) | | | Cash Out (in thousands of $) | | | Default Hazard (relative to base) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: Assume Full Recast of Loan to Original Term** | | | | | | | | | |
| | **Mean** | **Median** | **0%** | **Mean** | **Median** | **0%** | **Mean** | **Median** | **0%** |
| (1) Minimum Payment | -197 | -162 | -359 | — | — | — | 0.62 | 0.67 | 0.82 |
| (2) Max Cash Out | — | — | — | 35 | 29.5 | 70.5 | 1.26 | 1.26 | 1.65 |
| (3) Iso-default | -93 | -73 | -176 | 22.9 | 18.7 | 47.4 | — | — | — |
| (3a) $r_{30}$=2.5%, $r_{15}$=2.0% | -138 | -110 | -256 | 31.2 | 27 | 60.9 | — | — | — |
| **Panel B: Assume No Change in Termination Date** | | | | | | | | | |
| | **Payment Change (in $/month)** | | | **Cash Out (in thousands of $)** | | | **Default Hazard (relative to base)** | | |
| | **Mean** | **Median** | **0%** | **Mean** | **Median** | **0%** | **Mean** | **Median** | **0%** |
| (1) Minimum Payment | -73 | -58 | -153 | — | — | — | 0.84 | 0.86 | 0.99 |
| (2)Max Cash Out | — | — | — | 9.8 | 8.4 | 22.3 | 1.06 | 1.07 | 1.2 |
| (3) Iso-default | -38 | -21 | -81 | 6.3 | 5.5 | 14.6 | — | — | — |
| (3a) $r_{30}$=2.5%, $r_{15}$=2.0% | -73 | -47 | -155 | 13.1 | 12 | 25.2 | — | — | — |

*Notes: In the baseline calculations, borrowers with 30-year FRMs refinance at $r_{30}$ = 3.3 percent and those with 15-year FRMs refinance at $r_{15}$ = 2.5 percent. For Panel B, no change in termination date implies that a borrower with n years left on their 30-year mortgage refinances into a new n year mortgage.*

*Source: Authors' calculations using Black Knight McDash Data.*

over $280. The distribution is slightly skewed, as the median borrower receives less ($230) while 10 percent of borrowers receive a reduction of more than $520. In Panel B, we see that the payment reductions are significantly smaller when the maturities are not reset, which is not surprising given the high average age of the loan in our sample (see the bottom row in Panel A of Table 1). In this scenario, the median payment reduction is only $78, while the mean is $97.

In Table 3 we see that the payment reductions are lower for Ginnie Mae borrowers. Assuming that maturities are recast, the mean (median) Ginnie Mae borrower is able to lower their payment by $197 ($162). When maturities are held constant, the average (median) payment decreases by $73 ($58). The smaller payment reductions for Ginnie Mae loans are the result of two factors, which can be seen in Table 1: lower initial principal balances and lower initial rates.

In addition to providing increased cash flow for borrowers, refinancing affects default risk, which matters to both borrowers and lenders. We estimate the effect of refinancing on default risk by using estimates from Fuster and Willen (2017) to build a very simple model of default.[17] Roughly, our model says that a 1 percentage point reduction in the ratio of monthly payment to loan balance reduces the default hazard 30 percent (that is, from 1.0 to 0.7), and a 10 percentage point increase in LTV increases the default hazard by about 20 percent (for example, from 1.0 to 1.2).[18]

Columns (7) through (9) in the first row of Tables 2 and 3 show the change in the distribution of monthly default hazards from the HARP-like refinance policy. When we assume that maturities are reset, default risks

17 Fuster and Willen (2017) estimate the treatment effect of payment changes by focusing on a sample of borrowers who received large payment reductions when payments on their adjustable rate mortgages fell in 2010. They also estimate the effect of LTV by measuring the differences in default hazards for borrowers with different mark-to-market LTVs while controlling for origination LTV.

18 Further details are located in the appendix.

associated with mean and median Fannie Mae/Freddie Mac mortgages each fall by about 40 percent. If we do not recast the maturities, the decline in default risk is lower, since the monthly payments do not decrease by nearly as much. In that case, the default hazard of the median (mean) Fannie Mae/Freddie Mac loan decreases by 17 percent (18 percent). The corresponding default hazard effects for Ginnie Mae loans displayed in Table 3 are slightly smaller since the payment declines are smaller. The mean (median) Ginnie loan experiences a 38 percent (33 percent) decline in the default hazard when maturities are recast and a 16 percent (14 percent) decline when maturities are held constant.

## MAXIMIZING CASH-OUT PAYMENTS

In a more traditional economic contraction, a $280 increase in spending power might be an effective tool once it is magnified by an appropriate multiplier. However, in the current situation, the value of a flow payment reduction might be more limited. Given the severe restrictions on economic activity, many households simply cannot spend more, so $280 would have little to no effect. At the same time, other households cannot supply basic subsistence needs, so $280 would not help much. To address this, we consider, as shown in row (2) of Tables 2 and 3, a second experiment in which we maximize household cash by keeping the monthly payment the same and using the reduced interest rate to increase the loan balance and generate cash-out payments. This experiment deviates from the original HARP and the VA's IRRRL program, which did not allow any cash-out payment, as well as from the SLR program, which caps cash-out at $500. We allow borrowers to extract equity until their LTV reaches 90 percent. [19]Again, we reset loan maturities back to their initial levels in Panel A, while we hold maturities constant in Panel B. We report statistics from the distribution of maximum cash-out amounts in columns (4) through (6) and the distribution of the change in default hazards in columns (7) through (9).

We estimate that the average (median) household in the Fannie Mae/Freddie Mac sample could take out a maximum of $54,300 ($45,600). However, most of this is driven by extended amortization, as the effect of the interest rate alone, shown in Panel B of Table 2, is only $16,500 ($12,900). The cash-out numbers are lower across the board for the Ginnie Mae borrowers. As shown in Table 3, the average (median) household in the Ginnie Mae sample could take out $35,000 ($29,500) if maturities are recast, and $9,800 ($8,400) if maturities are held constant.

While generating substantial resources for borrowers, this cash-out maximizing plan leads to substantial increases in default risk. Under the maturity reset policy, the default hazard associated with the average Fannie Mae/Freddie Mac (Ginnie Mae) loan increases more than 30 percent (25 percent). The tables makes it clear that the greater the benefit to the borrower, the greater the increase in default risk, as the average default hazard increases by more than 60 percent for the 10 percent of Fannie/Freddie borrowers who could take more than $100,000 in cash-out payments. Thus, there is a reasonable argument that such a plan goes against the basic idea that the government agencies should ignore the risks because they already hold them.[20]

## AN ISO-DEFAULT POLICY

The third and final policy experiment that we evaluate is a hybrid between the first two policies. In this experiment, we calculate what we call the "iso-default" level of cash-out payments that keeps default risk constant for each borrower. Since default risk is monoton- ically increasing in leverage and decreasing in payment size, the iso-default level of cash-out payments will always be lower than the maximum amount that we calculated under the previous policy experiment. Table 2 shows that minimizing the payment reduces

19 LTVs of 90 percent are not uncommon, especially for FHA borrowers. Although there is a concern that such a high LTV has less of a cushion against declines in house prices, so far during the COVID-19 pandemic, house prices have continued to rise (see footnote 14).

20 There is also a concern that borrowers could "strategically" choose to use the extracted funds for purposes other than making their mortgage payments, leaving the GSEs and FHA/VA on the hook for the higher principal balance. However, we think the risk of this is small. As discussed in the introduction, all evidence points to borrowers making their mortgage payments even when doing so is not in their best interest.

default risk by about 40 percent for the median Fannie Mae/Freddie Mac loan. Our model says that a 10 percentage point increase in LTV increases the default hazard by about 20 percent. To be sure, the increase in loan balance also increases the payment and the default rate. However, as row (3) of Table 2 shows, the median Fannie Mae/Freddie Mac borrowers can reduce payments by about $80 per month and take out more than $30,000 in cash without increasing default risk for Fannie Mae and Freddie Mac. Row (3) of Table 3 shows that the median Ginnie Mae borrower can take out almost $19,000 in cash and reduce payments by just over $70 without an increase in default risk.[21]

## Discussion

One aspect of the above analysis that is worth spending a bit more discussion on is what to assume about the interest rate that borrowers in a streamlined refinance plan could obtain.[22] In our baseline specification, we assume that borrowers pay a rate roughly equal to the Freddie Mac Primary Market Survey rate. But one argument for the unusually wide spread between the primary and secondary mortgage rates is that lenders are concerned about the potential for income loss and forbearance due to the COVID-19 pandemic. Fannie and Freddie insure all credit losses, but there are still large risks for lenders in the securitization process, particularly related to the possibility that the borrower will enter forbearance before Fannie and Freddie or Ginnie purchase the loan.

Figure 4 shows that the primary-secondary spread grew from 100 basis points before the emergence of COVID-19 in mid-February to almost 200 basis points after forbearance became a first-order issue for lenders. A HARP-type refinance program would relieve originators of any risks associated with forbearance and, potentially, could reduce the primary-secondary spread. The line labeled "counterfactual" in the figure shows what the 30-year rate would be if the primary-secondary spread remained at 2019 levels.[23] Row (3a) of both panels in Tables 2 and 3 shows the benefits of the iso-default plan with the lower counterfactual rates (2.5 percent for 30-year FRMs and 2.0 percent for 15-year FRMs). If the maturities are reset, the median Fannie Mae/Freddie Mac borrower would obtain a $117 monthly payment reduction (compared with $80) and would be able to take out about $43,000 in cash (compared with $30,000). The median Ginnie Mae borrower would obtain a $110 payment reduction (compared with $73) and could take out $27,000 in cash (compared with $18,700).

It would also be of interest to understand the potential welfare gains of these various programs. While our iso-default policy would keep default risk constant at its pre-COVID-19 levels, it is possible that the welfare gains to borrowers from being able to extract additional equity would offset an increase in default risk. Especially if a streamlined refinance program were already in place ex ante, it could act as an automatic stabilizer for existing homeowners and therefore prevent the need for action by Congress. Unfortunately, while this question is of interest, answering it would require a model and is therefore beyond the scope of this paper.

Lastly, there are, of course, potential general equilibrium effects of such a policy on MBS prices. Agency MBS prices are highly dependent on investors' expectations of future prepayment rates, with higher expected prepayment rates lowering MBS values. Since a streamlined refinance program would increase prepayment rates, it would probably have a negative impact on MBS values. However, we do not think this is a major concern. COVID-19 was a shock that, ceteris paribus, lowered the probability of prepayment due to widespread job and income losses. This has almost certainly contributed to high MBS prices since the end of March 2020. A

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21 While default risk is constant, the effect on profitability is ambiguous and depends on the size of the guarantee fee and the level of expected flow losses on the loan.

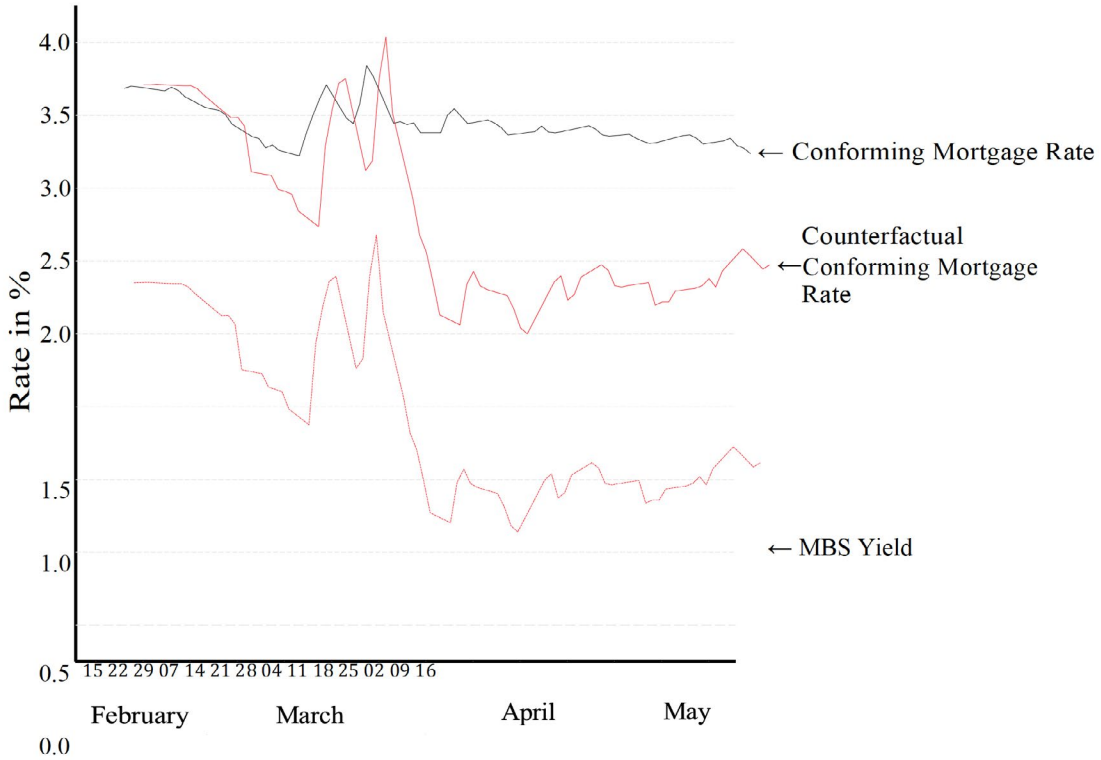
22 We abstract from the general equilibrium effects on the demand for mortgage credit on the grounds that the total volume of new debt will be small relative to the market.

23 We also calculate the counterfactual rate assuming that the primary-secondary spread equaled its average level in 2018 and find virtually identical results.

streamlined refinance program would mitigate this effect by bringing prepayment rates back in line with what was expected pre-COVID and therefore have little impact on investors' returns.

**FIGURE 4:**

*Decomposition of the Evolution of the Conforming Mortgage Rate*




*Notes: Conforming Mortgage Rate is the average rate associated with loans below the conforming loan limit and is taken from Optimal Blue (**https://www2.optimalblue.com/obmmi/**). MBS Yield is the current coupon in the TBA (to-be-announced) market, which is available from JP Morgan Markets. The Counterfactual Conforming Mortgage Rate is calculated by taking the MBS Yield and adding the average 2019 primary-secondary spread, defined here as the spread between the MBS Yields and the conforming mortgage rate.*

## Conclusion

Recent turmoil in labor markets from the COVID-19 pandemic has made it difficult for many mortgage borrowers experiencing financial distress to refinance into the prevailing, historically low market rates. In addition, it is even more difficult for these borrowers to access the substantial housing equity that many have accumulated from recent years of robust house price growth. This article evaluates a streamlined refinance program in the spirit of HARP that would allow households with government-insured loans to refinance into lower rates without needing to document income or employment. We consider a straight rate- refi program that minimizes payments while holding the loan balance constant as well as a cash-out program that maximizes equity extraction while holding payments fixed. Finally, we consider a hybrid program that both lowers mortgage payments and allows borrowers to extract equity but keeps default risk constant.

We find large potential payment savings for Fannie Mae, Freddie Mac, and Ginnie Mae borrowers from a HARP-like rate-refinance program. The average Fannie Mae/Freddie Mac borrower could save approximately $280, while the average Ginnie Mae borrower could save almost $200 per month. These monthly savings would, in turn, lead to substantial declines in default risk. Including a cash-out component but restricting the

amount of equity extraction to keep default risk constant results in a lower but nontrivial payment decline and a substantial cash windfall that financial distressed borrowers could use to help smooth consumption. For example, under the hybrid plan, we estimate that the median Fannie Mae/Freddie Mac borrower could reduce payments by $80 per month and extract more than $30,000 in equity. Such a program could be used as an alternative to forbearance that would enable borrowers to avoid delinquency.

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# Appendix

## EXAMPLES

Let $\pi_{in}$ be the annual annuity factor for a mortgage with annual interest rate $i$ and remaining term $n$ in years.

$$\pi_{in} = \frac{i(1+i)^n}{(1+i)^n - 1}$$

The annual payment for a given mortgage is then the product of $\pi_{in}$ and the unpaid balance. In all of our calculations, we set the new interest rates to $r_{30}$ = 3.3 percent and $r_{15}$ = 2.8 percent for 30-year and 15-year mortgages (roughly consistent with the Freddie Mac survey at the end of May 2020). The examples in Table 4 are all for loans that are recast to their original term.

Column 1 of Table 4 contains the details of the mortgage with the median payment change in the minimizing payments scenario. It is a 15-year mortgage with a 3.25 percent interest rate. To calculate the payment change we calculate a new annuity factor using an interest rate of 2.8 percent, calculate the new payment, and take the difference. The change in the default probability is calculated using Equation 5 below, where $\beta\pi = -30$.

Column 2 contains the details of the mortgage with the median balance change in the maximizing cash-out scenario, which is a 30-year mortgage with a 4 percent interest rate. We find the new balance by calculating the new annuity factor and then setting the new payment equal to the original. The change in default probability is derived from Equation 6 below where $\beta_L$ = 1.885.

Column 3 is the mortgage with the median payment change in the iso-default scenario, which is a 30-year mortgage with a 3.99 interest rate. The new loan amount is calculated using the new annuity factor and Equation 7 below and the same values for $\beta\pi$ and $\beta_L$ as used above.

## MAPPING BETWEEN MORTGAGE PAYMENTS AND DEFAULT RATES

In this section, we show the details of the mapping that we develop between monthly mort- gage payment changes and changes in default risk. The mapping is based on the analysis of Fuster and Willen (2017), which estimates the causal effect of payment reductions on default probabilities using variation created by contractually specified downward rate re- sets in a sample of interest-only, non-agency, adjustable-rate mortgages originated in the 2005–06 period. We also use Fuster and Willen's estimates of the sensitivity of default risk to cross-sectional variation in LTV ratios to develop a mapping between LTVs and default hazards. However, those estimates are not causal in nature and thus should be interpreted with caution.[24]

We start with a log default hazard function:

$$\log(P_k(d) = \alpha_k + \beta_\pi \pi_k + \beta_L LTV_k, \quad (1)$$

where $P_k(d)$ is the probability of default for loan $k$, $\pi_k$ is the mortgage $k$'s annuity factor, and $LTV_k$ is mortgage $k$'s LTV ratio, which is equal to $L_k/V_k$, the principal balance of the loan over the value of underlying collateral.

24 For a discussion of estimating the treatment effects of LTV changes, see Gupta and Hansman (2019).

**TABLE 4:**

*Example Calculations*

| | Minimizing Payments | Maximizing Cash-Out | Iso-Default |
|---|---|---|---|
| **Original Term (months)** | 180 | 360 | 360 |
| **Current Value ($)** | 210,742 | 442,030 | 375,053 |
| **Current UPB ($)** | 105,329 | 303,321 | 130,106 |
| **Term Remaining (months)** | 133.33 | 326.31 | 217.76 |
| **Current Rate (%)** | 3.25 | 4.00 | 3.99 |
| **Current Annuity Factor** | 0.109 | 0.061 | 0.078 |
| **Current Payment ($)** | 11,446 | 18,501 | 10,212 |
| **Current LTV (%)** | 69 | 69 | 35 |
| **New UPB ($)** | 105,329 | 348,960 | 174,404 |
| **New Rate (%)** | 2.80 | 3.30 | 3.30 |
| **New Annuity Factor** | 0.083 | 0.053 | 0.053 |
| **New Payment ($)** | 8,696 | 18,501 | 9,246 |
| **New LTV (%)** | 50% | 79% | 47% |
| **Δ Payment ($/Year)** | 2750 | 0 | 966 |
| **Δ Payment Change ($/Month)** | 229 | 0 | 80 |
| **Δ Balance** | 0 | 45,639 | 44,298 |

*Note: All three examples are Fannie or Freddie mortgages from the top panel of Table 2, assuming loans are recast to their original term. Column (1) provides the details for the mortgage with the median payment change in the minimizing payments policy. Column (2) contains the details for the mortgage with the median balance change in the maximizing cash-out proposal. Column (3) is the borrower with the median payment change in the iso-default scenario.*

Using column 1 of Table A.1 in Fuster and Willen (2017), we can calculate approximate values of $\beta\pi$ and $\beta_L$ as follows. A reduction of 0.04 in the annuity factor, holding LTV constant, multiplies the default hazard by a factor of 0.3, which implies that[25]:

$$\log(P_k(d)|\pi') - \log(P_k(d)|\pi) = \beta_\pi(\pi'_k - \pi_k)$$
$$\log(0.3) - \log(1) = \beta_\pi \cdot (-0.04)$$
$$\beta_\pi = \frac{\log(0.3)}{0.04} = -30.$$

When $\pi_k$ is held constant, increasing LTV from 0.85 to 1.05 increases the default probability by .585/.401 so

$$\log(P_k(d)LTV') - \log(P_k(d)LTV) = \beta_L(LTV'_k - LTV_k)$$
$$\log(.585) - \log(0.401) = \beta_L \cdot 0.2$$
$$\beta_L = \frac{\log(1.45)}{0.2} = 1.855.$$

25 The analysis in Fuster and Willen (2017) focuses on interest-only (IO) mortgages, in which case the annuity factor is the interest rate (on a mortgage with a term of infinity). We are assuming that the same reduction in the annuity factor on a non-IO mortgage results in the same drop in probability of default.

Using the definition of LTV and $\pi_k$ we transform equation (1):

$$\log(p)_k = \alpha + \beta_{L,k} L_k + \beta_{\pi_k k} \cdot \pi L_k, \quad (2)$$

where $\beta_{L,k} \equiv \beta_L / V_k$, and $\beta \pi_k, k \equiv \beta \pi_k / L_k$. The transformation means that equation (2) measures the effect on default of the loan balance (not the LTV) and the monthly payment in dollars (not as a percentage of the loan balance).

Suppose we start with $\pi_o$ and $L_o$ and assume that $L_k = L_o$ and $V_k = V$, so $\beta \pi,k = \beta \pi / L_o$ and $\beta_{L,k} = \beta_L / V$. Suppose a loan leads to annuity factor $\pi_N$ and loan balance $L_N$. Then taking differences of equation (2) yields:

$$\log(p)_N - \log(p)_0 = \frac{\beta_L}{V}(L_N - L_0) + \frac{\beta_\pi}{L_0}(\pi_N L_N - \pi_0 L_0) \quad (3)$$

$$= (\frac{\beta_L}{V} + \frac{\beta_\pi}{L_0}\pi_N)(L_N - L_0) + \beta_\pi \cdot (\pi_N - \pi_0) \quad (4)$$

Assume the annuity factor falls ($\pi_N < \pi_o$). We can now consider three policies.

**1.** No change in balance,

$$\log(p)_N - \log(p)_0 = \beta_\pi \cdot (\pi_N - \pi_0). \quad (5)$$

LTV stays the same and payment goes down, so default goes down.

**2.** Increase the balance to keep monthly payment constant (that is, $\pi_N L_N = \pi_o L_o$),

$$\log(p)_N - \log(p)_0 = \frac{\beta_L}{V}(L_N - L_0) = \frac{\beta_L L_0}{V \pi_N}(\pi_0 - \pi_N) \quad (6)$$

Payment stays the same and *LTV* goes up, so default goes up.

**3.** Increase balance just enough to maintain default rate, allowing for a maximum LTV of 0.9 percent. Set

$$L_N^* = \min\left(L_0 + \frac{\beta_\pi}{\frac{\beta_L}{V} + \frac{\beta_\pi}{L_0}\pi_N}(\pi_0 - \pi_N), 0.9V\right) \quad (7)$$

then $P_N - P_o = 0$. In *LTV* terms,

$$LTV_N^* = \min\left(LTV_0 + \frac{\pi_0 - \pi_N}{\frac{\beta_L}{\beta_\pi} + \frac{\pi_N}{LTV_0}}, 0.9\right) \quad (8)$$