Quantifying the Savings from FHA's Home Retention Programs

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Introduction and Executive Summary

For several decades, the Federal Housing Administration (FHA) has required mortgage servicers to perform loss mitigation on FHA-insured loans to resolve delinquencies and reduce foreclosure-related losses. Since FHA holds the risk of loss associated with borrower default, FHA has an economic interest in directing mortgage servicers to engage in risk management techniques that will reduce the number of defaults that transition to foreclosure and foreclosure-related loss severity.

To minimize losses, FHA requires servicers to move sequentially through a loss mitigation hierarchy, organized from least costly to most costly for FHA, to find the solution that effectively resolves the delinquent loan at the lowest cost. Under this "waterfall," to use FHA's term for the hierarchy, FHA instructs mortgage servicers to move from early intervention assistance (when necessary) to home retention and then home disposition. The last (and most costly) disposition option to be deployed in the hierarchy is foreclosure.

Within loss mitigation, FHA's home retention programs—which include the Standalone Partial Claim (PC), various loan modifications, and Payment Supplement (PS)—serve a specific purpose: to enable delinquent borrowers to reperform. Reperformance allows FHA to avoid the high cost of dispositions and thus mitigate losses it would otherwise incur.[1] And the avoided costs are high: we estimate that each disposition would cost FHA about $89,800.[2] In that context, between 1997 and 2016, the FHA home retention programs averted $24.8 billion in government losses from dispositions.[3]

The goal of this paper is to answer the question "what is the financial impact on FHA of its home retention programs?" To this end, we quantify the cost of the current FHA home retention programs and compare that cost to two alternative loss mitigation scenarios—one that includes only dispositions with no home retention options and a second that includes just one retention option, a traditional market-rate modification.[4] We then measure the financial impact on FHA if it were to eliminate the Standalone PC, modifications, and PS, or replace them with a market-rate modification, by calculating the difference in costs between the current programs and the two alternative scenarios.

We conclude that removing or reducing available home retention solutions will lead to substantially higher overall costs for FHA due to an increase in dispositions and associated losses. Notable findings from our analysis are:

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[1] See Home Retention Programs Save the GSEs and FHA Billions by Avoiding the High Cost of Dispositions (HPC, July 2025) for a discussion of home retention best practices and a detailed discussion of the FHA home retention programs.
[2] Dispositions include foreclosures, pre-foreclosure sales, and deeds-in-lieu of foreclosure. Calculated as the product of the UPB at default of the average seriously delinquent FHA loan ($236,300) and the weighted-average FHA loss severity on home dispositions between 2018 and June 2024 (38%), sourced from U.S Department of Housing and Urban Development.
[3] Source: Home Retention Programs Save the GSEs and FHA Billions by Avoiding the High Cost of Dispositions (HPC, July 2025), page 7.
[4] A market-rate modification adds missed payments to the loan balance, sets the modified interest rate to the current Freddie Mac Primary Mortgage Market Survey rate + 0.25%, and extends to the term to 30 years. FHA's 30-year Standalone Loan Modification is a market-rate modification.

1. Today, after accounting for self-cures and post-intervention redefaults, the average home retention action that FHA completes saves it $25,000 compared to a disposition and $19,000 compared to a market-rate modification.[5]

2. In aggregate, the more dispositions the retention programs prevent, the more the government saves. At the June 2025 serious delinquency (SDQ) rate of 3.6%, the FHA home retention programs will save $5.2 billion by averting 66,000 dispositions of existing SDQ loans.[6] New delinquencies over time add to the savings. Should the SDQ rate rise to the COVID-19 pandemic high of 11.9%, FHA would save $17 billion by averting 216,000 dispositions.

3. The FHA home retention programs are designed to optimize outcomes; they adapt to create savings relative to dispositions and market-rate modifications across economic cycles and various interest rate environments.

4. Standalone PCs generate loan reperformance at a high rate for about half the cost of dispositions and market rate modifications.

5. Unlike modifications, PS can reduce payments and generate loan reperformance when the prevailing mortgage rate is well above SDQ loan note rates. As a result, PS is more cost-effective than dispositions, market-rate modifications, and the other FHA home retention solutions in the current environment.[7] Eliminating PS would increase FHA's cost of resolving the existing set of SDQ FHA loans by $747 million.

6. The FHA home retention programs generate savings (relative to dispositions and market-rate modifications) that persist unless loss severity averages a historically low 5%, which is unrealistic. Even with strong house price appreciation, FHA loss severity averaged 38% between 2018 and 2024.

Based on our analysis, we recommend that FHA take two steps to improve the cost-effectiveness of its home retention programs. First, FHA should provide SDQ borrowers with a home equity estimate using FHA's automated valuation models. Understanding their equity position may motivate some borrowers to pursue a market sale and others to pursue home retention to retain their equity, both of which reduce costs for FHA. Second, by restructuring the PC as a servicer advance secured by the first lien, rather than a subordinate lien, FHA can reduce the cost and risk of administering the PC program.

It is important to note that home retention alternatives that provide payment reduction can only reduce the principal and interest (P&I) component of the total monthly payment and have no effect on monthly payments made for property taxes and homeowners' insurance (T&I) or the monthly FHA mortgage insurance premium (MIP). Therefore, percentage changes in this paper are expressed

[5] Self-cures occur when a seriously delinquent borrower repays past-due amounts without using loss mitigation, for example by selling their home on the private market or obtaining funds from family or friends.
[6] Seriously delinquency is defined as three or more missed payments.
[7] As of August 2025, the prevailing mortgage rate is about 6.625% and the average note rate for the SDQ FHA-insured portfolio is 4.57%.

in terms of the original P&I payment. Percentage changes in total monthly payment (PITI + MIP) will naturally be smaller.

In this paper, Section I provides more detail regarding the six Findings described above. Importantly, our analysis accounts for borrowers in default who self-cure (that is, by completing a market sale to pay off their loan or securing the funds needed to make up missed payments) as well as borrowers who receive a home retention alternative but then subsequently redefault and lose their home to disposition. In Section II, we provide a detailed rationale for our two recommendations for the FHA home retention programs.

In Section III, for our three loss mitigation scenarios—the current programs, no retention programs, and just market-rate modifications—we show how our assumptions lead to different levels of reperformance, self-cure, and disposition. Based on this analysis, we conclude that removing or reducing the available FHA home retention alternatives will lead to higher overall costs for FHA. We also provide the rationale behind our assumptions for take-up rates, redefault rates, transition rates from default to disposition, and loss severity, and highlight several reasons why our analysis likely underestimates the savings generated by the FHA home retention programs. In Section IV, we conclude.

In the Appendix, we provide additional measures of the efficiency of the FHA home retention programs by testing outcomes at the representative loan level when mortgage rates are at extremes. In addition, we detail the calculations used to estimate the expected cost of dispositions, Standalone PCs, FHA's modifications, and PS. We also describe the functions we use to calculate the durations of SDQ FHA loans, which are inputs to our cost calculations. Next, we present the functions we use to estimate the causal impact of changes in monthly payment on subsequent redefault rates. The final section details our sensitivity analysis and shows that our results are not determined solely by our choice of model parameter values.

To be sure, foreclosure is still necessary when a home is abandoned, or a delinquent borrower fails to engage with his or her servicer or faces a deterioration in financial circumstances beyond what can be addressed by home retention. But the central lesson is clear: by reducing the risk of disposition through its well-designed home retention programs, FHA saves the government billions of dollars. By offering assistance to borrowers with a willingness to pay and an ability to make some reasonable payment, FHA's credit losses are substantially lower than those associated with solely dispositions or market rate modifications.

Section I: Findings

Finding 1: Today, after accounting for self-cures and post-intervention redefaults, the average home retention action that FHA completes saves it $25,000 compared to a disposition and $19,000 compared to a market-rate modification.

Table 1 summarizes our top-line results for the savings per FHA home retention action and illustrates the value of cost-effective home retention alternatives compared to disposition and market-rate modifications. Based on the existing SDQ FHA portfolio and today's mortgage rate (about 6.625% as of August 2025), we estimate that the FHA home retention alternatives save FHA about $25,100 per completed action, reducing the disposition rate among SDQ loans from 60% to

26%, a reduction of 57%.[8] Compared to a traditional market-rate modification, FHA's current home retention alternatives save about $19,300 per completed action and cut the disposition rate for SDQ loans from 48% to 26%, a reduction of 46%.

Table 1. Summary of Costs and Relative Savings from FHA's Home Retention Alternatives.*

Loss Mitigation Scenario	Expected Cost per SDQ Loan ($)	SDQ Loan (% of UPB at Default)	Disposition Rate for SDQ Loans
No Home Retention (Disposition Only)	**53,876**	**23%**	**60%**
Traditional 30-year Market-Rate Modification	**48,113**	**20%**	**48%**
Savings vs. No Home Retention	5,763	3%	12 pp
Savings vs. No Home Retention (%)	11%	11%	19%
Current Home Retention	**28,790**	**12%**	**26%**
Savings vs. No Home Retention	25,086	10%	34 pp
Savings vs. No Home Retention (%)	47%	46%	57%
Savings vs. 30-year Market Rate Modification	19,323	8%	22 pp
Savings vs. 30-year Market Rate Modification (%)	40%	39%	46%

Source: Author's calculations.

*We use the term "cost" broadly throughout this paper to describe FHA's losses from dispositions (proceeds from the property sale less the remaining loan balance) and the cost of providing home retention alternatives (FHA's cost of funding deferred amounts, incentive payments, and the expected cost of redefaults that transition to disposition). "pp" = percentage points.

It is important to emphasize that these estimates have been developed using model inputs set to through-the-economic cycle values, which are applied to a representative set of existing SDQ FHA loans to estimate FHA's savings per SDQ loan.[9] Moreover, we account for other voluntary actions that reduce dispositions, such as SDQ borrowers who self-cure by repaying past due amounts without using loss mitigation (e.g., by completing a market sale or obtaining funds from family or friends) and thus impose little or no cost on FHA. Our analysis also includes actions that may increase losses, such as SDQ borrowers who receive assistance but subsequently redefault and lose their homes to disposition. We assume some SDQ FHA loans have experienced previous default episodes and have already made use of a part or all of their PC, which by statute is capped at 30% of unpaid principal balance (UPB) at default. We calculate our cost estimates as the average expected cost per SDQ loan, across all outcomes—reperformance, self-cure, or disposition.

In our analysis, we compare the cost to FHA under three alternative loss mitigation scenarios. The first is the current approach, which includes the Standalone PC, FHA's modifications, and PS (see Exhibit 1). For borrowers who redefault after using a home retention alternative but cannot self-cure, the next step in FHA's loss mitigation hierarchy is disposition alternatives, which include pre-foreclosure sales and deeds-in-lieu of foreclosure. Disposition alternatives are less costly to FHA than foreclosure, which is the final step in loss mitigation. **However, because our loss severity data is averaged across all home dispositions, we treat disposition alternatives and**

[8] Here and hereafter, serious delinquency and default are defined as missing 3 or more mortgage payments. The prevailing mortgage rate is calculated as the Freddie Mac Primary Mortgage Market Survey (PMMS) Rate of 6.58% as of August 14, 2025, rounded to the nearest 0.125%. Source: Mortgage Rates - Freddie Mac.

[9] We assume 55% of SDQ FHA borrowers state they can resume their original monthly payment, and the remainder do not, as discussed in Section III.

foreclosure as a single outcome in our analysis and, when referring to our results, use the term "disposition" broadly to include both disposition alternatives and foreclosure.

Exhibit 1. Summary of FHA Early Intervention and Home Retention Alternatives*

FHA **early intervention** tools include forbearance, which can be followed by a repayment plan. Forbearance suspends monthly payments for an initial period of one to three months, up to a maximum of 12 months, including any pre-forbearance delinquency. Borrowers can repay the missed payments in a lump-sum and resume their previous monthly payments or use a repayment plan, which establishes an increased monthly payment for a fixed period to repay missed payments for borrowers who can afford the payment increase.

FHA **home retention** alternatives include:

Standalone Partial Claim (PC): resolves the delinquency of borrowers who indicate they can resume making their originally scheduled monthly payments but cannot afford to repay their arrearages in a lump sum or a repayment plan. The cumulative balance on all PCs is limited to 30% of loan balance as of the date of the first default. The Standalone PC is a non-interest-bearing subordinate lien due at loan maturity or payoff. Because the Standalone PC is more costly to FHA than a Standalone Loan Modification (described below) when the latter provides a payment reduction, the 30-year Standalone Loan Modification is deployed prior to a Standalone PC if the 30-year Standalone Loan Modification provides at least a $1 reduction in the borrower's monthly payment.

Standalone Loan Modification: a market-rate modification that capitalizes arrearages and then targets a 25% P&I reduction. If a 30-year loan at the Freddie Mac Primary Mortgage Market Survey (PMMS) rate + 0.25% can reach the target, it is offered to the borrower. If not, if a 40-year loan at PMMS + 0.50% can reach the target, it is offered to the borrower. If not, the borrower is evaluated for a Combination Loan Modification and PC.

Combination Loan Modification and Partial Claim: a market-rate modification combined with a PC, where the PC will cover arrearages and defer principal in an amount necessary to reach the 25% P&I reduction target, up to the 30% of loan balance PC limit. Arrearages are capitalized and, if the 25% P&I reduction target can be reached with a 30-year modification at PMMS + 0.25% with deferred principal, it is offered. If not, a 40-year modification at PMMS + 0.50% with deferred principal is offered, as long as it can reduce the P&I payment by at least 15%.

Payment Supplement: temporarily reduces the borrower's monthly payment by up to 25% for three years. Because the Payment Supplement only provides temporary payment relief, whereas a loan modification provides permanent payment relief, the borrower is offered a 40-year Combination Loan Modification and Partial Claim prior to this option, if it will provide the borrower with a lower monthly payment than the Payment Supplement.

*Based on the FHA home retention alternatives that are scheduled to take effect September 30, 2025. For a more complete description, see Home Retention Programs Save the GSEs and FHA Billions by Avoiding the High Cost of Dispositions (HPC, July 2025) and Tightening and Expediting Implementation of the New Permanent Loss Mitigation Options (HUD Mortgagee letter 2025-12, April 16, 2025.

The second scenario we evaluate is loss mitigation with no home retention alternatives, only disposition. That is, we remove the Standalone PC, FHA modifications, and the PS from the current loss mitigation program set. Therefore, all SDQ FHA borrowers either self-cure (40%) or move to disposition (60%). We estimate the average disposition would cost FHA $89,800, so FHA's expected cost per SDQ loan in this scenario is 60% x $89,800 = $53,900. See Section III for a comprehensive discussion of the evidence that supports these figures.

In the third scenario, we replace the existing FHA home retention alternatives with a traditional market-rate modification. This type of modification cures the borrower's delinquency by adding missed payments to the loan balance, resetting the term to 30 years, and setting the interest rate to the prevailing mortgage rate (PMMS + 0.25%). Note that this market-rate modification matches the terms of one of FHA's modifications, the 30-year Standalone Loan Modification.

Depending on the age of the loan, and therefore how much term extension is available to reduce the payment, setting the interest rate to the prevailing market rate can result in a lower or higher monthly payment. As of August 2025, with the mortgage rate above 6.50% and substantially above the note rate on nearly all SDQ loans, a market-rate modification results in an increase in monthly payment and high redefault and disposition rates. Borrowers who accept market-rate modifications but redefault either self-cure or are evaluated for disposition.

To put our estimates into historical context, an Urban Institute analysis of FHA home retention actions taken between 1997 and 2016 indicates savings of $21,300 per home retention action taken relative to disposition, which is consistent with our calculations summarized in Table 1. Over the 20-year study period, 51.5% of the 2.41 million borrowers who did *not* receive a home retention alternative ended up losing their home to disposition, compared to just 23% of the 1.09 million FHA borrowers who *did* receive a home retention alternative.[10] Assuming that, without assistance, the 1.09 million borrowers would have lost their homes at the same 51.5% rate as the borrowers who did not receive assistance suggests that the FHA home retention programs prevented over 310,000 dispositions over the 20-year period.

If, as the Urban Institute study suggests, the average home retention alternative provided during the period cost FHA $1,500, then assisting 1.09 million FHA borrowers cost FHA $1.6 billion.[11] Moreover, assuming that SDQ loans had an average UPB at default of $200,000 and applying a more-conservative loss severity figure of 40% (the study authors assume a 50% loss severity), we estimate that the average disposition would have cost FHA $80,000.[12] Under this analysis, then, the FHA home retention programs averted about $24.8 billion in claims over the period, resulting in a net savings to FHA of $23.2 billion. Applying the net savings of $23.2 billion to the 1.09 million loans that received a home retention alternative results in a savings of $21,300 per action taken.

[10] Source: Analysis and Evaluation of Loss Mitigation Efforts | HUD USER.
[11] Ibid. Urban's analysis is historical, and therefore they only include the cost of financing deferred amounts, incentive payments, and administrative fees in their cost estimate of providing home retention solutions. Disposition-related losses from loans that received home retention solutions but redefaulted are calculated separately. Our expected cost for each home retention solution are forward looking and include both the cost to FHA of providing the option and *expected* losses from redefaults.
[12] Ibid.

Finding 2: In aggregate, the more dispositions the retention programs prevent, the more the government saves. At the June 2025 serious delinquency (SDQ) rate of 3.6%, the FHA home retention programs will save $5.2 billion by averting 66,000 dispositions of existing SDQ loans. New delinquencies over time add to the savings. Should the SDQ rate rise to the COVID-19 pandemic high of 11.9%, FHA would save $17 billion by averting 216,000 dispositions.

The current home retention alternatives create significant savings at the FHA portfolio level, as shown in Table 2. The most recent FHA SDQ rate of 3.6% (from June 2025) translates to 292,000 SDQ FHA loans. Applying our methodology to these SDQ loans at the August 2025 mortgage rate of 6.625% yields substantial savings: FHA's home retention programs save $5.9 billion by averting 79,300 dispositions. The savings relative to a market-rate modification are also compelling: the current FHA home retention programs save $4.5 billion by averting about 52,300 dispositions.[13] While there are likely to be individual loans for which disposition is the least costly solution, in aggregate, the more dispositions the FHA home retention programs avert, the greater the savings to the Mutual Mortgage Insurance Fund (MMIF). And, as additional loans cycle into SDQ status, the savings and number of dispositions avoided will rise accordingly.

Table 2. Portfolio-Level FHA Savings created by Current Home Retention Programs.

Portfolio-Level Savings from FHA Home Retention	Current SDQ Rate	COVID Peak SDQ Rate
FHA-Insured Loan Count	8,054,947	8,054,947
SDQ Rate	3.62%	11.90%
SDQ Loan Count	291,589	958,539
Relative to no Home Retention Options		
FHA's Savings ($ billions)	5.9	19.2
Avoided Foreclosures	79,302	260,689
Relative to Market-Rate Modifications		
FHA's Savings ($ billions)	4.5	14.8
Avoided Foreclosures	52,301	171,928

Sources: Recursion, SFLPTReportCover_2025, FHA SF Loan Performance Trends, and author's calculations.

The savings generated by FHA's current home retention programs are most pronounced during periods of economic or market stress, of course, when the SDQ rate increases. For example, if a sharp economic downturn produces an 11.9% SDQ rate for FHA loans, the rate at the height of COVID-19 pandemic, the current FHA programs would avoid about 260,700 dispositions, saving FHA $19.2 billion.[14] Similarly, the savings from the current FHA home retention alternatives relative to a market-rate modification are greater in the peak pandemic scenario—saving FHA $14.8 billion by avoiding about 171,900 dispositions.

To generate the portfolio-level savings shown in Table 2, we assume 20% of FHA SDQ borrowers are unresponsive to home retention. In addition, we assume 44% of FHA SDQ borrowers state they can resume their original monthly payment. We categorize these loans as **payment resumption loans**. The remaining 36% indicate they cannot resume their original monthly payment and require a payment reduction. We refer to these loans as **payment reduction loans**. These borrowers will be

[13] The portfolio-level savings for the existing stock of SDQ FHA loans would be realized between now and loan resolution. For the Finding 2 headline, we use the savings and number of averted dispositions averaged across the two alternative scenarios (no home retention options and market-rate modifications).
[14] Assuming all other model inputs and the existing stock of FHA loans are fixed.

offered a home retention alternative that reduces their monthly payment. For non-responsive borrowers, 60% transition to disposition and 40% self-cure. The basis for our assumed response rates and other model inputs is discussed in Section III.

It is important to note that FHA does not rely solely on the borrower's statements to determine the appropriate home retention alternative, but rather uses trial payment plans (TPPs) to discern borrower capacity. Specifically, borrowers who state they can resume their original monthly payment are required to complete a trial payment plan (TPP) of three consecutive monthly payments before the Standalone PC or 30-year Standalone Loan Modification becomes permanent. FHA employs the TPP to discern whether the payment is affordable for the borrower; the agency approves the home retention solution only after completion of the TPP. The FHA hierarchy authorizes payment resumption loans that fail a TPP to be reclassified as payment reduction loans, re-evaluated for another home retention alternative that can provide payment reduction, or, if ineligible, for disposition. For payment reduction loans, home retention alternatives are also followed by a 3-month TPP to demonstrate that the new, lower payment is affordable before it is made permanent. For both payment resumption and payment reduction loans, FHA only absorbs the cost of home retention solutions once the TPP has been successfully completed.

Finding 3: The FHA home retention programs are designed to optimize outcomes; they adapt to create savings relative to dispositions and market-rate modifications across economic cycles and various interest rate environments.

As described in Finding 1 and Finding 2, the FHA home retention programs generate substantial savings per SDQ loan and across the SDQ FHA-insured portfolio relative to disposition and market-rate modifications at the August 2025 level of mortgage rates. But what happens as the economy cycles through expansions and contractions and interest rates change? We find that the FHA home retention programs are remarkably adaptable. Even as mortgage rates vary to extreme levels, the FHA hierarchy automatically adjusts based on the relationship between the prevailing mortgage rate and the delinquent loan's note rate to offer the solution that generates loan reperformance while preserving the cost advantage of the programs over dispositions and market-rate modifications.

If the mortgage rate were to rise to 10.625%, we estimate that, on the existing portfolio of 292,000 SDQ FHA loans, the current FHA home retention programs would, on average, save the MMIF $17,800 relative to disposition and $20,900 relative to market-rate modifications per home retention action taken. Should the mortgage rate fall to 2.625%, the programs would generate average savings of $33,000 relative to disposition and $2,300 relative to market-rate modifications per action taken.

It is critical to emphasize that the reduction in relative savings between FHA's home retention programs and market-rate modifications as the mortgage rate falls is not a weakness, but rather a feature of the program design that enables FHA to minimize the cost of their programs. If the mortgage rate falls below the note rate on SDQ loans, making market-rate modifications more cost-effective, the FHA home retention programs automatically adjust and make increasing use of modifications. Accordingly, the cost of the current programs naturally converges to the cost of market-rate modifications at very low mortgage rates.

We test the cost-effectiveness of the FHA home retention programs across economic cycles by varying the mortgage rate because economic cycles are typically correlated with changes in interest rates. Economic expansions are usually followed by higher short-term interest rates while economic contractions are marked by lower short-term interest rates. While there are many factors that influence the relationship between short-term interest rates and mortgage rates, the latter broadly vary with economic cycles as well. Since 1990, mortgage rates have ranged between a low of 2.65% in early 2021 due to the COVID-19 pandemic-induced economic contraction (and the concurrent monetary policy response) and a high of 10.67% in early 1990 following the economic expansion of the 1980s. We use these extremes in mortgage rates to measure the performance of the FHA programs across economic cycles.

Specifically, we re-run the analysis of the expected cost and relative savings of each loss mitigation scenario shown in Finding 1 under two alternative economic situations, holding all other factors and the SDQ FHA portfolio constant: an economic expansion with a mortgage rate of 10.625% and FHA borrowing rate of 8.35%, and an economic contraction with a mortgage rate of 2.625% and FHA borrowing rate of 1.50%. It is important to note that, among other variables, house price appreciation (HPA) and therefore loss severity will also vary with economic cycles. We address both HPA and loss severity in Finding 6. We address the remaining model inputs in the sensitivity analysis section of the Appendix and show that our results persist unless those inputs are set to extreme and unlikely levels.

Our results for the economic expansion are summarized in Table 3. In this case, the savings from the FHA home retention programs relative to disposition would be $17,800 per SDQ loan, and the disposition rate would fall from 60% to 29%, slightly more than half. Relative to market-rate modifications, the current FHA programs would save $20,900 per SDQ loan and would reduce the disposition rate from 58% to 29%, by half. In this instance, 90% of responsive FHA SDQ loans would be resolved with a Standalone PC or PS, as these two home retention solutions continue to generate better loan reperformance and lower costs compared to the other FHA home retention alternatives, dispositions, and market-rate modifications, just as they did in the baseline case shown in Table 1.

Table 3. Summary of Costs and Relative Savings from FHA's Home Retention Programs during an Economic Expansion (Mortgage Rate = 10.625%, FHA Borrowing Rate = 8.30%).

Loss Mitigation Scenario	Expected Cost per SDQ Loan ($)	SDQ Loan (% of UPB at Default)	Disposition Rate for SDQ Loans
No Home Retention (Disposition Only)	**53,876**	**23%**	**60%**
Traditional 30-year Market-Rate Modification	**56,959**	**24%**	**58%**
Savings vs. No Home Retention	-3,083	-1%	2 pp
Savings vs. No Home Retention (%)	-6%	-6%	4%
Current Home Retention	**36,083**	**16%**	**29%**
Savings vs. No Home Retention	17,793	7%	31 pp
Savings vs. No Home Retention (%)	33%	31%	52%
Savings vs. 30-year Market Rate Modification	20,876	8%	29 pp
Savings vs. 30-year Market Rate Modification (%)	37%	35%	50%

Source: Author's calculations.

Our results for an economic contraction are summarized in Table 4. Here, the savings from the FHA home retention programs relative to disposition increase to $33,000 per SDQ loan as the programs cut the disposition rate from 60% to 20%, a reduction of 66%. In this case, FHA's modifications (and market-rate modifications in general) can deliver payment reductions and loan reperformance because the mortgage rate is below the note rate on most outstanding SDQ loans. Therefore, modifications become more cost-effective, which reduces the overall cost of the FHA programs and increases the savings from the programs relative to disposition. For example, in this scenario, 76% of responsive FHA SDQ loans would be resolved with a Standalone Loan Modification, which reduces the FHA programs cost from $28,800 per SDQ loan in the base case (Table 1) to $20,800 per SDQ loan in the economic contraction scenario.

Table 4. Summary of Costs and Relative Savings from FHA's Home Retention Programs during an Economic Contraction (Mortgage Rate = 2.625%, FHA Borrowing Rate = 1.50%).

Loss Mitigation Scenario	Expected Cost per SDQ Loan ($)	SDQ Loan (% of UPB at Default)	Disposition Rate for SDQ Loans
No Home Retention (Disposition Only)	**53,876**	**23%**	**60%**
Traditional 30-year Market-Rate Modification	**23,188**	**10%**	**23%**
Savings vs. No Home Retention	30,688	13%	37 pp
Savings vs. No Home Retention (%)	57%	57%	62%
Current Home Retention	**20,848**	**9%**	**20%**
Savings vs. No Home Retention	33,028	14%	40 pp
Savings vs. No Home Retention (%)	61%	61%	66%
Savings vs. 30-year Market Rate Modification	2,340	1%	3 pp
Savings vs. 30-year Market Rate Modification (%)	10%	10%	12%

Source: Author's calculations.

In our economic contraction, relative to the market-rate modifications scenario, the FHA programs would save a modest $2,300 per SDQ loan and reduce the disposition rate from 23% to 20%, a decrease of 12%. The savings relative to market-rate modifications are reduced for the reasons described above—market-rate modifications become more cost-effective at low mortgage rates. Accordingly, the FHA home retention programs automatically adjust to resolve 76% of responsive SDQ loans with an FHA Standalone Loan Modification rather than a Standalone PC, Combination Modification and PC, or PS. As a result, the cost of the FHA home retention programs automatically converges to the cost of a market-rate modification, and the relative savings naturally contract.

The results shown above illustrate the adaptability built into the FHA home retention programs. Based on the relationship between the prevailing mortgage rate and the delinquent loan's note rate, the programs automatically adjust to offer the solution that generates loan reperformance while preserving the cost advantage of the programs over dispositions and market-rate modifications even as mortgage rates vary to extreme levels. By building this feature into the program steps, FHA obviates the need to adjust the programs as prevailing market conditions change, and the resulting stability will avoid additional implementation costs for FHA going forward.

In sum, FHA has optimized their home retention programs to be cost-effective in a wide variety of interest rate scenarios, and the programs will continue to provide substantial portfolio-level benefits across economic cycles.

Finding 4: Standalone PCs generate loan reperformance at a high rate for about half the cost of dispositions and market rate modifications.

For SDQ FHA payment resumption loans, Standalone PCs are significantly more cost-effective than dispositions and market-rate modifications. Using a representative set of loans (based on FHA-insured loans that are seriously delinquent as of August 2025, which is described in the Appendix), we compare the cost and performance of each solution within our three loss mitigation scenarios. That is, we calculate the average cost, change in P&I payment, expected redefault rate, and expected disposition rate for the Standalone PC, the four existing FHA modification programs, disposition, and a market-rate modification, as shown in Table 5.

For comparison purposes, we calculate the averages shown in Table 5 across the representative SDQ FHA loans that are eligible for that solution, regardless of whether the FHA home retention hierarchy would select that particular alternative.[15] In addition, because these are payment resumption loans, we set the payment reduction target for all four FHA modifications to $1, matching the target for the 30-year Standalone Loan Modification in Exhibit 1. As noted above, the FHA 30-year Standalone Loan Modification has the same terms as a market-rate modification, and therefore the figures in Table 5 are the same for these 2 rows.

Table 5. Expected Cost, P&I Reduction, and Redefault and Disposition Rates for Payment Resumption Loans.

Loss Mitigation Scenarios	Expected Cost per SDQ Loan	Average P&I Reduction Delivered*	Expected Redefault Rate	Expected Disposition Rate
1. Current FHA Home Retention Programs				
Standalone PC	$24,763	N/A	35%	21%
30-Year Loan Mod	$45,892	-33%	77%	46%
40-Year Loan Mod	$43,016	-27%	72%	43%
30-Year Combo Mod	$33,374	-11%	52%	31%
40-Year Combo Mod	$30,618	-7%	47%	28%
2. Disposition	**$53,876**	**N/A**	**N/A**	**60%**
3. Market-Rate Modification	**$45,892**	**-33%**	**77%**	**46%**

Source: Author's calculations.

*Negative P&I reduction delivered indicates an increase in monthly P&I payment.

The figures in Table 5 show that for the average SDQ FHA payment resumption loan the Standalone PC produces an expected redefault rate of 35%, which means that 65% are expected to reperform. Due to that higher reperformance rate, a Standalone PC costs 54% less than disposition and cuts the SDQ loan disposition rate by 65%. Similarly, a Standalone PC costs 46% less than a market-rate modification because the reperformance cuts the SDQ loan disposition rate by 54%. For the average SDQ FHA loan, using a Standalone PC instead of going to disposition saves the MMIF about $29,000. Relative to market-rate modifications, the Standalone PC saves the MMIF $21,000.

For the FHA modifications and the market-rate modification scenario shown in Table 5, we include the costs, redefault rates, and disposition rates for payment resumption loans only, since it is this

[15] We do not include PS because it would have the same terms as a Standalone PC if the payment reduction target were set to $1. As described in the Appendix, we assume the two oldest loans in our representative SDQ FHA portfolio have exhausted their PC, are ineligible for a Standalone PC, and are instead resolved using 40-year Standalone Loan Modifications. The other eight loans have sufficient PC capacity available to cover their missed payments and are resolved with Standalone PCs.

group that would be eligible for a Standalone PC. We analyze outcomes for payment reduction loans separately in Finding 5.

Two additional considerations are critical to emphasize. First, as mortgage rates change, the FHA home retention hierarchy will automatically adjust to choose the home retention solution that generates loan reperformance and maintain its cost advantage over dispositions and market-rate modifications, as illustrated in Finding 3. With respect to payment resumption loans, as described in Exhibit 1, SDQ FHA borrowers who state they can afford to resume their original monthly payment are offered a 30-year Standalone Loan Modification if it can reduce their monthly payment by at least $1, because under these circumstances this modification is less costly to FHA than a Standalone PC. If the modification cannot reduce the monthly payment, these borrowers are offered the more cost-effective Standalone PC.

As of August 2025, with the mortgage rate at around 6.625%, for all ten of our representative SDQ FHA loans the 30-year Standalone Loan Modification has a higher expected cost than a Standalone PC.[16] The 30-year Standalone Loan Modification results in higher monthly payments because the prevailing mortgage rate is considerably higher than the note rate on the ten representative loans in this study, and the resulting high redefault and disposition rates push up the relative cost of this alternative. However, should mortgage rates fall, any loans for which the 30-year Standalone Loan Modification can provide payment reduction will be resolved using this solution because it will have become the lower-cost option for FHA. We examine this outcome in greater detail in the Appendix.

Second, the cost to FHA of financing the deferred amount for a Standalone PC is small and most of the cost of this solution is due to redefaults, as shown in the Appendix. As a result, the cost of any "unnecessary" Standalone PCs accepted by borrowers who didn't actually need them is modest. There is little to no evidence of this type of "strategic" behavior by borrowers pursuing forbearance without the presence of a financial hardship and then resolving their delinquency using a Standalone PC.[17] However, because the probability of redefault in this case is zero, even if the average SDQ FHA borrower took this course, the cost to FHA would be just $5,400 or 2.3% of the UPB at default.[18] And such an action would not be costless to the borrower as their missed payments would significantly harm their credit score.

Finding 5: Unlike modifications, PS can reduce payments and generate loan reperformance when the prevailing mortgage rate is well above SDQ loan note rates. As a result, PS is more cost-effective than dispositions, market-rate modifications, and the other FHA home retention solutions in the current environment.[19] Eliminating PS would increase FHA's cost of resolving the existing set of SDQ FHA loans by $747 million.

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[16] As discussed in the Appendix, we address the concern that the lack of granularity in our ten representative loans may bias our results by expanding our representative loan set to 137 loans and find no material change in our results.
[17] As discussed under Best Practice 4 in Home Retention Programs Save the GSEs and FHA Billions by Avoiding the High Cost of Dispositions (HPC, July 2025), pages 16 - 17.
[18] Calculated as Standalone PC amount x FHA's annual borrowing cost x loan duration + incentive payment = $21,855 x 4.30% x 5.22 years + $500. Due to a lack of data, we cannot calculate the number or cost of PCs that are not repaid. To reduce the risk of PC non-payment, we recommend that FHA restructure the PC as a servicer advance secured by the first lien.
[19] As of August 2025, the prevailing mortgage rate is about 6.625% and the average note rate for the SDQ FHA-insured portfolio is 4.57%.

Unlike a market-rate modification, PS allows the note rate on the SDQ loan to remain unchanged, and therefore the PS is able to provide payment reduction regardless of the relationship between the existing note rate and the prevailing mortgage rate. The PS uses the partial claim methodology – that is, FHA insurance funds are made available to defer some amount of the loan balance, to be repaid upon payoff of the first mortgage. Unlike a Standalone PC, the PS provides temporary payment relief by using the deferral to reduce the principal portion of the monthly P&I payment for three years, after which the P&I payment returns to the previous level. This approach provides payment reduction while allowing these loans to remain in the Ginnie Mae mortgage-backed securities (MBS) and retain their existing note rates.

Across our representative SDQ portfolio, at the August 2025 mortgage rate of about 6.625%, PS provides an average payment reduction of 21% and reaches the 25% payment reduction target for 58% of eligible loans, whereas FHA modifications can only provide a meaningful payment reduction for 29% of SDQ FHA loans. Consequently, under current market conditions, for loans with below-market note rates, the PS generates better loan reperformance, reduces dispositions, and provides savings to the MMIF relative to dispositions, market-rate modifications, and the other FHA home retention alternatives.

As described below, should mortgage rates fall and modifications become more cost-effective than PS, the FHA home retention hierarchy will automatically adjust to offer modifications rather than PS.

Applying the per-loan savings described in detail in the Appendix to the existing portfolio of SDQ FHA loans at current market interest rates suggests that, relative to loss mitigation that only includes disposition, the PS will save the MMIF $1.3 billion by averting 19,700 dispositions. Relative to market-rate modifications, the PS will save the MMIF $1.28 billion on 16,100 averted dispositions. **And if FHA were to eliminate the PS but leave the remaining FHA home retention alternatives intact, it would result in additional 9,500 dispositions and cost the MMIF $747 million.**

Two additional considerations are important to emphasize. First, as long as the mortgage rate remains elevated relative to note rates, any payment reduction loans that become SDQ in the future are likely to be treated with a PS, which averts dispositions and generates savings relative to disposition, market-rate modifications, and the other existing FHA home retention alternatives noted above. Moreover, to the extent FHA SDQ rates increase, the savings and averted dispositions will increase. Similarly, should mortgage rates rise, the savings provided by PS will increase. For example, as we show in the Appendix, with mortgage rates at 10.625%, the savings generated by PS relative to the 40-year Combination Loan Modification and PC would increase by 45%.

Second, as modifications become cheaper than PS for loans with a note rate sufficiently close to or below the prevailing mortgage rate, the FHA home retention hierarchy summarized in Exhibit 1 will automatically shift to offer less costly modifications. The FHA hierarchy has already made this adjustment for the 2023 and 2024 originations in our portfolio of representative SDQ FHA loans, which have note rates around 6.50%. Today, for these loans, the 40-year Combination Loan Modification and PC is less costly than PS, so these loans are resolved with the modification rather than PS. We examine this dynamic in more detail in the Appendix.

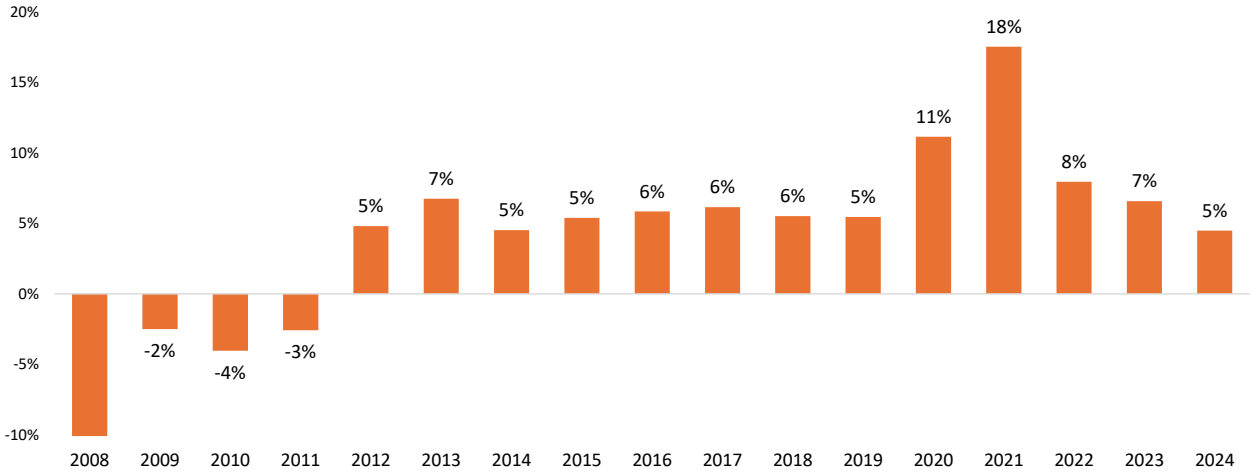
Finding 6: The FHA home retention programs generate savings (relative to dispositions and market-rate modifications) that persist unless loss severity averages a historically low 5%, which is unrealistic. Even with strong house price appreciation, FHA loss severity averaged 38% between 2018 and 2024.

We have shown that the savings created by the FHA home retention programs, relative to dispositions and market-rate modifications, persist in a wide range of mortgage rates. Now, we test the sensitivity of our results to HPA and loss severity and find that unless loss severity falls to the historically low (and likely unrealistic) level of 5%, the FHA home retention programs generate savings for the MMIF.

For our baseline results, which are calibrated to through-the-economic cycle model inputs, we use the average FHA UPB-weighted loss severity of 38% from dispositions completed between January 2018 and April 2025 for all disposition outcomes.[20] As noted above, the FHA loss severity figures include not only foreclosures but also home disposition alternatives (i.e., pre-foreclosure sales, deeds-in-lieu, claims without conveyance of title (CWCOT), and note sales).[21] Holding other model inputs fixed, the savings from the current FHA home retention programs persist unless the loss severity on FHA dispositions drops to 5%. Given the considerations noted below outlining why HPA and reducing foreclosure timelines cannot reduce loss severity beyond a certain point, it seems unlikely that FHA's loss severity would *average* 5% across economic cycles.

While one might expect a high correlation between HPA and loss severity, for the reasons described below, HPA alone does not reduce loss severity on dispositions beyond a certain level. For context, Figure 1 shows annual HPA (or depreciation) since 2008. After recovering from the Great Recession, HPA remained stable between 2012 and 2019, increased sharply in 2020 and 2021, and has since returned to pre-pandemic levels.

Figure 1. Annual Change in FHFA Purchase-Only House Price Index (Seasonally Adjusted).

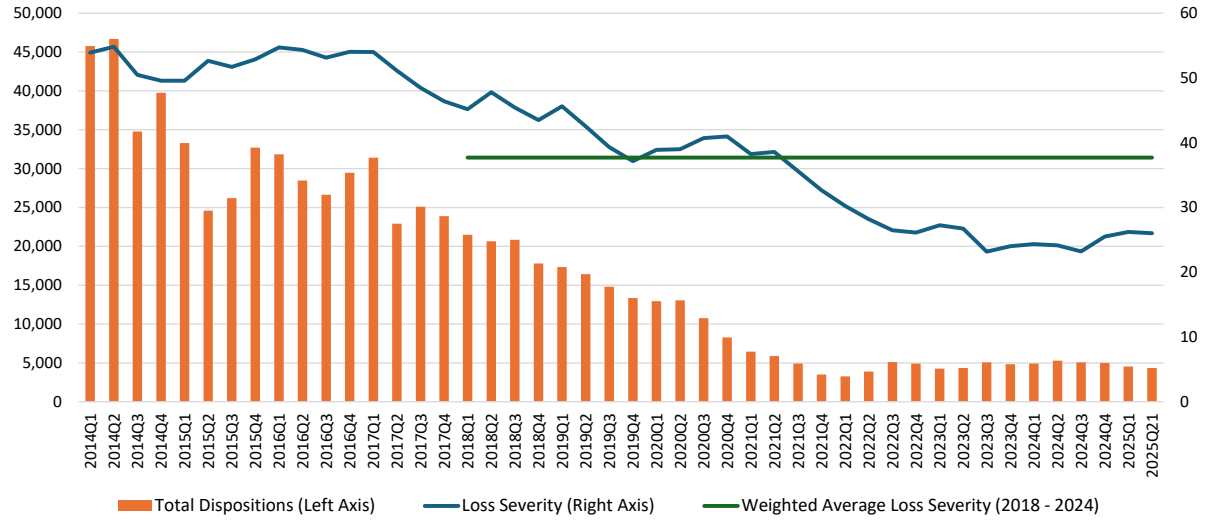


Source: FHFA House Price Index® Datasets | FHFA and author's calculations.

[20] Source: U.S Department of Housing and Urban Development.
[21] Ibid.

Figure 2 shows the number of FHA dispositions and loss severity **by quarter of disposition**. Dispositions have dropped dramatically since 2014 and have now stabilized at low levels. Loss severity has also fallen since peaking at 55% in 2014Q2 but, despite strong HPA in 2020 - 2021, it has recently increased to 26% from a low of 23% in 2023Q3.

Figure 2. FHA Dispositions and Loss Severity by Disposition Quarter.



Source: U.S Department of Housing and Urban Development and author's calculations.

From Figure 2, it is evident that the double-digit HPA of 2020 – 2021 reduced FHA loss severity to a point, but not beyond 23%. There are two reasons why HPA alone does not reduce loss severity on dispositions beyond a certain level.

First, any benefit of a brief period of strong HPA on loss severity will be short lived.[22] While it may seem obvious, a period of sharp HPA can only reduce loss severity on loans originated **prior to the run-up in house prices**. In other words, the sharp HPA experienced in 2020 – 2021 shown in Figure 1 does nothing to reduce the loss severity on a loan originated in 2023. If anything, a period of strong HPA makes loss severity on loans originated after the period worse because, as a result of the strong HPA, loan amounts will be larger, reflecting higher house purchase prices.

Second, the influence of a sharp HPA period on loss severity naturally fades over time because FHA's portfolio turns over and mortgage defaults are typically more concentrated in recent originations. Portfolio turnover, which is driven by refinances, house sales, mortgage payoffs, and dispositions, shows that few borrowers remain in their mortgage for more than 10 years. As a result, just 2% of the outstanding FHA-insured portfolio was originated before 2005 and 18% was originated before 2015.[23] Moreover, while 45% of the outstanding FHA-insured portfolio was originated between 2021 and 2024, these recent originations account for 68% of SDQ loans.[24] Taken together, portfolio turnover and recency in defaults limit the benefit of HPA on loss severity—

[22] See pages 16 -20 of Quantifying the Savings from the GSEs' Home Retention Programs (HPC, July 2025) for additional evidence regarding the muted relationship between HPA and loss severity.
[23] Source: Recursion as of August 2025.
[24] Ibid.

borrowers either exit their mortgage or default before HPA has had a chance to accumulate in a significant way.

Since dispositions peaked in the aftermath of the Great Recession, foreclosure timelines have steadily increased and, all other things held equal, reducing foreclosure timelines would reduce loss severity. Longer foreclosure timelines, which are largely due to changes in state regulatory requirements, increase loss severity due to the additional accumulation of arrearages on delinquent mortgages, and therefore increase the need for cost-effective FHA home retention programs that avoid foreclosure whenever possible. For example, the average number of days between default notice and foreclosure sale increased from 350 days in 2011Q4 to 671 days in 2025Q1, an extension of about 10.5 months.[25] Research indicates that extending foreclosure timelines by 10.5 months would cause an increase in loss severity of between 4.5 and 7 percentage points.[26]

If shortening foreclosure timelines to 2011 levels should have the opposite and maximum effect, reducing our through-the-cycle loss severity estimate from 38% to 31%, the per-action savings from the FHA home retention programs would still be substantial: $19,700 relative to disposition and $15,200 relative to market-rate modifications. Foreclosure timelines are largely driven by state regulations, and in states where foreclosure timelines have extended substantially more than the national average, reducing foreclosure timelines would lead to a more material reduction in loss severity.

In the context of the historical FHA loss severity rates shown in Figure 2 and the considerations discussed above, it seems unlike that FHA loss severity, which has never been below 23%, could average 5% across market cycles.

Section II: Recommendations to Improve the Cost-Effectiveness of the FHA Home Retention Programs

We recommend FHA consider two policy changes to increase the cost-effectiveness of FHA loss mitigation.

Recommendation 1: Given current home equity levels, FHA should enhance their early intervention actions by providing SDQ borrowers with estimates of their house value and home equity using FHA's automated valuation models.

Today, due to pandemic-induced HPA, a greater percentage of SDQ FHA borrowers may have sufficient home equity to voluntarily sell their houses and self-cure, avoiding the use and cost of loss mitigation altogether; this opportunity is more significant under the current market conditions than is typical across more traditional economic cycles. Based on state-level HPA and a reasonable estimate of transaction costs, we can roughly approximate that at least 60% of SDQ FHA borrowers today would be able to retain some positive equity after a sale, suggesting a voluntary retail house sale may be a viable alternative to home retention.

[25] Source: https://www.attomdata.com/news/market-trends/foreclosures/q1-and-march-2025-foreclosure-market-report/.
[26] Source: Mortgage Loss Severities: What Keeps Them So High?

Given current home equity levels, we recommend FHA enhance their early intervention actions by using their automated valuation models (AVMs) to provide SDQ borrowers with an approximate value for their home that, when paired with their unpaid loan balance, would provide a rough estimate of home equity.[27] This information may motivate some SDQ borrowers to sell and others to contact their servicer to find a home retention solution that works for them so they can keep their home (and equity). Either of these actions will lead to additional savings for FHA compared to disposition.

It is important to note that, despite positive equity, there may be many reasons why a market sale is not a viable outcome for some SDQ FHA borrowers, raising the importance of cost-effective home retention programs. Selling a house and moving takes time, has an uncertain outcome, and has costs that cannot be covered using the sales proceeds because they must be incurred before closing. Borrowers under financial duress may have neither the time nor resources to contemplate a market sale. Moreover, many homeowners today have a mortgage with a well-below-market note rate and, even with a substantial amount of equity for a downpayment, may not want to rent and may have difficulty finding a suitable home with an affordable mortgage payment. SDQ borrowers will have already experienced the negative impact of mortgage default on their credit scores, so many will have difficulty qualifying for a mortgage at all, making the option to move into another owned house impossible.

Taken together, these factors lead to the counterintuitive conclusion that, while HPA does create positive home equity that is helpful, positive equity alone may not provide sufficient reason for a borrower to pursue a market sale. Still, recent research finds that positive equity foreclosures are surprisingly common, so borrowers should be made aware of this alternative.[28] In fact, 55% of CWCOT sales completed between 2021 and 2024 resulted in surplus funds being returned to the homeowner, averaging about $38,000.[29]

Recommendation 2: FHA should change the PC program from a subordinate lien structure to a more cost-effective and less risky first lien, servicer advance structure.

FHA should change the PC program from a subordinate lien structure to the more cost-effective and less risky first lien, servicer advance structure used by the Department of Agriculture (USDA) Mortgage Recovery Advance (MRA) program and the Fannie Mae and Freddie Mac payment deferral programs.[30]

Today, FHA PCs are secured by the property, with repayment due under a subordinate mortgage owed by the borrower to FHA. Setting up this subordinate lien creates additional costs and risks for FHA. FHA must pay for recording subordinate liens and then either service the subordinate mortgages itself or pay a separate servicer to do so. FHA must also expend staff resources tracking and collecting PCs that were not properly recorded or repaid upon house sale. In addition, FHA may

[27] As discussed in AEI Housing Market Indicators, March 2025 | American Enterprise Institute - AEI, page 26.
[28] Source: What Triggers Mortgage Default? New Evidence from Linked Administrative and Survey Data by David Low :: SSRN.
[29] Source: https://www.urban.org/urban-wire/how-cwcot-program-could-deliver-even-more-benefits-fha-borrowers-and-homeowners-facing.
[30] The USDA MRA servicer advance model is described in https://www.federalregister.gov/documents/2024/08/15/2024-18291/single-family-housing-guaranteed-loan-program-changes-related-to-special-servicing-options.

suffer losses due to intervening, senior liens that are still junior to the FHA-insured first mortgage or when these PC subordinate liens aren't identified when the house is sold.

In contrast, using the first lien model would allow the PC to be managed by the first mortgage servicer, to be paid in full as part of the primary FHA mortgage payoff. This arrangement would reduce the cost to FHA of administering the program and increase recoveries on deferred amounts. In this structure, the mortgage servicer managing the first lien advances funds on behalf of the borrower as part of a home retention action. FHA reimburses the servicer for these funds, and the servicer establishes a receivable to be collected from the borrower upon loan payoff, which the servicer then remits to FHA. In this case, there is no second lien to record or service. The PC is treated similarly to servicer advances for taxes and insurance from an accounting perspective; it is not part of the principal balance of the first mortgage and is not accruing interest. However, it *is* an outstanding obligation secured by the property, in accordance with the mortgage and note. With this deferred balance managed in conjunction with the primary mortgage, the borrower will see the amount owed on their monthly statement, making clear that this obligation is indeed due upon payoff or maturity of the loan, thereby reducing confusion and misunderstanding that may contribute to non-payment.

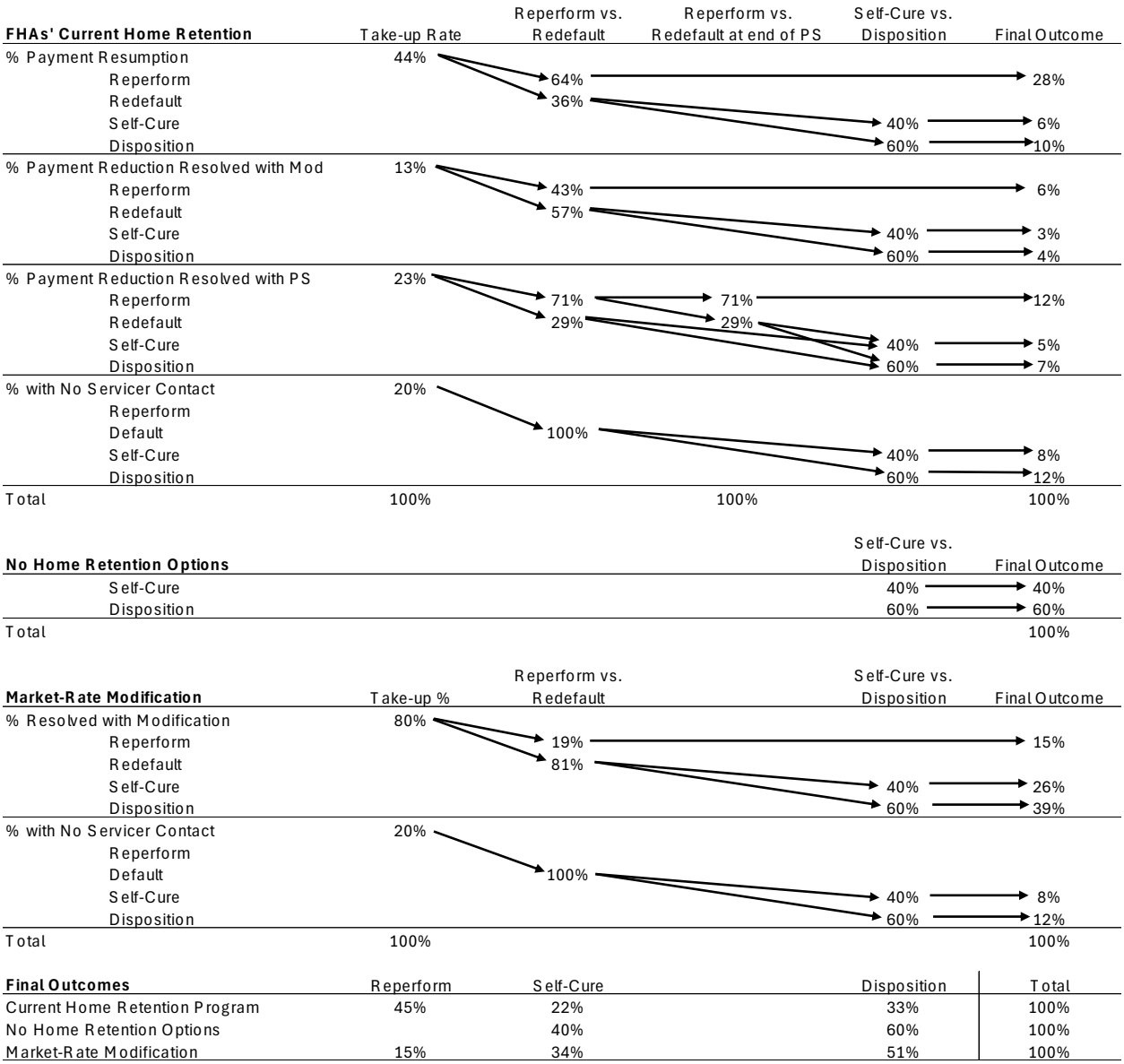
Section III. Scenario Outcomes and Model Assumptions

In this section, we first trace how our assumptions for model parameter values under each scenario (the current FHA home retention programs, only dispositions, and only market-rate modifications) lead to three final outcomes: reperformance, self-cure, or disposition. We then provide the rationale to support our assumptions for take-up rates, redefault rates, rates of transition from default to disposition, and loss severity, which have been calibrated to historical values and chosen to represent through-the-economic cycle values.

Final Outcomes for SDQ FHA Borrowers: Reperformance, Self-Cure, or Disposition

Table 6 summarizes how our assumptions for take-up rates, redefault rates, and rates of transition from default to disposition lead to reperformance, self-cure, or disposition for the existing stock of SDQ FHA loans at the current (6.625%) mortgage rate.

Table 6. Paths and Final Outcomes for SDQ FHA Borrowers under Three Loss Mitigation Scenarios.



Final Outcomes	Reperform	Self-Cure	Disposition	Total
Current Home Retention Program	45%	22%	33%	100%
No Home Retention Options		40%	60%	100%
Market-Rate Modification	15%	34%	51%	100%

Source: Author's calculations. Figures may not sum due to rounding.

The final outcomes at the bottom of Table 6 reflect the significant benefit of home retention on reperformance and the reduced disposition rate for SDQ loans. Under the current FHA home retention programs, 45% of SDQ borrowers reperform, 22% self-cure, and 33% move to disposition. In contrast, with no home retention programs, 60% of SDQ FHA borrowers would face disposition and 40% would self-cure.

In the market-rate modification scenario, 15% of SDQ borrowers reperform, 34% self-cure, and 51% move to disposition. Because in the current interest-rate environment the market-rate modification results in a payment increase for SDQ FHA borrowers, the redefault rate (81%) is high, which leads to an 18 percentage point increase in disposition rate relative to the current home retention programs.

Table 6 shows that **the elimination of home retention programs would not ultimately reduce FHA losses and generate more savings. Instead, removing home retention alternatives would increase dispositions and the associated losses would far outweigh the savings induced by more self-cures.**

In sum, the current FHA home retention programs lead to a greater proportion of lower-cost outcomes than the other scenarios: 67% of SDQ loans reperform or self-cure, 68% more than under no home retention options (40%) and 36% more than with a market-rate modification (49%).

Assumed Model Parameter Values

Below we provide our model inputs for take-up rates, redefault rates, prepayment rates, transition rates from default to disposition, and loss severity, and describe the historical data on which they are based.

Take-up Rates: the results in Table 1 are based on the assumption that, across economic cycles, 55% of SDQ FHA borrowers will state that they can resume their original monthly payment but cannot afford to repay their arrearages in a single lump-sum payment or a short-term repayment plan that increases their monthly payment. For these payment resumption loans, among the existing FHA home retention solutions, either the Standalone PC or the 30-year Standalone Loan Modification (if it provides a payment reduction) will be the provided FHA home retention alternative, as described in Exhibit 1. FHA favors the 30-year Standalone Loan Modification over the Standalone PC when the former can provide payment reduction because in those cases it is less costly to FHA. We base this take-up rate assumption on November 2021 - February 2025 data which indicate that over the period, the Standalone PC averaged 56% of completed home retention actions each month.[31]

We then assume that the remaining 45% of SDQ FHA borrowers indicate they will need a payment reduction to make their mortgage affordable, which is consistent with the 44% of completed FHA home retention actions that were modifications over the same 2021 – 2025 period. These are payment reduction loans.

For the portfolio-level results presented in Table 2, we assume 20% of SDQ FHA borrowers will be unresponsive to the current home retention alternatives.[32] Based on this assumption, we adjust our portfolio-level take-up rates to 55% x 80% = 44% for payment resumption and 45% x 80% = 36% for payment-reducing alternatives.

For the market-rate modification portfolio-level results, we use the same non-response rate of 20%, which implies an 80% take-up rate for the market-rate modification and likely leads us to understate the portfolio-level savings created by the current FHA home retention programs. A market-rate modification will result in a higher monthly payment for loans that have a note rate below the prevailing mortgage rate. This is the case for most loans today and, over the long run,

[31] Source: The Mortgage Bankers Association (MBA) Monthly Loan Monitoring Survey, March 2025. We ignore the 5% of FHA loans resolved with repayment plans because FHA incurs no cost from this resolution.
[32] Our 20% non-response rate is based on the non-response rate of SDQ FHA borrowers recorded by 2 large mortgage servicers.

there will always be some fraction of the SDQ FHA portfolio for which this is true. In contrast, the current FHA home retention programs include the PS solution, designed to provide payment reduction regardless of the relationship between note rates and the prevailing mortgage rate. A lower (higher) payment acts as an incentive (disincentive) to accept a home retention solution. Therefore, across economic cycles, it is likely that the non-response rate for market-rate modifications will be higher than the non-response rate for the current FHA program, leading to a greater number of dispositions and therefore greater portfolio-level savings from the current programs compared to those shown in Table 2.

As we show in the Appendix, the per-action-taken savings from the current FHA home retention programs relative to the disposition and market-rate modification scenarios persist even as the non-response rate increases. Moreover, the portfolio-level savings from the current FHA programs relative to disposition and market-rate modifications are substantial even at higher non-response rates. In fact, FHA's current home retention alternatives are at worst break-even relative to the disposition scenario; if no SDQ borrowers use the home retention programs, they create no cost for FHA.

In the market-rate modification scenario, we again assume that 55% of loans are payment resumption loans and 45% are payment reduction loans. While both sets of borrowers will receive a market-rate modification in this scenario, we make this distinction because their expected redefault rates will differ, as described below.

Redefault Rates: for our analysis of the current FHA home retention programs, we project the probability of Standalone PC redefault to be 35%, which is modestly higher than recent experience. Mortgage industry data shows that 64% of FHA borrowers who received a Standalone PC in 2020 or later were current as of April 2025, which indicates 36% have missed at least one payment.[33] In contrast, our definition of redefault is at least 3 missed payments. Since many borrowers who miss 1 or 2 payments do not transition to default, our 35% redefault rate for the Standalone PC is high relative to recent experience.

That said, our Standalone PC redefault rate of 35% is reasonable based on redefault data provided by two large servicers. Both servicers report a 23% redefault rate for FHA Standalone PCs completed since 2020, over a weighted-average observation window of 2.2 years. Assuming the implied monthly hazard rate is constant over a 5-year period, the servicer redefault data translates into a 44% 5-year Standalone PC redefault rate. Assuming that the newly instituted 3-month TPP that follows Standalone PCs will catch 25% of redefaults, the servicer data translates to a 33% 5-year redefault rate for Standalone PCs going forward, which is consistent with our assumption.

After making the necessary adjustments described above, our assumed Standalone PC redefault rate of 35% is slightly higher than our benchmarks. However, both benchmarks were established during the pandemic and post-pandemic periods. In light of the substantial additional government support borrowers received during the pandemic, which may not reflect the steady-state government response to every period of increased delinquency, we think 35% is more reflective of the through-the-cycle redefault rates for FHA's Standalone PC.

[33] Source: The MBA Monthly Loan Monitoring Survey, May 2025.

For payment resumption loans that are modified, we use a payment resumption redefault function to map changes in monthly payment to expected 5-year redefault rates. As would be expected, loan reperformance improves (deteriorates) as the amount of payment reduction increases (decreases), but only up to a point, as described in the Appendix. It is important to note that our Standalone PC redefault rate (35%) is consistent with the rate projected by the payment resumption redefault function—if a modification results in no payment change, our payment resumption redefault function reverts to a redefault rate of 38%.

For payment reduction loans that are modified, we use a second redefault function—our payment reduction redefault function—to calculate redefault rates depending on the change in monthly payment. The payment reduction redefault function is based on research that measures the causal relationship between payment change and loan reperformance for modifications made after the Great Recession.[34] That is, for a given percentage change in monthly payment provided by each of the different FHA modifications, the function returns the expected 5-year redefault rate, as described in the Appendix. Again, loan reperformance increases as the payment reduction provided by the modification increases. For example, a 25% payment reduction leads to a 42% redefault rate, no change in payment results in a 66% redefault rate, and a 10% payment *increase* leads to a 74% redefault rate.

All other factors held equal, payment resumption loans would be expected to have lower redefault rates than payment reduction loans. As described in further detail in the Appendix, our payment resumption redefault function returns lower redefault rates than our payment reduction redefault function for the same amount of payment decrease or increase, unless the payment changes are large.

For PS redefault rates, we account for redefaults in two parts: redefaults during the 3-year PS term and redefaults after the term ends and the monthly payment increases to its previous level. While the PS targets a 25% payment reduction, payment reduction can be limited by available partial claim capacity and the principal portion of the monthly payment. Accordingly, for redefaults during the PS term, we use the same payment reduction redefault function noted above to estimate redefaults during the three-year PS term.[35] We convert the 5-year redefault rate provided by the payment reduction redefault function into a monthly redefault hazard rate and use the hazard rate to compute the redefault rate over the 3-year PS term.[36]

For loans that did not redefault during the PS term and do then experience a post-PS payment increase, we look to data from the Home Affordable Modification Program (HAMP). HAMP

[34] Source: ganong_noel_liquidity_vs_wealth_2020_appendix.pdf.
[35] After using the PC to repay arrearages, the PS uses any remaining available PC funds to reduce the monthly payment for 3 years, so the payment reduction is naturally capped by available PC funds. Moreover, the amount of payment reduction provided by the PS cannot exceed the amount of principal in the first monthly payment due at the inception of the PS. Source: Tightening and Expediting Implementation of the New Permanent Loss Mitigation Options.
[36] For example, a 35% 5-year default rate has a 1-month hazard rate = 1 – (1 – 35%)^(1/60) = 0.715%. A 0.715% monthly default hazard rate implies a 3-year default rate = 1 – (1 – 0.715%)^36 = 22.8%. As would be expected, a 0.715% hazard rate implies a 5-year default rate = 35%.

modifications included a 1% increase in interest rate after year five, which research concludes caused a 20% increase in redefault rates.[37]

As described in the Appendix, we first convert the post-PS increase in monthly P&I payment to an increase in interest rate and then scale the results from the HAMP study accordingly to project redefaults that resulted from the payment increase at the end of the PS term. We then recompute our monthly redefault hazard rate and use it to project defaults for years four and five.

We can use the paths in Table 6 to quantify how our redefault rates translate into outcomes. Of the SDQ loans that are resolved with a PS, 29% redefault before the end of the PS term. Of those that make it to the end of the PS term, 29% redefault due to the payment increase at the end of the PS term, so the cumulative redefault rate for the PS is 50%.[38] For context, our payment reduction redefault function indicates that a *permanent* 25% payment reduction would be expected to result in a 42% redefault rate, so it is unsurprising that the *temporary* 25% payment reduction offered by PS has a 19% higher redefault rate. Importantly, the cumulative PS redefault rate (50%) is significantly lower than the market-rate modification redefault rate for these loans (81%) and the redefault rate with no home retention alternatives (100%).

In the future, it would be instructive to study loans that were resolved using PS to measure their redefault rates in the months after the PS term ends and compare the results to our post-PS default rate projections. Once sufficient time has passed, we hope to complete such a study.

Transition Rates from Default to Disposition: not every borrower who misses three or more mortgage payments ends up in disposition, as some borrowers self-cure. To account for these transitions properly, we must project the probability of defaults transitioning to disposition.

We assume a probability of disposition given default of 60%. We assume the rest of defaults, or 40%, will self-cure. We use the same 60% probability of disposition given default when no home retention alternatives are available, for borrowers who are unresponsive, and for borrowers who use a home retention alternative but redefault.

As one would expect, the transition rate from default to disposition varies with economic conditions. During periods of economic recession and house price depreciation, a higher proportion of defaults will end in disposition, whereas during periods of economic expansion and HPA, a lower proportion of defaults will end in disposition.

We test our 60% transition rate from default to disposition against three empirical measures—the first two indicate that our 60% transition rate for all SDQ loans is too low and the third suggests our transition rate is too high for SDQ loans that are resolved with home retention solutions. Collectively, these three benchmarks indicate we may be underestimating the savings generated by the FHA home retention programs.

First, analysis of HAMP modifications that redefaulted and were fully resolved, which took place after a period of considerable house price depreciation, finds a transition rate from redefault to

[37] Source: The effect of changing mortgage payments on default and prepayment: Evidence from HAMP resets - Scharlemann - 2022 - Real Estate Economics - Wiley Online Library.

[38] The cumulative redefault rate = 29% 3-year redefault rate + (29% post-PS redefault rate x 71% of PS loans that do not redefault during the PS term).

disposition of 69%, which suggests our 60% transition rate is too low.[39] As described in the Appendix, if the transition rate from default to disposition is higher than we have assumed, then the savings generated by the FHA home retention programs relative to dispositions and market-rate modifications will also be higher than we have calculated.

Second, a comparison of our 60% transition rate from default to disposition against forbearance exit data also suggests our transition rate may be too low and therefore we may be underestimating the savings from the FHA home retention programs. Our 60% transition rate from default to disposition implies a 40% self-cure rate, which is at the upper end of the range implied by forbearance exit data (13% - 48%), as described in the Appendix. In light of the substantial government support borrowers received during the pandemic, which may not reflect the steady-state government response to every period of increased delinquency, one would expect our through-the-economic-cycle self-cure rate to be lower than the post-pandemic self-cure rate. Because a lower self-cure rate would lead to a higher transition rate from default to disposition, it would also increase our estimate of the savings from FHA's home retention programs.

Third, when we compare our outcomes in Table 6 to a study that measures outcomes for SDQ FHA loans, it suggests that SDQ loans that are resolved using the current FHA home retention programs should have a 50% transition rate from default to disposition rather than our assumed 60%, which would increase the savings generated by the FHA programs. The study examines outcomes for SDQ FHA loans between 1997 and 2016 and finds that, of the loans that **did not** receive a home retention alternative, 60% moved to disposition, which exactly matches our 60% transition rate from default to disposition in our disposition-only scenario.[40]

Moreover, of the loans that **did** receive a home retention alternative, the FHA study finds 28% moved to disposition, compared to our finding of 33% in Table 6.[41] To match the FHA study, we would have to reduce our transition rate from default to disposition to 51% for loans resolved using the current FHA home retention programs.

We can also benchmark the 51% disposition rate for the market-rate modification scenario shown in Table 6 against the FHA study by limiting the comparison to those home retention solutions in the FHA study that resulted in an increase in monthly payment, since market-rate modifications also produce higher monthly payments for all of our representative SDQ FHA loans. The FHA study indicates that 50% of SDQ FHA loans that were provided with a home retention alternative that increased the monthly payment ended in disposition, which is consistent with our disposition rate.[42]

Therefore, to match the results from the FHA study across all three scenarios—the current FHA home retention programs, dispositions only, and market-rate modifications only—we would have to reduce our transition rate from default to disposition to 51% for the current FHA home retention

[39] Source: ganong_noel_liquidity_vs_wealth_2020_appendix.pdf
[40] Source: Analysis and Evaluation of Loss Mitigation Efforts | HUD USER. We reallocate loans that remain in default at the end of the study on a proportional basis to one of the other three outcomes (current, prepaid, or dispositioned).
[41] Ibid.
[42] See Exhibit 15 in Analysis and Evaluation of Loss Mitigation Efforts | HUD USER. Again, we reallocate loans that remain in default at the end of the study on a proportional basis to one of the other three outcomes (current, prepaid, or dispositioned).

programs but leave the transition rate at 60% for the disposition and market-rate modification scenarios, which would increase the estimated savings from the current programs relative to dispositions and market-rate modifications.

Because we assume that loans that redefault after receiving a Standalone PC, FHA modification, PS, or market-rate modification do not receive a subsequent home retention alternative, we have likely understated the savings from the current FHA home retention programs. The FHA home retention hierarchy stipulates that borrowers who redefault after accepting a home retention alternative may be eligible for another if at least 24 months have elapsed. In addition, borrowers with payment resumption loans who fail a TPP may be permitted a payment reduction alternative. However, we do not consider these possibilities in our analysis and instead assume that all post-home retention redefaults either self-cure (40%) or result in disposition (60%). Given the relative savings produced by the current FHA home retention alternatives relative to the disposition scenario, it is likely that including more than one home retention action for some SDQ loans would lead to incremental savings generated by the FHA programs.

Section IV. Conclusion

The purpose of loss mitigation is to minimize the number of defaults that transition to foreclosure and the related losses. Our analysis shows that, within loss mitigation, the FHA home retention programs, which include the Standalone PC, various modifications, and PS, generate loan reperformance in a cost-effective manner in different interest rate environments and therefore enable the MMIF to avoid the high cost of disposition-related claims.

We estimate that the average disposition will cost the MMIF about $89,800. In that context, FHA would suffer considerable financial losses if it were to eliminate the Standalone PC, its Combination Loan Modification and PC, or PS, or replace them with a single resolution option in the form of a market-rate modification. After accounting for self-cures and post-intervention redefaults, every home retention action that FHA completes saves the MMIF $25,100 compared to a disposition and $19,300 compared to a market-rate modification.

In aggregate, the more dispositions these programs prevent, the more the government saves. At today's rates of serious delinquency, the FHA home retention programs will save $5.2 billion by averting 66,000 dispositions on average. Should the serious delinquency rate rise to the COVID-19 pandemic high, the MMIF would save $17 billion by averting about 216,000 dispositions.

It is important to emphasize that today, unlike modifications, **the Standalone PC and Payment Supplement are able to generate loan reperformance even when the prevailing mortgage rate is well above the note rate on SDQ loans, because these solutions allow the delinquent loan to retain its note rate**. Moreover, as we have demonstrated, the savings created by the FHA home retention programs relative to dispositions and market-rate modifications persist regardless of the mortgage rate, unless loss severity falls to a historically low and likely unrealistic 5%. As the post-pandemic experience illustrates, periods of strong HPA do not reduce loss severity beyond a certain point over the long run.

We offer two recommendations for how FHA could improve the cost-effectiveness of their home retention programs: first, by using their AVMs to provide delinquent borrowers with a home value

and equity estimate and second, by restructuring the PC as a component of the FHA first lien, using a servicer advance approach rather than a subordinate lien.

Dispositions are necessary when a home is abandoned, a delinquent borrower fails to engage with their servicer, or the borrower's financial circumstances deteriorate beyond a certain point. But our findings make clear that the FHA home retention programs reduce the risk of disposition for borrowers who fall behind on their mortgages, thereby saving the government billions of dollars.

Appendix

In this Appendix, in Section A1, we provide the details of our representative portfolio of SDQ FHA loans. Section A2 provides an additional look at the cost-effectiveness of the existing set of FHA home retention programs by testing outcomes at the representative loan level for our base case and when mortgage rates are at extremes. Section A3 provides a detailed description of the calculations used to estimate the expected cost of dispositions, Standalone PCs, modifications, and PS. Section A4 describes the functions we use to calculate the durations of SDQ FHA loans, which are inputs to our cost calculations. Section A5 presents the functions we use to estimate the causal impact of changes in monthly payment on subsequent redefault rates for payment resumption and payment reduction loans. Section A6 details our sensitivity analysis and shows that our results are not determined solely by our choice of model parameter values.

Section A1: Our Representative Portfolio of SDQ FHA Loans

To conduct our cost analysis, we first construct a representative portfolio of SDQ FHA-insured loans based on SDQ FHA loans as of August 2025.[43] Our representative portfolio is comprised of ten loans, as shown in Table A1. The terms of loan 1 are set to match the average note rate, loan amount, LTV at origination, annual MIP rate, and current or mark-to-market loan-to-value ratio (MTMLTV) of all SDQ FHA loans originated between 2000 and 2015.[44] Loan 1 has an average origination date of May 2012 and represents 7% of the SDQ FHA portfolio. The remaining nine loans have terms that match the average terms of SDQ FHA loans for each origination year between 2016 and 2024. Recent vintages dominate, as 70% of the SDQ portfolio is composed of mortgages originated between 2021 and 2024. We make the simplifying assumption that loans had an original term of 30 years unless they were the result of 40-year modifications, which were completed in 2022 or later. As a result, the 2022, 2023, and 2024 representative loans have terms slightly longer than 30 years.

We estimate available PC capacity based on data provided by 2 large servicers—their portfolios indicate that the average existing SDQ FHA loan has available PC capacity in the amount of 20% of UPB at default. To distribute available PC capacity across our representative loans, we assume that older loans are more likely than more recent loans to have experienced a default episode that was resolved using the PC. Therefore, we assume the 2 oldest loans, which represent 10% of SDQ FHA loans, have exhausted their PC entirely. For loans 3 through 9, we assume that available PC capacity increases as origination year increases. For the 2024 loans, because 37% of these loans are the result of 40-year modifications, we assume half of these modifications had their PC consumed entirely by principal deferral. Our weighted-average available PC capacity is 20%, matching the benchmark data.

For loans that have already used a portion of their PC, we base the amount of existing PC dollars on the UPB at default for the current default episode. However, the actual PC amount should be calculated using the UPB at default at the time of the initial PC use, which would be higher than the UPB at default for the current default episode, which means our estimate of available PC dollars is

[43] All loan data is sourced from Recursion.
[44] MTMLTV is computed by Recursion using FHFA's state-level purchase-only house price index (non-seasonally adjusted) applied to the ratio of original loan amount / origination LTV.

too low. Our use of the most recent UPB at default to compute available PC dollars reduces our estimate of the savings generated by the current FHA home retention programs.

For each representative loan, we calculate the percentage of the SDQ portfolio it represents, the monthly P&I payment, the term, the number of months from origination to default, and the UPB at default. UPB at default (the loan balance after the last-made payment) is calculated by amortizing the original loan amount using the note rate, term, and months from origination to default for each loan.

Table A1. Terms of the Ten Representative SDQ FHA Loans.

At Origination	1	2	3	4	5	6	7	8	9	10
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Origination Loan Amount	136,419	164,726	171,746	171,181	191,030	216,978	238,927	258,640	270,744	253,765
Note Rate	4.505%	3.833%	4.138%	4.658%	4.474%	3.445%	3.118%	4.370%	6.364%	6.787%
Term (months)	360	360	360	360	360	360	360	362	373	405
LTV at Origination	93%	94%	94%	95%	95%	96%	95%	93%	93%	92%
Monthly P&I Payment	692	771	834	883	965	968	1,023	1,287	1,667	1,598
Annual MIP Rate	0.44%	0.81%	0.82%	0.82%	0.82%	0.83%	0.83%	0.83%	0.67%	0.63%
At Default										
Months from Origination to Default	147	97	85	73	60	48	36	26	13	6
MTMLTV	31%	41%	45%	50%	54%	58%	69%	78%	85%	90%
UPB at Default	101,294	137,310	147,949	152,738	174,071	199,262	223,786	249,240	267,634	252,772
Monthly T&I Payment	461	472	490	519	543	521	527	501	498	451
Remaining PC (% of UPB at Default)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Existing PC ($)	30,388	41,193	22,192	18,329	19,148	19,926	20,141	14,954	8,029	15,166

Source: Recursion, two large mortgage servicers, and author's calculations.

For loans 1 through 9, we assume that the borrower has missed 12 monthly payments of P&I, T&I, and MIP, which is set to match the average number of missed payments for SDQ loans within the portfolios of the two large servicers. For loan 10, given the average origination date is June 2024, we assume 3 on-time payments followed by 9 missed payments. Our weighted-average number of missed payments across the portfolio is 11.6, which is consistent with the benchmark data provided by servicers.

To estimate T&I payments for each representative loan shown in Table A1, we use data that represents the current T&I payment as a percentage of total mortgage payment (PITI), as shown in Table A2.

Table A2. T&I as a Percentage of T&I and PITI by Origination Year.

Origination Year	T&I (% of PITI)	T&I (% of P&I)
2005	32%	47%
2006	30%	43%
2007	33%	49%
2008	36%	56%
2009	38%	61%
2010	39%	64%
2011	40%	67%
2012	40%	67%
2013	40%	67%
2014	39%	64%
2015	39%	64%
2016	38%	61%
2017	37%	59%
2018	37%	59%
2019	36%	56%
2020	35%	54%
2021	34%	52%
2022	28%	39%
2023	23%	30%
2024	22%	28%

Source: Visual inspection of page six of ICE Mortgage Monitor - October 2024 and author's calculations.

To address the concern that a lack of granularity in our representative portfolio may bias our results, we reproduced our analysis after extending our representative portfolio to 137 loans using the same process described above. We used one loan with the average terms of all SDQ FHA loans originated before 2016, which represents 7% of the FHA SDQ portfolio. We then created one representative loan for each origination *month* that matched the average terms of 30-year SDQ FHA loans originated between January 2016 and November 2024, which resulted in 107 loans that represent 86% of SDQ FHA loans. We separately include existing SDQ FHA loans that result from redefaults of 40-year modifications, which were completed after July 2022 and November 2024, with one loan per month with matched terms, and these 29 loans represent 6% of the SDQ FHA portfolio. For the 40-year modified loans, we assume that half of these 29 loans result from 40-year Combination Loan Modification and PCs that used the entire PC balance for deferred principal. Note that if we were to instead assume that all 40-year loans had no remaining PC balance, our results would not change materially.

After repeating our analysis on this larger portfolio of representative loans, we found no material changes in our estimates of the savings from FHA's home retention programs outlined in our Findings. We use the smaller loan set for our analysis because the results are more tractable.

Section A2: Illustrating the Automatic Adjustments in the FHA Home Retention Hierarchy

The FHA home retention programs generate cost-savings relative to dispositions regardless of the prevailing mortgage rate or the relationship between the note rates on SDQ FHA-insured loans and the prevailing mortgage rate. Moreover, because the FHA home retention hierarchy automatically adjusts to use a market-rate modification when it is the most cost-effective alternative, the cost of the current FHA home retention programs is always less than or equal to the cost of a program that offers the market-rate modification alone.

In this section of the Appendix, we provide cost comparisons at the representative loan level among our three loss mitigation scenarios—the existing FHA home retention solutions, disposition only,

and market-rate modifications only—with the mortgage rate set to the current level of 6.625%. In addition, we examine the efficiency of the home retention hierarchy for the existing portfolio of FHA SDQ loans when mortgage rates are at low (2.625%) and high (10.625%) extremes. Other than for a small subset of SDQ loans that have already exhausted their PC capacity (10% based on our assumptions) and at very high mortgage rates, **the FHA home retention hierarchy chooses a home retention solution that is less costly than disposition**. **In all cases, the FHA hierarchy chooses a home retention alternative that costs the same or less than a market-rate modification.**

After considering the effects of the limitations in our analysis—how we may underestimate the value of reserving limited term extension and PC capacity for potential future default episodes and overestimate the benefits of payment reductions beyond 30% for payment reduction loans—we conclude that the FHA home retention hierarchy, without alteration, is likely to prescribe the least-costly solution from among the existing FHA home retention alternatives in the current, low and high mortgage rate environments.

Additional Baseline Cost Comparisons for Payment Resumption Loans

Below, we present analysis that shows the cost and performance of the various FHA home retention alternatives relative to disposition and market-rate modifications for payment resumption loans at the current mortgage rate (6.625%). Based on this analysis, we conclude that the FHA home retention hierarchy chooses the least-cost solution to generate loan reperformance for payment resumption loans.

The figures in Table A3 show the loan details for our ten representative SDQ FHA loans that form the basis of our analysis, as well as the payment reduction provided and expected redefault rate, disposition rate, and cost for each of the five FHA home retention alternatives available to resolve payment resumption loans. Note that because these are payment resumption loans, we have set the payment reduction target for the FHA modifications to $1.[45]

We assume the first two loans in the portfolio, which are also the oldest loans, have exhausted their PC capacity in previous default episodes, and are therefore ineligible for a Standalone PC. The number of actual SDQ FHA loans represented by each of the loans in Table A3 is calculated by first applying the 20% non-response rate and then the assumption that 55% of SDQ FHA loans are payment resumption loans, as discussed in Section III.

Table A3. Payment Reductions, Default and Disposition Rates, and Expected Costs for FHA Home Retention Alternatives for Payment Resumption Loans.

[45] PS is not included in Table A3 because with a payment reduction target of $1 it would have the same terms and costs as a Standalone PC.

Payment Resumption Loan Details	1	2	3	4	5	6	7	8	9	10
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Note Rate	4.50%	3.83%	4.14%	4.66%	4.47%	3.44%	3.12%	4.37%	6.36%	6.79%
Remaining PC (% of Default UPB)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Number of SDQ Loans	9,166	3,293	3,713	4,034	5,594	11,309	27,126	27,283	16,518	14,982
Home Retention Solution	40y Mod	40y Mod	PC	PC	PC	PC	PC	PC	PC	PC
P&I Reduction Provided										
Standalone PC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30-Year Loan Mod	-7%	-28%	-28%	-25%	-30%	-46%	-54%	-38%	-16%	-12%
40-Year Loan Mod	-3%	-23%	-23%	-20%	-25%	-40%	-48%	-32%	-11%	-8%
30-Year Combo Mod	-7%	-28%	-10%	-5%	-8%	-19%	-24%	-7%	0%	0%
40-Year Combo Mod	-3%	-23%	-6%	-1%	-3%	-14%	-19%	-3%	0%	0%
Expected Redefault Rate										
Standalone PC	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
30-Year Loan Mod	46%	76%	75%	72%	78%	93%	95%	87%	58%	53%
40-Year Loan Mod	41%	68%	68%	64%	71%	90%	94%	81%	52%	47%
30-Year Combo Mod	46%	76%	50%	43%	47%	63%	70%	46%	38%	38%
40-Year Combo Mod	41%	68%	45%	39%	42%	56%	63%	41%	38%	38%
Expected Disposition Rate										
Standalone PC	N/A	N/A	21%	21%	21%	21%	21%	21%	21%	21%
30-Year Loan Mod	28%	45%	45%	43%	47%	56%	57%	52%	35%	32%
40-Year Loan Mod	25%	41%	41%	39%	43%	54%	56%	49%	31%	28%
30-Year Combo Mod	28%	45%	30%	26%	28%	38%	42%	28%	23%	23%
40-Year Combo Mod	25%	41%	27%	23%	25%	33%	38%	25%	23%	23%
Expected Cost ($)										
Standalone PC	N/A	N/A	**17,933**	**18,019**	**20,196**	**22,707**	**24,995**	**26,804**	**27,069**	**24,849**
30-Year Loan Mod	16,058	34,037	32,635	31,541	38,523	51,058	57,393	57,641	41,188	35,718
40-Year Loan Mod	**14,384**	**30,855**	29,569	28,446	35,057	49,079	56,747	53,533	36,706	31,804
30-Year Combo Mod	16,558	34,537	23,951	21,783	25,931	36,792	44,628	35,172	30,552	28,523
40-Year Combo Mod	14,884	31,355	21,518	19,649	23,329	33,159	40,459	31,640	29,521	27,624
Disposition	30,024	40,699	38,792	39,003	44,054	49,975	55,615	60,236	62,851	61,090

Source: Recursion and Author's calculations.

The last row under loan details (highlighted in yellow) shows which home retention alternative is provided to each loan under the current FHA hieararchy after following the steps outlined in Exhibit 1. Loans 1 and 2 are ineligible for the PC due to no PC capacity and therefore receive a 40-year Standalone Loan Modification. The other 8 loans are resolved with a Standalone PC. The remaining sections of Table A3 show the payment reduction delivered and the expected redefault rate, disposition rate, and cost of each solution for each loan. The lowest cost solution for each loan is shown in green.

With respect to payment reduction delivered, by design, the Standalone PC resolves delinquent loans without changing the monthly payment. In contrast, both the 30-year and 40-year Standalone Loan Modifications lead to an **increase** in monthly payments for all loans. The 30-year and 40-year Combination Modification and PC alternatives can only reach the payment reduction target (0% for payment resumption loans) for loans 9 and 10, which have at-market note rates.

As would be expected, the redefault and disposition rates for each home retention solution reflect the variation in payment reduction provided—larger payment reductions (increases) lead to lower (higher) redefault and disposition rates. The expected cost for each loan and home retention alternative aligns with the expected redefault and disposition rates—for a given loan, the home retention alternative that has the lowest redefault and disposition rates also has the lowest expected cost. Note that the expected costs include both the cost of providing the home retention alternative and the cost of disposition for those loans that subsequently redefault and result in a claim on the MMIF, as described in further detail in Section A3.

Relative to the expected cost of disposition, the FHA home retention hierarchy chooses a less costly home retention solution for all ten representative loans. This is clear when we compare the expected cost of the solution provided, shown in green, to the expected cost of disposition, the last row in Table A3. Moreover, the current hierarchy also prescribes a home retention solution that is less costly than a market-rate modification. The expected cost of the solution provided for each loan is lower than the cost of the 30-year Standalone Loan Modification, which matches the terms of a market-rate modification.

The home retention hierarchy also determines the least costly alternative from among the current FHA home retention solutions for all ten representative SDQ loans. Loans 1 and 2 are resolved with a 40-year Standalone Loan Modification, which has the lowest expected cost among the FHA home retention alternatives. Loans 3 through 10 are resolved with a Standalone PC, which also has the lowest expected cost among the FHA home retention alternatives.

Additional Baseline Comparisons for Payment Reduction Loans

To arrive at Finding 5, we applied the FHA home retention hierarchy in Exhibit 1 to our ten representative SDQ FHA loans at current mortgage rates and examined the payment reduction provided and expected redefault rate, disposition rate, and cost for each of the five FHA home retention alternatives available for payment reduction loans as well as disposition. The details of this analysis are shown in Table A4.

A few details are worth highlighting from the "loan details" section of Table A4. The first eight loans have note rates between 3.12% and 4.66%, which are well below the current rate (around 6.625%). As shown in Table A4, we assume the first two loans in the portfolio, which represent the oldest loans, have exhausted their PC capacity in previous default episodes, and are therefore ineligible for PS. In addition, we assume that all of the remaining loans have already used some portion of their PC.[46] The number of actual SDQ FHA loans represented by each of the loans in Table A4 is calculated by first applying the 20% non-response rate and then the assumption that 45% of SDQ FHA loans are payment reduction loans, as discussed in Section III. The last row under loan details, highlighted in yellow, shows which home retention alternative is provided to each loan under the current FHA programs after following the steps outlined in Exhibit 1.

The next section of Table A4 shows that for most SDQ loans, FHA modifications lead to an **increase** in monthly payment because they set the modified interest rate to the prevailing mortgage rate. Both the 30-year and 40-year Standalone Loan Modifications lead to an increase in monthly payments for all loans. The 30-year and 40-year Combination Loan Modification and PC can only provide a material payment reduction for loans 9 and 10, which have at-market note rates (6.36% and 6.79% respectively). In contrast, the PS can provide payment reductions of between 11% and 25% for all 8 eligible loans. The PS cannot reach the 25% payment reduction target for loan 3 due to limited PC capacity and cannot reach the target for loans 9 and 10 because payment reduction from the PS is limited to the principal portion of the monthly payment.

[46] 37% of the 2024 loans are the result of 40-year modifications, and we assume half of these modifications were Combination Loan Modification and PCs that used the full allotment of PC funds for principal deferral and therefore have no remaining PC funds.

The combination of PC capacity and amount of payment reduction provided determine the home retention solution provided for each loan. Loans 1 and 2 are ineligible for PS due to no PC capacity and therefore receive a 40-year Standalone Loan Modification. The PS is the only solution that provides payment reduction for loans 3 through 8, so they receive this solution. For loans 9 and 10, the 40-year Combination Loan Modification and PC can provide a payment reduction of at least 15% and, because it offers a permanent reduction and therefore has the lowest expected cost to FHA, is offered in lieu of the PS by the FHA home retention hierarchy.

Table A4. Payment Reductions, Default and Disposition Rates, and Expected Costs for FHA Home Retention Alternatives for Payment Reduction Loans.

Loan Details	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Note Rate	4.50%	3.83%	4.14%	4.66%	4.47%	3.44%	3.12%	4.37%	6.36%	6.79%
Remaining PC (% of Default UPB)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Number of SDQ Loans	7,500	2,695	3,038	3,300	4,577	9,253	22,194	22,322	13,515	12,258
Home Retention Solution	40y Mod	40y Mod	PS	PS	PS	PS	PS	PS	40y Combo	40y Combo
P&I Reduction Provided										
30-Year Loan Mod	-7%	-28%	-28%	-25%	-30%	-46%	-54%	-38%	-16%	-12%
40-Year Loan Mod	-3%	-23%	-23%	-20%	-25%	-40%	-48%	-32%	-11%	-8%
30-Year Combo Mod	-7%	-28%	-10%	-5%	-8%	-19%	-24%	-7%	12%	13%
40-Year Combo Mod	-3%	-23%	-6%	-1%	-3%	-14%	-19%	-3%	16%	16%
Payment Supplement	N/A	N/A	17%	25%	25%	25%	25%	25%	16%	11%
Expected Redefault Rate										
30-Year Loan Mod	72%	85%	85%	84%	86%	92%	94%	89%	78%	75%
40-Year Loan Mod	68%	82%	82%	81%	83%	90%	93%	87%	75%	72%
30-Year Combo Mod	72%	85%	74%	70%	72%	80%	83%	72%	54%	54%
40-Year Combo Mod	68%	82%	71%	66%	69%	77%	80%	68%	51%	51%
Payment Supplement	N/A	N/A	56%	50%	49%	49%	49%	49%	56%	59%
Expected Disposition Rate										
30-Year Loan Mod	43%	51%	51%	50%	52%	55%	56%	54%	47%	45%
40-Year Loan Mod	41%	49%	49%	49%	50%	54%	56%	52%	45%	43%
30-Year Combo Mod	43%	51%	45%	42%	43%	48%	50%	43%	33%	32%
40-Year Combo Mod	41%	49%	42%	40%	41%	46%	48%	41%	31%	30%
Payment Supplement	N/A	N/A	33%	30%	30%	29%	29%	29%	34%	36%
Expected Cost ($)										
30-Year Loan Mod	24,382	38,176	36,735	36,654	42,254	50,328	56,817	58,921	54,907	50,586
40-Year Loan Mod	**23,240**	**36,995**	35,592	35,445	41,003	49,340	55,928	57,467	52,675	48,374
30-Year Combo Mod	24,882	38,676	33,346	32,225	37,097	45,356	51,693	49,984	42,690	40,119
40-Year Combo Mod	23,740	37,495	31,894	30,686	35,396	43,685	49,985	47,659	**40,084**	**37,670**
Payment Supplement	N/A	N/A	**27,136**	**25,627**	**28,509**	**31,574**	**34,465**	**37,455**	42,442	41,627
Disposition	30,024	40,699	38,792	39,003	44,054	49,975	55,615	60,236	62,851	61,090

Source: Recursion and Author's calculations.

As would be expected, the redefault and disposition rates for each home retention solution reflect the variation in payment reduction provided to payment reduction loans—larger payment reductions lead to lower redefault and disposition rates. Note that the redefault rates for PS reflect both redefaults that occur during the PS term and redefaults that result when the payment increases to the initial level after the PS terminates. This is an important consideration for loans nine and ten, as the cumulative expected redefault rates for PS are higher than the expected redefault rates for the 40-year Combination Loan Modification and PC, which is why the FHA home retention hierarchy prescribes the modification to resolve these delinquent loans.

The expected cost for each loan and home retention alternative aligns with the expected redefault and disposition rates. For each loan, the alternative with the lowest expected cost is shown in green and, because the FHA home retention programs are organized cost-efficiently, the home retention alternative provided aligns with the lowest cost alternative for each loan. In other words, for payment reduction loans, **following the steps outlined in Exhibit 1 to determine which home**

retention alternative is applied to each loan results in the application of the lowest cost alternative.

Based on the expected costs and disposition rates for loans 3 through 8, shown in Table A4, we can calculate the aggregate savings and number of averted dispositions created by the PS relative to various alternatives for the existing SDQ FHA loan population, which are shown in Table A5 and form the basis for Finding 5. Relative to dispositions, applying PS saves FHA $20,000 per loan on average and $1.3 billion across the portfolio by cutting the disposition rate in about half, averting 19,700 dispositions.

Table A5. Savings and Averted Dispositions Generated by Payment Supplement.

Savings from Payment Supplement	Loan 3	Loan 4	Loan 5	Loan 6	Loan 7	Loan 8	Avg/Total
Relative to Disposition							
Expected Per Loan Savings	$11,656	$13,376	$15,545	$18,400	$21,150	$22,781	$20,080
Total Savings ($ millions)	$35	$44	$71	$170	$469	$509	$1,299
Avoided Dispositions	808	996	1,388	2,833	6,840	6,856	19,721
Relaive to Market-Rate Modification							
Expected Per Loan Savings	$9,599	$11,027	$13,745	$18,754	$22,352	$21,466	$19,746
Total Savings ($ millions)	$29	$36	$63	$174	$496	$479	$1,277
Avoided Dispositions	534	672	1,005	2,388	6,045	5,411	16,057
Relative to 40y Combo Mod							
Expected Per Loan Savings	$4,758	$5,059	$6,886	$12,111	$15,521	$10,203	$11,548
Total Savings ($ millions)	$14	$17	$32	$112	$344	$228	$747
Avoided Dispositions	275	330	526	1,556	4,196	2,601	9,484

Source: Author's calculations.

The savings from PS relative to market-rate modifications are similarly compelling. Because the note rates on loans 3 through 8 are well below the prevailing mortgage rate today, a market-rate modification **increases** the P&I payment on all six loans by an average of 43%. As a result, the PS has a lower expected redefault (49%) and disposition (30%) rate for these SDQ loans compared to a market-rate modification (91% redefault rate and 54% disposition rate), which results in a projected savings of $19,700 per loan on average and $1.28 billion across the portfolio, on 16,100 averted dispositions. Notably, the PS achieves a cost and loan reperformance advantage over a market-rate modification with a 40-year term and modified interest rate set to PMMS + 0.50%, which has the same terms, costs, and expected reperformance as FHA's 40-year Standalone Loan Modification.

Similarly, if FHA were to eliminate PS from its home retention program, the 64,683 loans represented by loans 3 through 8 would be provided with a 40-year Combination Loan Modification and PC instead, which is the next best (i.e. least-costly) alternative shown in Table A4. This would cost FHA an additional $11,500 per loan on average, total $747 million in additional costs to the MMIF across the SDQ FHA portfolio, and result in an additional 9,500 dispositions.

Cost Comparisons at Low Mortgage Rates

We can illustrate how the FHA home retention hierarchy adjusts when mortgage rates fall by examining which home retention solution is used for each representative SDQ FHA loan with the mortgage rate at 2.625%. At low rates, the expected costs of resolving each representative SDQ loan under the current programs are substantially less than the costs of disposition. Moreover, for the reasons described above, the hierarchy optimizes to find the least-costly alternative for FHA and prescribes market-rate modifications when rates are low.

We also examine below whether the FHA home retention hierarchy prescribes the least-costly alternative from among the FHA home retention alternatives when mortgage rates are low. At first glance, our analysis indicates that FHA could reduce the cost of their home retention programs by adjusting their hierarchy to prescribe term extension to 40 years for more loans. However, we make two key assumptions that affect our results—that post-intervention redefaults are not resolved with a second home retention solution and that payment reductions beyond 30% provide incremental reductions in redefaults. After consideration of two limitations due to our assumptions and that the FHA home retention hierarchy is prescribing 30-year modifications in order to preserve term extension capacity and PC funds and reduce their exposure to future redefaults, we conclude that the FHA hierarchy is likely prescribing the most cost-effective solution to resolve SDQ loans when mortgage rates are low.

Expected Cost of Resolving Payment Resumption Loans at Low Mortgage Rates

We begin with the results for payment resumption loans, which are shown in Table A6. Table A6 is analogous to Table A3, showing the loan details, changes in monthly payment, expected redefault and disposition rates, and expected cost of each home retention alternative. With the mortgage rate at 2.625% and assuming FHA's borrowing rate has fallen to 1.50%, all loans are resolved with a 30-year Standalone Loan Modification. In this situation, the modification can provide all ten loans with at least $1 of payment reduction, so it is less costly than and therefore preferred over the Standalone PC. The lowest cost solution for each loan is shown in green and mismatches between the solution provided and the lowest cost solution are shown in red.

A comparison of the expected costs at the bottom of Table A6 affirms our conclusion that, at low rates, the FHA home retention hierarchy is more cost-effective for payment resumption loans than the disposition scenario and, at a minimum, equally cost-effective compared to the market-rate modification scenario. For all ten representative loans, the provided FHA home retention solution, the 30-year Standalone Loan Modification, is considerably less costly than disposition. Moreover, since this modification matches the terms of a market-rate modification, the expected costs under the current FHA home retention programs and the market-rate modifications scenario are equivalent.

Among the FHA home retention solutions, for loan 1 the hierarchy prescribes the cheapest alternative, a 30-year Standalone Loan Modification, and therefore the hierarchy is internally efficient. For loans 2 through 10, however, our analysis indicates that a 40-year Standalone Loan Modification would be less costly to FHA than the 30-year Standalone Loan Modification prescribed by the hierarchy. These results indicate that the FHA home retention hierarchy has not chosen the least-costly alternative for these payment resumption loans. However, the results shown in Table A6 for loans 2 through 10 reflect a simplifying assumption in our analysis that post-intervention redefaults cannot be resolved with an additional home retention solution. As described below, once we account for the limitation associated with this assumption, the FHA home retention hierarchy *is* likely structured in the most cost-effective manner.

Table A6. Payment Reductions, Default and Disposition Rates, and Expected Costs for FHA Home Retention Alternatives for Payment Resumption Loans with the Mortgage Rate at 2.625%.

Loan Details	1	2	3	4	5	6	7	8	9	10
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Note Rate	4.50%	3.83%	4.14%	4.66%	4.47%	3.44%	3.12%	4.37%	6.36%	6.79%
Remaining PC (% of Default UPB)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Number of SDQ Loans	9,166	3,293	3,713	4,034	5,594	11,309	27,126	27,283	16,518	14,982
Home Retention Solution	30y Mod	30y Mod	30y Mod	30y Mod	30y Mod	30y Mod	30y Mod	30y Mod	30y Mod	30y Mod
P&I Reduction Provided										
Standalone PC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30-Year Loan Mod	32%	19%	19%	21%	18%	8%	3%	13%	27%	29%
40-Year Loan Mod	40%	29%	29%	30%	28%	19%	14%	23%	35%	38%
30-Year Combo Mod	32%	19%	19%	21%	18%	8%	3%	13%	27%	29%
40-Year Combo Mod	40%	29%	29%	30%	28%	19%	14%	23%	35%	38%
Expected Redefault Rate										
Standalone PC	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
30-Year Loan Mod	23%	25%	25%	24%	25%	31%	36%	28%	23%	23%
40-Year Loan Mod	23%	23%	23%	23%	23%	25%	27%	24%	23%	23%
30-Year Combo Mod	23%	25%	25%	24%	25%	31%	36%	28%	23%	23%
40-Year Combo Mod	23%	23%	23%	23%	23%	25%	27%	24%	23%	23%
Expected Disposition Rate										
Standalone PC	N/A	N/A	21%	21%	21%	21%	21%	21%	21%	21%
30-Year Loan Mod	14%	15%	15%	15%	15%	19%	21%	17%	14%	14%
40-Year Loan Mod	14%	14%	14%	14%	14%	15%	16%	14%	14%	14%
30-Year Combo Mod	14%	15%	15%	15%	15%	19%	21%	17%	14%	14%
40-Year Combo Mod	14%	14%	14%	14%	14%	15%	16%	14%	14%	14%
Expected Cost ($)										
Standalone PC	N/A	N/A	15,272	15,421	17,289	19,539	21,625	23,234	24,625	23,434
30-Year Loan Mod	8,432	11,872	11,441	11,365	13,149	17,681	22,079	18,916	16,963	16,047
40-Year Loan Mod	8,476	11,019	10,642	10,732	12,044	14,407	17,012	16,375	16,718	16,000
30-Year Combo Mod	8,932	12,372	11,941	11,865	13,649	18,181	22,579	19,416	17,463	16,547
40-Year Combo Mod	8,976	11,519	11,142	11,232	12,544	14,907	17,512	16,875	17,218	16,500
Disposition	30,024	40,699	38,792	39,003	44,054	49,975	55,615	60,236	62,851	61,090

Source: Recursion and Author's calculations.

To simplify our analysis, our cost estimates are based on a single use of home retention, as we assume that any post-intervention redefaults either result in a self-cure or disposition. As a result, we ignore the possibility that, because FHA has a rule that a borrower may receive only one retention option in a 24-month period, some post-intervention redefaults will reperform through a subsequent intervention rather than either self-curing or moving directly to disposition.

After considering future default episodes and the potential for subsequent home retention actions, FHA's choice to use the 30-year Standalone Loan Modification for loans 2 through 10 may reflect a preference for preserving term extension and PC capacity, which are both limited, and the desire to reduce their exposure through the faster amortization offered by the 30-year modification. In other words, it may be more cost-effective for FHA to first apply a home retention alternative that can reach the target payment (the original monthly P&I payment for these loans) and is therefore likely to lead to reperformance and less risk, before using term extension or PC funds to provide what may be unnecessary payment reduction beyond the target payment.

The benefits of term extension are limited because once a loan term is extended to 40 years, any subsequent use of term extension will produce less payment reduction. The amount of payment reduction created by term extension is determined by the difference between the modified loan term and the original loan term. For example, holding all other loan terms constant, extending a 4.00% loan with 25 years remaining to maturity to a 40-year term reduces the monthly payment by 21%, whereas extending a 4.00% loan with 35 years remaining to maturity to a 40-year term reduces the monthly payment by just 6%. In the home retention context, then, modifying a delinquent loan five years after origination and extending the term from 25 to 40 years can produce

substantial payment reduction. However, if the modified loan redefaults five years later, extending the term from 35 to 40 years to resolve the second default episode will offer little benefit. Therefore, when a Standalone PC or modification with a 30-year term is sufficient to reach a payment target, FHA may wish to use it and reserve term extension to 40 years for a future default episode.

Partial claim funds are limited to 30% of UPB at default at the time of the first PC use, and because we only consider a single use of home retention alternatives, our analysis cannot make a quantitative distinction between alternatives that use more PC funds and those that use less PC funds. This limitation in our approach is evident in the cost comparisons when mortgage rates are low for payment reduction loans that match the terms of loan 8, as discussed in the next section. For this loan, our analysis indicates a 40-year Combination Loan Modification and PC would have a lower cost than the prescribed FHA solution, a 30-year Combination Loan Modification and PC, but our analysis does not quantify the cost or benefit of using additional PC funds rather than term extension to provide payment reduction.

Use of the 30-year Standalone Loan Modification rather than the 40-year has an additional benefit to FHA because the 30-year loan amortizes faster than a 40-year loan. As a result, by using the 30-year Standalone Loan Modification when it reaches the payment target, FHA is reducing their expected losses in the event of a future redefault that leads to disposition.

While the consideration of such trade-offs in the use of term extension and PC capacity for future home retention actions is beyond the scope of our analysis, in designing their current home retention program, FHA may have explicitly considered the probability of future default episodes and the trade-offs noted above, and may have chosen to structure the home retention hierarchy to preserve term extension and PC funds accordingly.

In light of the limitations noted above regarding the potential value to FHA of preserving term extension and PC capacity, we return to the analysis in Table A6 and note that FHA's choice of the 30-year Standalone Loan Modification may in fact be optimal for loans 2 through 10. These borrowers have stated that they can resume their original monthly payment, so the FHA home retention hierarchy sets the original monthly payment as the target and only allows use of the 30-year Standalone Loan Modification, which preserves both PC capacity and term extension to 40 years and has the benefit of faster amortization, when it can provide at least $1 of payment reduction. In other words, after considering the value of preserving term extension and PC capacity and reducing their exposure to future redefaults, FHA seems to have made an explicit choice to preserve these limited resources for a potential future default episode and limit their risk when another solution can reach the target payment that produces reperformance. In this case, using the 30-year Standalone Loan Modification in lieu of the Standalone PC also reduces FHA's administrative burden because the modification requires no PC.

Expected Cost of Resolving Payment Reduction Loans at Low Mortgage Rates

The results for payment reduction loans are shown in Table A7. In this case, all loans are resolved with modifications instead of PS, as FHA's modifications can produce sufficient payment reduction to reach the target and cost less than PS.

Once again, a comparison of the expected costs at the bottom of Table A7 supports our conclusion that, at low rates, the FHA home retention hierarchy is more cost-effective than the disposition scenario and the market-rate modification scenario. At low rates, the FHA home retention hierarchy determines solutions that deliver significant savings relative to disposition for payment reduction loans for all ten representative loans. In addition, the hierarchy either uses a market-rate modification (the FHA 30-year Standalone Loan Modification) or an FHA modification with a lower expected cost than the market-rate modification, and therefore the current FHA home retention programs are more cost-effective than a scenario that only includes market-rate modifications.

Among the FHA home retention solutions, FHA's hierarchy resolves loans 2 through 7, which represent 43% of SDQ FHA loans, using the lowest-cost alternative. For loans 1, 8, 9, and 10, it appears that FHA could reduce their costs by resolving these loans using 40-year modifications rather than 30-year modifications, even though the latter already reach FHA's target of a 25% payment reduction. However, for the reasons described below, the FHA hierarchy is likely choosing the most cost-effective alternative from among the existing FHA home retention solutions.

Once we account for the fact that our payment reduction redefault function is likely to underestimate redefault rates when payment reductions exceed 30%, the 40-year Standalone Loan Modification becomes more costly relative to the 30-year version for loans 1, 9, and 10, indicating the FHA hierarchy is in fact choosing the least costly alternative. For loans 1, 9, and 10, the 40-year Standalone Loan Modification would increase the payment reduction relative to the 30-year modification from 27% - 32% to 35% - 40%, which according to our payment reduction redefault function creates a 6 to 8 percentage point reduction in redefault rates. However, as described in Section A5 below, our payment reduction redefault function is likely to assign redefault rates that are too low for payment reductions beyond 30%.

As a result, for these three loans, we are likely to overestimate the cost advantage produced by the incremental payment reductions from extending the term from 30 years to 40 years. For example, if we were to eliminate any marginal improvement in redefault rates beyond a 25% payment reduction for loans 1, 9, and 10, the 30-year Standalone Loan Modification would cost the same as the 40-year Standalone Loan Modification, and therefore the FHA home retention hierarchy would have chosen the most cost-effective solutions while also preserving an extra 10 years of term extension should the borrower have another default episode in the future. By setting their monthly P&I payment reduction target to 25%, FHA has incorporated the latest analysis that shows the declining marginal benefit of payment reduction beyond 30%, which likely improves the cost-effectiveness of its home retention programs.[47]

For loan 8, our analysis suggests that FHA could save $738 by using a 40-year Combination Loan Modification and PC rather than the selected 30-year Combination Loan Modification and PC. The former modification uses less deferred principal ($5,449) than the latter ($37,094), which creates the cost differential. In this case, the FHA hierarchy is making a trade-off between using more PC funds, in the amount of 12.7% of UPB at default, while preserving 10 years of term extension, and the cost of this choice is quite modest. FHA could equally have chosen to use term extension and preserve PC funds, which would yield an equally small savings.

[47] As discussed in Section A5.

For all four of these loans, by using 30-year rather than 40-year modifications, FHA will get the benefit of faster amortization, reducing their exposure in the event of a future redefault.

Table A7. Payment Reductions, Default and Disposition Rates, and Expected Costs for FHA Home Retention Alternatives for Payment Reduction Loans with the Mortgage Rate at 2.625%.

Loan Details	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Note Rate	4.50%	3.83%	4.14%	4.66%	4.47%	3.44%	3.12%	4.37%	6.36%	6.79%
Remaining PC (% of Default UPB)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Number of SDQ Loans	7,500	2,695	3,038	3,300	4,577	9,253	22,194	22,322	13,515	12,258
Home Retention Solution	30y Mod	40y Mod	40y Mod	40y Mod	40y Mod	40y Combo	40y Combo	30y Combo	30y Mod	30y Mod
P&I Reduction Provided										
30-Year Loan Mod	32%	19%	19%	21%	18%	8%	3%	13%	27%	29%
40-Year Loan Mod	40%	29%	29%	30%	28%	19%	14%	23%	35%	38%
30-Year Combo Mod	32%	19%	25%	25%	25%	25%	22%	25%	27%	29%
40-Year Combo Mod	40%	29%	29%	30%	28%	25%	25%	25%	35%	38%
Payment Supplement	N/A	N/A	17%	25%	25%	25%	25%	25%	16%	11%
Expected Redefault Rate										
30-Year Loan Mod	35%	48%	48%	46%	49%	59%	64%	54%	41%	38%
40-Year Loan Mod	29%	39%	39%	37%	40%	48%	53%	44%	33%	31%
30-Year Combo Mod	35%	48%	42%	42%	42%	42%	45%	42%	41%	38%
40-Year Combo Mod	29%	39%	39%	37%	40%	42%	42%	42%	33%	31%
Payment Supplement	N/A	N/A	56%	50%	49%	49%	49%	49%	56%	59%
Expected Disposition Rate										
30-Year Loan Mod	21%	29%	29%	28%	29%	35%	38%	32%	24%	23%
40-Year Loan Mod	17%	23%	23%	22%	24%	29%	32%	26%	20%	19%
30-Year Combo Mod	21%	29%	25%	25%	25%	25%	27%	25%	24%	23%
40-Year Combo Mod	17%	23%	23%	22%	24%	25%	25%	25%	20%	19%
Payment Supplement	N/A	N/A	33%	30%	30%	29%	29%	29%	34%	36%
Expected Cost ($)										
30-Year Loan Mod	**12,567**	21,926	21,072	20,680	24,540	32,539	38,726	35,881	**29,011**	**26,192**
40-Year Loan Mod	**10,347**	**17,916**	**17,223**	**16,891**	**20,047**	26,855	32,228	29,368	**23,587**	**21,324**
30-Year Combo Mod	13,067	22,426	19,522	19,694	22,124	25,158	29,497	**29,761**	29,511	26,692
40-Year Combo Mod	10,847	18,416	17,723	17,391	20,547	**24,471**	**27,163**	**29,023**	24,087	21,824
Payment Supplement	N/A	N/A	24,779	22,734	25,242	27,979	30,603	33,260	40,224	40,453
Disposition	30,024	40,699	38,792	39,003	44,054	49,975	55,615	60,236	62,851	61,090

Source: Recursion and Author's calculations.

Cost Comparisons at High Mortgage Rates

We can also illustrate how the FHA home retention hierarchy adjusts when mortgage rates rise by examining which home retention solution is used for each representative loan with the mortgage rate at 10.625%. In this case, we assume FHA's borrowing cost is 8.35%. At high rates, the existing FHA home retention programs continue to provide cost savings relative to dispositions and market-rate modification because the Standalone PC and PS generate better loan reperformance. In addition, the hierarchy determines the most cost-effective home retention solution from amongst the FHA alternatives for all ten representative loans.

Expected Cost of Resolving Payment Resumption Loans at High Mortgage Rates

For payment resumption loans, cost comparisons are shown in Table A8. In this instance, 90% of the SDQ FHA portfolio that are payment resumption loans are resolved with solutions that are less costly than disposition. Should the mortgage rate increase to 10.625%, only for loans 1 and 2, which represent the remaining 10% of SDQ FHA payment resumption loans, would disposition be a less costly alternative to a 40-year Standalone Loan Modification, the solution provided by the FHA home retention hierarchy. Note that this outcome is due to our assumption that these loans have already exhausted their available PC capacity and are no longer eligible for a less-costly

Standalone PC, which illustrates the importance and value to FHA of retaining PC capacity when possible. Moreover, the expected cost difference is modest, less than $2,000. These results hold even after we expand our set of representative loans to 137 loans, as described in Section A1. Disposition is only less costly than the home retention alternative selected by the FHA hierarchy for loans that we assume have no remaining PC capacity, and the cost difference is modest, $2,500 on average and $3,000 at most.

Relative to market-rate modifications, the existing FHA home retention hierarchy retains its advantage, as it either prescribes lower cost options (Standalone PCs for loans 3 through 10) or a 40-year Standalone Loan Modification with the same cost as a market-rate modification (loans 1 and 2). For all ten representative loans, the FHA home retention hierarchy dictates the least costly FHA home retention solution.

Table A8. Payment Reductions, Default and Disposition Rates, and Expected Costs for FHA Home Retention Alternatives for Payment Resumption Loans with the Mortgage Rate at 10.625%.

Loan Details	1	2	3	4	5	6	7	8	9	10
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Note Rate	4.50%	3.83%	4.14%	4.66%	4.47%	3.44%	3.12%	4.37%	6.36%	6.79%
Remaining PC (% of Default UPB)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Number of SDQ Loans	9,166	3,293	3,713	4,034	5,594	11,309	27,126	27,283	16,518	14,982
Home Retention Solution	40y Mod	40y Mod	PC	PC	PC	PC	PC	PC	PC	PC
P&I Reduction Provided										
Standalone PC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30-Year Loan Mod	-54%	-84%	-84%	-80%	-87%	-110%	-121%	-98%	-67%	-61%
40-Year Loan Mod	-53%	-83%	-83%	-79%	-86%	-109%	-120%	-97%	-66%	-60%
30-Year Combo Mod	-54%	-84%	-58%	-51%	-54%	-71%	-78%	-54%	-26%	-25%
40-Year Combo Mod	-53%	-83%	-58%	-50%	-54%	-70%	-77%	-53%	-25%	-25%
Expected Redefault Rate										
Standalone PC	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
30-Year Loan Mod	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
40-Year Loan Mod	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
30-Year Combo Mod	95%	95%	95%	95%	95%	95%	95%	95%	72%	72%
40-Year Combo Mod	95%	95%	95%	94%	95%	95%	95%	95%	71%	71%
Expected Disposition Rate										
Standalone PC	N/A	N/A	21%	21%	21%	21%	21%	21%	21%	21%
30-Year Loan Mod	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%
40-Year Loan Mod	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%
30-Year Combo Mod	57%	57%	57%	57%	57%	57%	57%	57%	43%	43%
40-Year Combo Mod	57%	57%	57%	56%	57%	57%	57%	57%	43%	42%
Expected Cost ($)										
Standalone PC	N/A	N/A	**22,719**	**23,187**	**25,741**	**27,988**	**30,421**	**33,457**	**35,305**	**30,686**
30-Year Loan Mod	31,996	42,489	40,952	41,477	46,544	51,944	57,393	62,676	66,527	63,397
40-Year Loan Mod	**31,996**	**42,489**	40,952	41,477	46,544	51,944	57,393	62,676	66,527	63,397
30-Year Combo Mod	32,496	42,989	41,694	42,277	47,405	52,879	58,406	63,829	55,667	52,238
40-Year Combo Mod	32,496	42,989	41,661	41,892	47,356	52,820	58,336	63,740	54,589	51,253
Disposition	30,024	40,699	38,792	39,003	44,054	49,975	55,615	60,236	62,851	61,090

Source: Recursion and Author's calculations.

Expected Cost of Resolving Payment Reduction Loans at High Mortgage Rates

For payment reduction loans, cost comparisons are shown in Table A9. Once again, 90% of the SDQ FHA portfolio that are payment reduction loans are resolved with solutions that are less costly than disposition, while disposition would be a less costly alternative for the 10% of the payment reduction loans represented by loans 1 and 2. Again, these are the two loans we have assumed have no available PC capacity. Relative to market-rate modifications, the results are the same as for the payment resumption loans: the FHA home retention hierarchy retains its cost advantage, as it either chooses lower cost options (PS for loans 3 through 8) or a 40-year Standalone Loan

Modification with the same cost as a market-rate modification (loans 1 and 2).[48] Within the FHA home retention solutions, for all ten loans, the FHA home retention hierarchy offers the least costly alternative.

Table A9. Payment Reductions, Default and Disposition Rates, and Expected Costs for FHA Home Retention Alternatives for Payment Reduction Loans with the Mortgage Rate at 10.625%.

Loan Details	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Origination Year	2012	2016	2017	2018	2019	2020	2021	2022	2023	2024
Weighted % of SDQ Portfolio	7.1%	2.5%	2.9%	3.1%	4.3%	8.7%	21.0%	21.1%	12.8%	11.6%
Note Rate	4.50%	3.83%	4.14%	4.66%	4.47%	3.44%	3.12%	4.37%	6.36%	6.79%
Remaining PC (% of Default UPB)	0%	0%	15%	18%	19%	20%	21%	24%	27%	24%
Number of SDQ Loans	7,500	2,695	3,038	3,300	4,577	9,253	22,194	22,322	13,515	12,258
Home Retention Solution	40y Mod	40y Mod	PS	PS	PS	PS	PS	PS	PS	PS
P&I Reduction Provided										
30-Year Loan Mod	-54%	-84%	-84%	-80%	-87%	-110%	-121%	-98%	-67%	-61%
40-Year Loan Mod	-53%	-83%	-83%	-79%	-86%	-109%	-120%	-97%	-66%	-60%
30-Year Combo Mod	-54%	-84%	-58%	-51%	-54%	-71%	-78%	-54%	-26%	-25%
40-Year Combo Mod	-53%	-83%	-58%	-50%	-54%	-70%	-77%	-53%	-25%	-25%
Payment Supplement	N/A	N/A	17%	25%	25%	25%	25%	25%	16%	11%
Expected Redefault Rate										
30-Year Loan Mod	94%	98%	98%	98%	98%	99%	100%	99%	96%	95%
40-Year Loan Mod	94%	98%	98%	98%	98%	99%	100%	99%	96%	95%
30-Year Combo Mod	94%	98%	95%	93%	94%	97%	98%	94%	84%	84%
40-Year Combo Mod	94%	98%	95%	93%	94%	97%	97%	94%	84%	83%
Payment Supplement	N/A	N/A	56%	50%	49%	49%	49%	49%	56%	59%
Expected Disposition Rate										
30-Year Loan Mod	56%	59%	59%	59%	59%	60%	60%	59%	58%	57%
40-Year Loan Mod	56%	59%	59%	59%	59%	60%	60%	59%	58%	57%
30-Year Combo Mod	56%	59%	57%	56%	56%	58%	59%	56%	50%	50%
40-Year Combo Mod	56%	59%	57%	56%	56%	58%	58%	56%	50%	50%
Payment Supplement	N/A	N/A	33%	30%	30%	29%	29%	29%	34%	36%
Expected Cost ($)										
30-Year Loan Mod	31,633	43,809	42,209	42,625	48,089	54,230	60,082	65,160	67,351	63,611
40-Year Loan Mod	**31,578**	**43,779**	42,180	42,592	48,058	54,214	60,070	65,131	67,270	63,520
30-Year Combo Mod	32,133	44,309	41,642	41,602	47,019	53,674	59,653	63,267	61,889	58,589
40-Year Combo Mod	32,078	44,279	41,552	41,477	46,892	53,589	59,577	63,069	61,366	58,118
Payment Supplement	N/A	N/A	**31,375**	**31,383**	**34,741**	**37,570**	**40,682**	**45,275**	**49,914**	**46,472**
Disposition	30,024	40,699	38,792	39,003	44,054	49,975	55,615	60,236	62,851	61,090

Source: Recursion and Author's calculations.

As shown in Table A10, for the eight loans resolved with PS, the savings provided by PS relative to disposition and market-rate modifications is still compelling. Relative to disposition, PS would save about $13,500 per SDQ loan and would avert 19,700 dispositions, leading to a total savings of $870 million. Relative to market-rate modifications, the savings are larger: nearly $18,000 per SDQ loan and $1.2 billion on 19,300 averted dispositions.

Relative to the next-cheapest alternative in the FHA hierarchy of home retention solutions, the 40-year Combination Loan Modification and PC, the savings generated by the PS have expanded from the base case to $16,800 per SDQ loan. Applied to the existing SDQ FHA portfolio, should the mortgage rate rise to 10.625%, the PS would save the MMIF $1.1 billion by averting 18,000 dispositions relative to the 40-year Combination Loan Modification and PC.

Table A10. Savings and Averted Dispositions Generated by Payment Supplement with the Mortgage Rate at 10.625%.

[48] For loans 1 and 2, all four FHA modifications produce about the same payment increase because when mortgage rates are high, extending the mortgage term does little to reduce the monthly P&I payment and these loans have no remaining PC capacity for principal deferral. Therefore, the expected redefault rates, disposition rates, and costs are similar for all four modifications.

Savings from Payment Supplement	Loan 3	Loan 4	Loan 5	Loan 6	Loan 7	Loan 8	Avg/Total
Relative to Disposition							
Expected Per Loan Savings	$7,417	$7,620	$9,313	$12,405	$14,933	$14,962	$13,458
Total Savings ($ millions)	$23	$25	$43	$115	$331	$334	$870
Avoided Dispositions	808	996	1,388	2,833	6,840	6,856	19,721
Relaive to Market-Rate Modification							
Expected Per Loan Savings	$10,834	$11,242	$13,348	$16,660	$19,400	$19,885	$17,929
Total Savings ($ millions)	$33	$37	$61	$154	$431	$444	$1,160
Avoided Dispositions	771	950	1,340	2,792	6,778	6,698	19,329
Relative to 40y Combo Mod							
Expected Per Loan Savings	$10,177	$10,094	$12,151	$16,019	$18,895	$17,795	$16,768
Total Savings ($ millions)	$31	$33	$56	$148	$419	$397	$1,085
Avoided Dispositions	712	856	1,221	2,648	6,502	6,018	17,956

Source: Author's calculations.

Section A3: Calculating the Cost of Dispositions and the FHA Home Retention Solutions

In this section, we present the detailed calculations we use to develop our estimates for the cost of dispositions and the current FHA home retention solutions, which include a market-rate modification. Using the set of 10 representative loans as a proxy for the SDQ FHA portfolio, we calculate the expected cost of disposition, a Standalone PC, the FHA modifications, and PS for each loan. FHA's cost under each alternative is then the portfolio-weighted sum across all 10 loans.

Computing the Expected Cost of Disposition

For SDQ loans that don't receive a home retention alternative or that redefault after receiving a home retention alternative, we compute the expected cost of disposition as:

(1) *Expected Cost of Disposition = UPB at Default x Probability of Disposition Given Default x Loss Severity*

SDQ loans are by definition already in default. Therefore, when we calculate the expected cost of disposition for SDQ loans, we do not include a term that captures the probability of default in Equation (1) and in the equations that follow because it would always be 100%. As described in Section III, we set the probability of disposition given default to 60% and use a loss severity of 38%.

Using Equation (1), each SDQ loan has an expected disposition cost = 60% x 38% = 22.8% of UPB at default. In the scenario where FHA has no home retention alternatives, our weighted-average UPB at default = $236,300, which includes both the UPB as of the current default episode and existing PCs (if any). Therefore, the expected cost of disposition per SDQ loan is about $53,900. In other words, if the average disposition costs $89,800 and 60% of SDQ loans are expected to transition to disposition, the expected disposition cost per SDQ loan is $89,800 x 60% = $53,900.

Computing the Expected Cost of FHA's Standalone PC

We compute the expected cost of a Standalone PC as:

(2) *Expected Cost of Standalone PC = Expected Cost of Financing PC Amount + (Probability of Standalone PC Redefault x Expected Cost of Disposition) + Incentive Payment*

where

(3) *Expected Cost of Financing PC Amount = Number of Missed Payments x (P&I + T&I + MIP) x FHA Annual Borrowing Cost x Duration of Loan x (1 - Probability of Standalone PC Redefault)*

A Standalone PC allows the borrower to repay arrearages to FHA at the payoff or maturity of their loan. The borrower does not pay interest on the deferred amount. Therefore, we model FHA's cost of providing a Standalone PC by assuming FHA would have to borrow the PC amount to reimburse servicers for advancing missed P&I, T&I, and MIP payments at the time the Standalone PC becomes effective. Then, FHA would pay the FHA borrowing cost on the PC amount until they are repaid by the borrower, at loan payoff or maturity.

In addition, we capture the cost to FHA from those borrowers who redefault after receiving a Standalone PC and end up in disposition.

FHA's annual borrowing cost is set to 4.30%, which is about the yield on the 10-year US Treasury Note.[49] The remaining duration of each loan is calculated based on the note rate and remaining maturity using a duration function that has been calibrated to prices of Ginnie Mae II MBS observed on August 20, 2025, as described in Section A4.

Our weighted-average P&I = $1,189, T&I = $500, annual MIP converted to a monthly payment = $139, remaining loan duration = 5.26 years, and Standalone PC redefault rate = 35%. Plugging these figures into Equation (3) results in an average expected cost of financing the PC amount of $3,127. This amount, plus the $500 incentive payment, is the cost to FHA of providing the Standalone PC.

We assume redefault is immediate, and therefore the expected cost of disposition is calculated using Equation (1) after substituting UPB at redefault for UPB at default.[50] Our weighted average UPB at redefault is $264,700, calculated as UPB at default (as shown in Table A1) plus the non-principal portion of the new Standalone PC plus any existing PC amount. The expected cost of Standalone PC redefaults is then $21,123. Adding the financing and disposition costs to the $500 incentive payment paid by FHA to mortgage servicers for each completed Standalone PC brings the total expected cost of providing a Standalone PC to about $24,750, or 10.1% of average UPB at default.

Computing the Expected Cost of FHA's Existing Modification Programs

To complete any of FHA's four existing modification solutions, we assume the servicer purchases the SDQ loan out of the MBS pool, modifies the terms of the loan, and resecuritizes the modified loan. FHA's modifications target a 25% P&I reduction and attempt to reach the target by capitalizing arrearages, extending the term to 30 years (or 40 years when necessary), and setting the note rate to the prevailing mortgage rate (i.e., PMMS) + 0.25% (or 0.50% when the term is extended to 40 years). For the Combination Loan Modifications and PC, if necessary, principal can be deferred to reach the payment reduction target in an amount up to the available PC capacity.

[49] As of August 21, 2025, sourced from U.S. 10 Year Treasury Note Price & News - WSJ | TMUBMUSD10Y.

[50] We make the simplifying assumption that redefault after a Standalone PC is immediate and therefore neglect the cost of financing the PC amount between provision and disposition for redefaults. If, for example, the average SDQ borrower redefaulted 1 year after taking a Standalone PC, FHA would incur an additional $610 in expected financing costs, which is too small to change our results.

We also must account for FHA modification recipients who redefault, some of whom will lose their homes to disposition. The FHA modifications change the P&I of our 10 representative SDQ FHA loans by different amounts depending on the original note rate and term. For example, the 30-year Standalone Loan Modification increases the P&I payment of loan 7 by 54% whereas the 40-year Combination Loan Modifications and PC decreases the P&I payment of loan 10 by 16%, and these two modifications will have starkly different expected redefault rates. As shown in Table A4, FHA modifications are not effective at delivering payment reduction today for 74% of SDQ FHA loans because the current mortgage rate is well-above the note rate for much of the outstanding stock of FHA loans.

In addition, all other factors held equal, we expect that payment resumption loans would have lower redefault rates compared to payment reduction loans. Therefore, we need two functions to translate changes in P&I to expected redefault rates, one for each set of borrowers.

First, to map payment changes from FHA modifications to redefault probabilities for payment resumption loans, we use the payment resumption redefault function described in Section A5. To the extent the modified payment resulting from a modification matches the original payment, the payment resumption redefault function reverts to a redefault rate of 38%, which is consistent with our assumed 35% redefault rate for a Standalone PC.

It is important to note that our estimated savings from the FHA home retention programs are not particularly sensitive to our payment resumption redefault function. As discussed in Sections A5 and A6, even if we limit the payment resumption redefault rate to a maximum of 35% regardless of the size of payment increases, the existing FHA home retention programs still generate savings for the MMIF relative to market-rate modifications. Such a limit would imply that, for these loans, the expected redefault rate would remain 35% even if an FHA modification doubled the monthly payment, which is unlikely to be the case.

Second, to map payment changes from FHA modifications to redefault probabilities for payment reduction loans, we use a payment reduction function derived from a study that tracks post-modification redefault rates for borrowers who received varying amounts of payment reduction either from a HAMP modification or a private modification, as described in Section A5.[51] The payment reduction redefault function produces a 42% redefault for modifications that meet the 25% P&I reduction target. In contrast, for the 30-year Standalone Loan Modification, which matches the terms of a market-rate modification, the average 33% P&I increase results in an 86% redefault rate for payment reduction loans. It is important to acknowledge that while FHA's modifications are ineffective at providing payment reductions in conditions like those of today where the mortgage note rates are lower than the prevailing market rate, they **can** provide payment reductions when the prevailing mortgage rate is at or below the existing note rate, as discussed in Section A2.

To complete an FHA modification, the servicer purchases the delinquent loan out of the Ginnie Mae MBS pool at par. The note rate on the modified loan is always set to PMMS + 0.25% (or 0.50% for

[51] Our function is derived from the data presented in Figure 30 from ganong_noel_liquidity_vs_wealth_2020_appendix.pdf. The authors' function parameters are available from GitHub - ganong-noel/mtg_mods_public: Repkit for Liquidity vs. Wealth in Household Debt Obligations: Evidence from Housing Policy in the Great Recession.

loans with a 40-year term), thus the "market-rate modification" designation for FHA's Standalone Loan Modifications. So, when the servicer reissues the modified loan for securitization, the transaction is also made at par (or slightly above par, in which case the servicer retains the premium over par).

In calculating the cost of FHA's modifications for each representative loan, we use a PMMS rate of 6.625%. We then compute the expected cost of an FHA modification to FHA as:

(4) *Expected Cost of FHA Modification = Expected Cost of Financing Deferred Principal + (Probability of Modification Redefault x Expected Cost of Disposition) + Incentive Payment*

where

(5) *Expected Cost of Financing Deferred Principal = Deferred Principal Amount x FHA Annual Borrowing Cost x Duration of Modified Loan x (1 – Probability of Modification Redefault)*

Each representative loan is assigned a redefault rate for payment resumption and payment reduction based on the change in P&I delivered by each of the four FHA modifications, as shown in Table A3 (payment resumption loans) and Table A4 (payment reduction loans).

For FHA's Standalone Loan Modifications, the deferred principal amount is always zero and Equation (5) falls away. For FHA's Combination Loan Modification and PC, Equation (5) is only applied when deferred principal is needed to reach the payment reduction target. Any deferred principal, which is non-interest bearing, must be financed by FHA at FHA's annual borrowing cost from the modification effective date to the expected payoff date of the modified loan. The duration of the modified loan is calculated using the equations provided in Section A4. The amount calculated in Equation (5), along with the incentive payment, is the cost to FHA of providing a modification.

For example, in the base case, loan 9 is resolved with a 40-year Combination Loan Modification and PC, and about $72,260 of principal is deferred, consuming the entire available PC capacity. This modification reduces the monthly P&I payment by 16%, which produces a 51% redefault rate for payment reduction loans. The modified loan has a duration of 2.3 years. The expected cost of financing deferred principal for this loan is $3,469 or 1.3% of UPB at default.

With regard to PC funds, of the payment reduction loans with available PC capacity, 29% will be resolved in the base case with a 40-year Combination Loan Modification and PC that consumes the entire remaining PC balance. The remaining 71% will be resolved with PS, and 95% of the loans resolved with a PS will have some PC funds available in the event of a future default episode.

For FHA modifications that redefault, we apply the expected cost of disposition from Equation (1) after substituting UPB at redefault for UPB at default. UPB at redefault is the capitalized UPB before any principal is deferred. To account for self-cures, Equation (1) includes the probability of disposition given default. FHA modifications that fail and end in disposition have the same loss severity as other FHA loans that end in disposition.

Using Equation (1), we compute the expected cost of disposition for each representative loan. We then apply the redefault probability from each modification for each representative loan for payment resumption and payment reduction loans to arrive at an average expected cost of FHA modifications that redefault.

FHA pays the mortgage servicer an incentive fee of $1,000 for each Standalone Loan Modification completed and $1,500 for each Combination Loan Modification and PC completed. Summing the components of Equation (4), including the incentive payments, results in the expected costs shown in Tables A3 and A4.

Computing the Expected Cost of FHA's Payment Supplement

FHA's PS targets a 25% P&I reduction for 36 months by using PC funds to "supplement" the reduced monthly P&I payment made by the borrower during the PS term such that the full monthly P&I payment can be passed along to the MBS investor. This arrangement allows the delinquent loan to retain its note rate and remain in the Ginnie Mae MBS pool. In order to be eligible for a PS, the loan must have sufficient available PC capacity to cover both the sum of the missed payment amount and the supplement amount, as discussed below.

While the PS targets a 25% P&I reduction, in two cases the payment reduction amount may not reach the 25% target. First, payment reduction is limited to available PC funds less the amount required to reinstate the mortgage (i.e. cover missed payments). Second, in any month during the PS term, the payment supplement amount cannot exceed the principal portion of the monthly P&I payment. Because the principal portion of the monthly P&I grows with each monthly payment made, the principal portion of the next P&I payment due will be the limiting factor. Therefore, at the outset of the PS, the monthly payment reduction amount is capped at the principal portion of the next due monthly P&I payment.[52]

With these two limitations in mind, the PS amount is calculated as:

(6) *Payment Supplement Amount = Smaller of (Available PC Funds – PC Funds Required to Reinstate Loan, Principal Portion of Next P&I Payment x 36, 25% of Existing P&I Payment x 36)*

where

(7) *PC Funds Required to Reinstate Loan = Number of Missed Payments x (P&I + T&I + MIP)*

Note that the PS must generate a monthly payment reduction that is at least 5% of the loan's existing monthly P&I payment and at least $20 per month, otherwise the loan is ineligible for the PS.[53]

The expected cost of the FHA PS can then be calculated as:

[52] See Tightening and Expediting Implementation of the New Permanent Loss Mitigation Options for a full description of the PS.
[53] Ibid.

(8) *Expected Cost of FHA PS = Expected Cost of Financing Deferred Amount + (Probability of PS Redefault during PS x Expected Cost of Disposition) + (Probability of PS Redefault after PS x Expected Cost of Disposition) + Incentive Payment*

where

(9) *Expected Cost of Financing Deferred Amount = (PC Funds Required to Reinstate Loan + Payment Supplement Amount) x FHA Annual Borrowing Cost x Duration of Loan x (1 – Probability of PS Redefault during PS – Probability of PS Redefault after PS)*

The terms in Equations (7) are available in or can be computed from the data for each representative loan shown in Table A1. For example, loan 8 has used PC funds in the amount of 6% of UPB at default for a past default episode, which leaves about $60,000 of available PC funds. The PC funds required to reinstate the loan are about $23,500, calculated using Equation (7) for 12 missed payments using the P&I, T&I, and MIP amounts shown in Table A1. Note that we approximate the monthly MIP payment as the annual MIP rate / 12 x UPB at default.[54]

To determine the PS amount using Equation (6), we start with the $36,500 of PC funds available for PS after subtracting past due amounts. The monthly P&I payment on the original loan is $1,287, of which the principal portion of the next payment due is $395. PS targets a payment reduction of 25%, or $322. Using these inputs, loan 8 will require a PS amount that is the smaller of $36,500; $395 x 36; and $322 x 36; which is $11,592. In this case, there are sufficient PC funds available to reach the 25% payment reduction target and the principal portion of the next monthly P&I payment due is greater than the target payment reduction, so the payment target can be achieved.

For the PS redefault rates that are components of Equations (8) and (9), we account separately for redefaults during the 3-year PS term and at the end of the 3-year PS term caused by the increase in monthly payment as it returns to its previous level. For redefaults during the PS term, we use the P&I reduction provided by the PS as an input to our payment reduction redefault function. We convert the 5-year redefault rate provided by the payment reduction redefault function (described in Section A5) into a monthly redefault hazard rate and use the hazard rate to compute the redefault rate over the 3-year PS term. We assume that loans that redefault during the PS term redefault at inception of the PS.

For those loans that did not redefault during the PS term and therefore experience the post-PS payment increase, we compute the post-PS redefault rate by increasing the monthly hazard rate implied by our 5-year payment reduction redefault based on the results of research on HAMP modifications that experienced an interest rate increase after 5 years. Research shows that the 1 percentage point increase in the modified interest rate for HAMP modifications at the end of year 5 caused an increase in the default hazard of 20%.[55] For each representative loan, we first compute the PS-implied interest rate, which is the interest rate that would create the reduced monthly P&I payment provided by the PS. Since the post-PS P&I payment is the same as the original P&I payment, we then compute the difference between the PS-implied interest rate and the original

[54] Actual MIP payments are recalculated every 12 months based on average UPB over the 12-month period.
[55] Source: The effect of changing mortgage payments on default and prepayment: Evidence from HAMP resets - Scharlemann - 2022 - Real Estate Economics - Wiley Online Library.

interest rate shown in Table A1. We use this difference to scale the result from the HAMP study to project the increase in hazard rate caused by the payment increase at the end of the PS term and then recompute our monthly redefault hazard rate and use it to project post-PS redefaults.

For example, in the base case, loan 8 is resolved with a PS that delivers a 25% P&I reduction. For a 25% P&I reduction, the payment reduction redefault function returns a 42% redefault rate. Since this is a 5-year redefault rate, we convert it to a monthly default hazard (0.91%) and use the monthly hazard rate to compute a 3-year redefault rate (28%). Therefore, for Equations (8) and (9), the probability of PS redefault during the PS term for loan 8 is 28%, which means the expected reperformance rate is 72%.

To compute the post-PS redefault rate, we start by calculating the PS-implied interest rate, which is 1.88%. The original interest rate is 4.37%, so the loan will experience an effective interest rate increase of 2.49 percentage points at the end of the PS term. Scaling the results from the HAMP study suggests that the payment increase at the end of the PS term would cause a 2.49 x 20% = 50% increase in the monthly hazard rate, which brings the post-PS hazard rate to 0.91% x 150% = 1.36%. Applied to the remaining 2 years, the post-PS monthly hazard rate implies a 28% redefault rate conditional on reperformance during the PS. Once we apply this redefault rate to the 72% of loans that are expected to reperform, we get a 20.2% probability of post-PS redefault for Equations (8) and (9), which implies a cumulative 5-year redefault rate of 48.2% for this loan.

The expected cost of disposition appears twice in Equation (8), once for loans that redefault during the PS term and again for loans that redefault at the end of the PS term. In both instances, the expected cost of disposition is calculated using Equation (1) after replacing UPB at default with the UPB at redefault. For loans that redefault during the PS term, the UPB at redefault is the sum of UPB at default, the non-principal portion of the funds used to reinstate the loan, and any existing PC amount, as we assume redefault is immediate and the PC funds allocated to the PS are returned to FHA. For loans that redefault at the end of the PS term, the UPB at redefault is increased by the PC funds allocated to the PS and then decreased by the principal paid down in the 36 months that the PS was active.

Returning to loan 8 as an example, the UPB at redefault at the inception of the PS term is about $283,450 and the UPB at redefault at the end of the PS term is $279,750. After applying the 60% transition rate from default to disposition and the 38% loss severity, the expected costs of disposition in Equation (8) are $64,630 and $63,780.

To calculate the expected cost of financing the deferred amount we use Equation (9) and begin by summing the PS amount ($11,592) and PC funds required to reinstate the loan ($23,500). FHA's borrowing cost is assumed at 4.30% and the duration of loan 8 is 5.6 years. Using the probability of PS redefault during PS and probability of PS redefault after PS calculated above, the expected cost of financing the deferred amount is then $4,377.

FHA pays servicers $1,750 for each PS completed and, with the above terms in hand, the expected cost of the PS can be computed using Equation (8). Using the figures calculated above, we

compute the expected cost of PS for loan 8 at about $37,100, which is consistent with the cost shown in Table A4.[56]

Section A4: Loan Durations

To calculate the cost of the Standalone PC, Combination Loan Modification and PC, and PS, we need to estimate the duration of existing and modified loans to determine the cost of deferring arrearages and principal. To do so, we create simple functions to compute a price and duration for a loan with a given note rate and term, following the process described in the Appendix of Quantifying the Savings from the GSEs' Home Retention Programs (HPC, July 2025). We summarize the steps below.

We begin by calibrating a cubic polynomial to price and weighted-average coupon (WAC) data for 30-year Ginnie Mae II MBS.[57] Then, for a given WAC, we can then compute MBS prices. We price loans with a term longer than 30 years using our pricing function for 30-year loans.

However, our pricing function needs to be dynamic, because we want to compute the duration of a static set of loans with fixed note rates **as the prevailing mortgage rate varies**. Therefore, we need a function that can compute the hypothetical price of a loan based on the difference between its note rate and our mortgage rate input. To do so, we calibrate an additional pricing function that take as inputs the "rate spread," or difference between the note rate and the current mortgage rate used in our model.

As a first step, we solve for the "current origination coupon," or the WAC for which the MBS price equals 101. Most lenders will originate loans at a 101% price (or higher) so that they can keep the one percent premium over par (or 100%) as a profit. Our current origination coupon is 6.40% and is consistent with the 30-year PMMS rate used in our model (6.625%).

We then compute the rate spread for each WAC and calibrate a second cubic polynomial to the rate spread and MBS price. Now, for a loan with a given rate spread, we can calculate the price. To compute the rate spread for each loan, we take the difference between the note rate and the 30-year PMMS rate from our model, which is set to 6.625% in the base case but can be varied as described in Section A2. We can then estimate a price for each loan for a given mortgage rate.

To estimate loan duration, we start by taking the derivative of our cubic polynomial MBS price function, which gives us a quadratic formula for the duration of a 30-year loan for a given WAC. We then convert WAC into a rate spread using the 30-year PMMS rate from our model, which gives us a duration for each rate spread:

$$\text{Duration of Loan} = (-0.085 \times \text{Rate Spread}^2) + (-1.357 \times \text{Rate Spread}) + 2.974 \quad (10)$$

To calculate the expected cost of financing deferred amounts, we calculate the rate spread for each loan as described above and use the rate spread to calculate the loan duration using Equation (10).

[56] Figures from this section may not exactly match the figures in Table A4 due to rounding.
[57] Prices are as of August 20, 2025. Source: JP Morgan MBS Pricing and Analytics Package dated August 20, 2025.

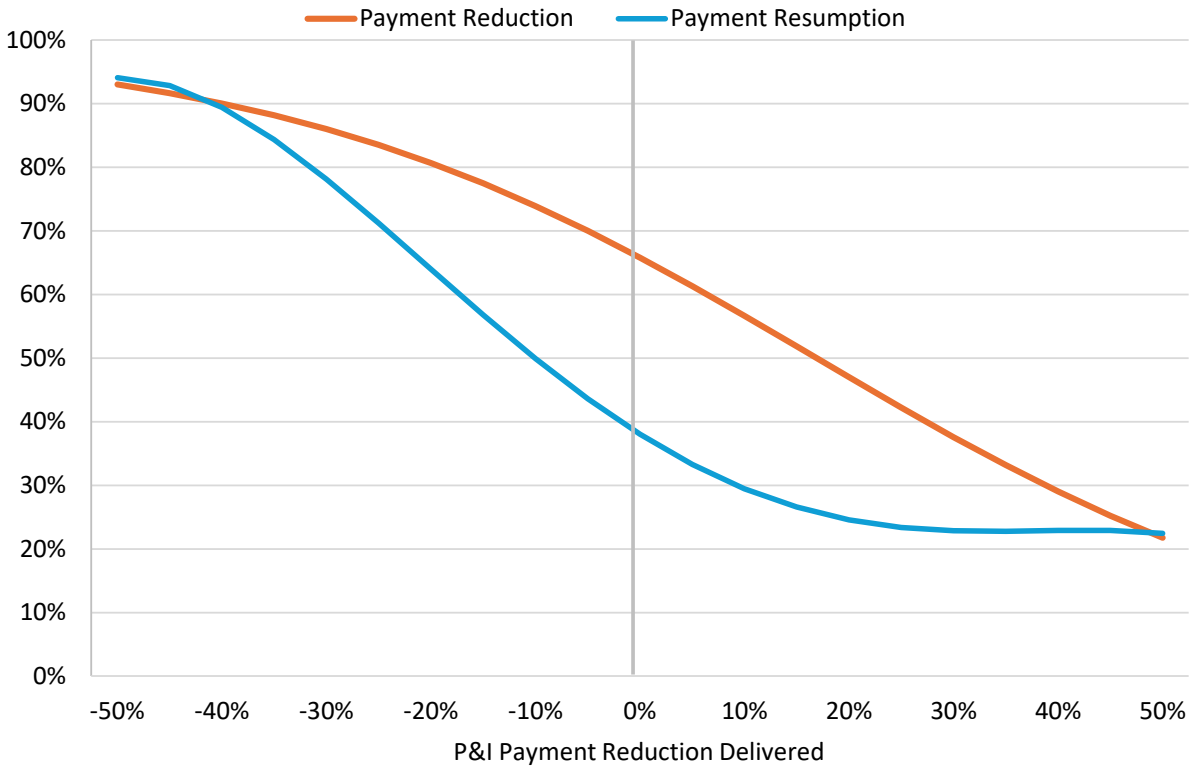
Loan duration is then the smaller of the result of Equation (10) and the remaining term of the loan and the greater of the result of Equation (10) and six months.

Section A5: Estimating the Probability of Redefault for Various Changes in Monthly Payment

Post-intervention loan performance depends on the P&I change delivered and, for our purposes, on the borrower's stated ability to resume making their original monthly payment or need for payment reduction. Therefore, to estimate the cost of FHA's home retention solutions and the post-intervention disposition rate, we require two functions that translate P&I changes to post-intervention redefault rates.

To create the function for payment reduction loans, we rely on a study that compares the performance of HAMP modifications to private modifications based on the different amounts of P&I reduction delivered.[58] This payment reduction redefault function is shown in Figure A1. For example, Figure A1 indicates that providing a modification to an SDQ borrower that increases their P&I by 50% would result in a 93% redefault probability, whereas a P&I reduction of 25% would result in a 42% redefault probability.

Figure A1. Probability of Redefault as a Function of Payment Reduction Delivered for Payment Resumption and Payment Reduction Loans.



Sources: ganong_noel_liquidity_vs_wealth_2020_appendix.pdf, GitHub - ganong-noel/mtg_mods_public: Repkit for

[58] Our function is derived from the data presented in Figure 30 from ganong_noel_liquidity_vs_wealth_2020_appendix.pdf. The authors' function parameters are available from GitHub - ganong-noel/mtg_mods_public: Repkit for Liquidity vs. Wealth in Household Debt Obligations: Evidence from Housing Policy in the Great Recession.

Liquidity vs. Wealth in Household Debt Obligations: Evidence from Housing Policy in the Great Recession, and author's calculations.

Note that our payment reduction function is likely to assign redefault rates that are too low for P&I reductions beyond 30%, and therefore we underestimate redefault rates and expected costs for FHA modifications when they deliver payment reductions beyond 30%. Analysis of GSE post-modification two-year cumulative default rates suggests no improvement in loan performance is achieved by increasing payment reduction from between 20% and 30% (43.2% redefault rate) to between 40% and 50% (43.7% redefault rate).[59] In contrast, our function indicates that a 25% P&I reduction would result in a 42% redefault rate and a 45% P&I reduction would result in a 25% redefault rate. In a scenario in which PMMS is much lower than the loan note rate, a modification can result in a payment reduction greater than 30%. In this scenario, we underestimate the redefault rate, disposition rate, and cost of the modification, which may incorrectly indicate that the FHA home retention hierarchy is not choosing the least costly alternative, as discussed in Section A2.

Our payment resumption redefault function, which is used for borrowers who state that they can resume their original monthly payment, is also shown in Figure A1. Finding any analysis, much less causal analysis, on which to base the payment resumption redefault function is difficult because SDQ borrowers are not classified according to whether or not they state that they can afford their original payment until they are provided with a home retention alternative, at which point their redefault rate will reflect the home retention alternative provided. In other words, there is no data source, much less analysis, that we are aware of that measures the redefaults of *only those SDQ borrowers who stated they could afford their original monthly payment but were instead provided modifications that either increased or decreased their payment*.

With these limitations in mind, we constructed the payment resumption redefault function shown in Figure A1 by assuming that, for a given amount of payment reduction and all other factors held equal, borrowers who indicate that they can resume their original payment would have lower redefault rates compared to borrowers who state that they require payment reduction, unless payment changes for both are very large. That is, we assume that a payment increase of 50% or more would be equally unaffordable for a payment resumption and payment reduction loan while a payment reduction of 50% would be equally affordable for a payment resumption and payment reduction loan. Therefore, our payment resumption redefault rates are lower than our payment reduction redefault rates, except at extreme levels of payment change, in which case the redefault rates are roughly the same.

We then calibrate our payment resumption redefault function to three data points. First, modifications that don't change the monthly payment should have similar redefault rates to our Standalone PC redefault rate of 35%, and our function returns 38%. Second, for payment increases of 40% or more, the payment resumption redefault rate should be similar to the payment reduction redefault rate, as payment increases of this magnitude are very likely to result in redefaults for both

[59] See figures 6 and 12 in Assessing the effectiveness of payment reduction on preventing borrower re-default for mortgages, which show loan performance results by P&I reduction are similar within credit score bins.

sets of borrowers, since neither of them stated they could afford much higher payments. Third, the marginal impact of payment reductions beyond 30% should be small, for the reasons cited above.

We test our redefault probabilities for payment **increases** using a study of HAMP modifications that included a step-up in interest rate of 1% five years after the modification took effect. HAMP provided borrowers with a 2% note rate for the first 5 years of their modified loan, after which the note rate increased to 3% in year 6. The authors found that the 1% interest rate increase caused an increase in the default hazard rate of 20%.[60] The increase in interest rate from 2% to 3% in year six equates to a P&I increase of about 12%, and so we can translate the results from this study into P&I terms—a 12% increase in P&I increased the subsequent default hazard rate by 20%.

Using the data point provided by the HAMP analysis as a benchmark for modifications, our payment reduction and payment resumption redefault rate functions return a redefault rate above the benchmark. Directionally, this is to be expected—our redefault functions are projecting the 5-year performance of loans that were SDQ and resolved with a home retention solution. In contrast, the HAMP analysis measures the redefault rate of loans that were current for five years after they were modified and experienced a predictable payment increase. Therefore, one would expect, for a given payment increase, that our redefault functions would project higher redefault rates than the HAMP analysis.

Specifically, our payment reduction redefault function projects a 5-year default rate 2.5 percentage points above the benchmark, suggesting that we may be slightly overestimating the redefault probability and expected cost of modifications for payment reduction loans where the payment increases, which suggests the actual savings from the FHA home retention programs relative to market-rate modifications may be modestly lower. That said, the relative difference in default rates is small and is unlikely to result in a meaningful bias in our results.

Moreover, our payment resumption redefault function projects a 5-year redefault rate nine percentage points higher than the benchmark, in part because the baseline redefault rate of 38% is a low starting point. As a result, we may be overestimating the redefault probability and expected cost of modifications for payment resumption loans and therefore overestimating the savings from the FHA home retention programs.

However, because the savings created by the existing FHA home retention programs persist even if we limit the payment resumption redefault rate to an unrealistically low level of 35% regardless of payment change, we believe the net impact on our results of any potential misestimates noted above is small. As discussed in the next section, even if we cap the payment resumption redefault function at 35%, **thereby making the unrealistic assumption that payment increases of any size lead to no increase in redefault rates**, the FHA home retention programs still generate $6,100 in savings relative to market-rate modifications. In other words, in the unlikely event that the Standalone PC had a redefault rate of 35% and modifications provided to payment resumption loans also had a maximum 35% redefault rate **regardless of whether they got a modification that**

[60] Source: The effect of changing mortgage payments on default and prepayment: Evidence from HAMP resets - Scharlemann - 2022 - Real Estate Economics - Wiley Online Library.

matched the existing payment or doubled their payment, the FHA home retention programs would still generate $6,100 in savings relative to market-rate modifications.

Given that the current FHA home retention programs still generate savings for the MMIF even with a payment resumption redefault function that is unrealistically insensitive to payment increases, we conclude that it is unlikely that correcting any overstatement of payment reduction or payment resumption redefault rates would have a material impact on our results.

Section A6: Sensitivity Analysis

The savings produced by the current FHA home retention alternatives remain even if we adjust our model inputs to extremely conservative levels. In fact, we find that the FHA home retention programs only lose the cost advantage versus disposition and market-rate modifications if loss severity falls to the unrealistically low level of 5%.

Loss Severity: holding other model parameters constant, loss severity would have to drop to 5% in order for the savings generated by FHA's existing home retention programs relative to disposition and market-rate modifications to erode entirely. To be clear, the expected disposition rates for SDQ loans in each scenario would not change from those shown in Table 6—no home retention alternatives at 60%, a market-rate modification at 51%, and the current FHA home retention programs at 33%—but the MMIF's losses associated with each disposition would be smaller.

Based on FHA data, it is unlikely that loss severity would **average** 5% through economic cycles. As shown above in Figure 2, the lowest loss severity experienced in the post-Great Recession period was 23% in the third quarter of 2023, which is based on a small sample size of dispositions and was reduced by the 31% HPA experienced during 2020 – 2021.[61] Since 2014, FHA loss severity has ranged from 23% (2023Q3) to 50% (2014Q2). As noted in Finding 6, HPA alone does not reduce loss severity beyond a certain level.

Mortgage Rates: holding other model inputs constant, the savings generated by the FHA home retention programs versus no retention options or just market-rate modifications persist at very low and very high mortgage rates. As described in Finding 3, should the mortgage rate rise to 10.625%, the FHA home retention programs would save $17,800 per action taken relative to disposition and $20,900 per action taken relative to market-rate modifications. Conversely, should the mortgage rate fall to 2.625%, the per action savings relative to disposition would be $33,000 and relative to market-rate modifications would be $2,300. The reduced savings relative to market-rate modifications are by design—as the mortgage rate falls and market-rate modification become less costly, the FHA home retention programs make less use of what become more costly alternatives such as the Standalone PC and PS.

FHA's Borrowing Cost: our results are not very sensitive to the interest rate at which the FHA can borrow to fund PCs. Increasing FHA's borrowing rate from 4.30% to 7%, which would be quite high in the context of a 6.625% PMMS rate and current rates on investment grade debt, only reduces the

[61] See U.S Department of Housing and Urban Development. HPA measured using FHFA's Quarterly Purchase-only, SA HPI available at House Price Index Datasets | FHFA.

savings provided by the FHA home retention alternatives to $23,100 per action taken relative to no retention alternatives and $17,400 per action taken relative to a market-rate modification.[62]

Non-Response Rate: the per action savings estimates we calculate are not impacted by a higher or lower non-response rate. Our portfolio level savings do vary with the non-response rate input, increasing as non-response rates fall and decreasing as non-response rates increase.

That said, even if we double the non-response rate from 20% to 40%, the savings created by the current home retention alternatives at the FHA portfolio level are still considerable, as shown in Table A11. In this case, based on the existing SDQ FHA population, the FHA home retention programs will avoid about 59,500 dispositions, saving FHA $4.4 billion. The savings relative to a traditional market-rate modification remain compelling: the current FHA home retention programs will avoid about 39,200 dispositions, saving FHA $3.4 billion.

Should the FHA SDQ rate increase to the pandemic-high of 11.9% and 40% of those borrowers be non-responsive, relative to a scenario with no home retention, the current FHA programs would avoid about 195,500 dispositions, saving FHA $14.4 billion. Relative to market-rate modifications, the current home retention programs would avoid 128,900 dispositions, saving FHA $11.1 billion.

Table A11. Portfolio-Level FHA Savings from Home Retention with a 40% Non-Response Rate.

Portfolio-Level Savings from FHA Home Retention	**Current SDQ Rate**	**COVID Peak SDQ Rate**
FHA-Insured Loans	8,054,947	8,054,947
SDQ Rate	3.62%	11.90%
SDQ Loan Count	291,589	958,539
Relative to no Home Retention Options		
FHA's Savings ($ billions)	4.4	14.4
Avoided Foreclosures	59,477	195,517
Relative to Market-Rate Modifications		
FHA's Savings ($ billions)	3.4	11.1
Avoided Foreclosures	39,225	128,946

Source: SFLPTReportCover_2025 and Author's calculations.

While we have assumed that non-response rates for the current home retention programs and the market-rate modification scenario will be equivalent, it is worth noting that this is an unlikely outcome. The Standalone PC offers a way for FHA to bring current those delinquent borrowers who have overcome temporary hardships and, unless the mortgage rate falls, PS will deliver more payment reduction than a market-rate modification. Therefore, one would expect a lower non-response rate to the current FHA home retention programs than to a program limited to market-rate modifications. As a result, our use of the same 20% non-response rate for the existing FHA home retention programs and a program with only market-rate modifications leads us to underestimate the savings generated by the current programs.

It is also important to note that the per-action-taken savings from the current FHA home retention programs persist even as the non-response rate increases, and that the portfolio-level savings do not fall to zero until the non-response rate reaches 100%.

[62] For example, as of August 7, 2025, JP Morgan's JULI investment grade corporate bond index had a spread over US Treasuries of 90 basis points, suggesting a yield of roughly 5.14%.

Payment Resumption vs. Payment Reduction Take-up Rates: our results do not depend on the proportion of SDQ FHA loans that are payment resumption loans vs. payment reduction loans. If 100% of SDQ loans were payment resumption loans, the FHA home retention programs would save $29,700 per action taken relative to disposition and $21,700 per action taken relative to market-rate modifications. Conversely, if 100% of SDQ FHA loans were payment reduction loans, the per action savings relative to disposition and market-rate modifications would be $19,400 and $16,400, respectively.

Probability of Disposition Given Default: if the probability of disposition given default for all defaults (defaults not treated with home retention alternatives and redefaults after the application of FHA home retention alternatives or a market-rate modification) fell to 8%, the savings from FHA's home retention alternatives relative to disposition would fall to zero. However, it is extremely unlikely that only 8% of SDQ loans would go through to disposition without intervention (or additional intervention in the case of redefault), since this would imply that an unreasonably high 92% of SDQ FHA borrowers self-cured.

For added context, we can compare the self-cure rates implied by our baseline assumptions shown in Table 6 under no home retention alternatives (40%) and market modifications (34%) and the 92% self-cure rate noted above to the range implied by CARES Act forbearance exits that were possibly self-cures (13% to 48%).

Between 13% and 48% of exits by borrowers with an FHA, VA, or USDA-backed loan who took CARES Act forbearance and missed at least 1 payment were the result of self-cures. Since not all of these loans were seriously delinquent, we use forbearance exits that may have resulted from a self-cure as an **upper bound** for SDQ self-cure rates, as it is easier for borrowers who miss one or two payments to self-cure compared to borrowers who miss three or more payments.

Industry data as of February 2025 shows that 13% of DQ borrowers exited CARES Act forbearance and reinstated their loan without assistance from a home retention option.[63] These are likely all self-cures. An additional 7% exited forbearance by paying off their loan.[64] While many of these payoffs are market sales, some could be refinances. And 28% of borrowers exited forbearance and were delinquent but not in loss mitigation, and some of these borrowers could have either reinstated their loan without using loss mitigation or completed a market sale later.[65] Therefore, using reinstatement exits as the minimum and the sum of all three exits as the maximum suggests that between 13% and 48% of DQ FHA, VA, or USDA-backed borrowers who exited forbearance were self-cures.

In this context, our estimates of self-cure rates seem reasonable while the 92% break-even self-cure rate is likely unrealistic. Conversely, to the extent that the actual transition rate from default to disposition is higher than our 60% assumption, the savings from the FHA home retention programs will increase.

[63] Source: The MBA Monthly Loan Monitoring Survey, March 2025.
[64] Ibid.
[65] Ibid.

Redefault Probabilities: our estimates of the savings generated by the existing FHA home retention programs relative to disposition and market-rate modifications are not predicated on our assumed redefault rate of 35% for the Standalone PC or our redefault functions.

With respect to the savings relative to disposition, even if we increase our expected redefault rate for the Standalone PC to 80%, which is likely an unreasonably high rate, the current FHA home retention programs would still save the MMIF $12,700 per action taken. Similarly, if we increase our baseline redefault probability for payment reduction loans to 100%, which would mean that all loans that received an unchanged or higher monthly payment redefault and the redefault rate for loans that reached the 25% payment reduction target would be 64%, the FHA home retention programs would still save the MMIF $19,500 per action taken relative to disposition. And if we make the FHA home retention programs much less effective at generating reperformance by making both changes simultaneously, FHA's savings from their home retention programs still remain meaningful, at $7,200 per action taken.

With respect to the savings relative to market-rate modifications, because we use the same payment reduction redefault function for both the FHA home retention modifications and market-rate modifications, we do not examine the relative sensitivity to redefault rates amongst those alternatives. In other words, a higher or lower redefault rate for payment reduction loans would result in higher or lower expected costs for each payment reduction alternative, including market-rate modifications, and the relative cost of each alternative and the savings generated by the FHA home retention programs relative to dispositions and market-rate modifications would be similar to those shown in Tables 1 and 2.

For payment reduction loans that are resolved with the PS, the redefault rate during the 3-year PS term is determined using the same payment reduction redefault function, and so again increasing or reducing the expected redefault rates provided by the payment reduction redefault function would change the cost advantages of the FHA home retention programs relative to dispositions and market-rate modifications only marginally.

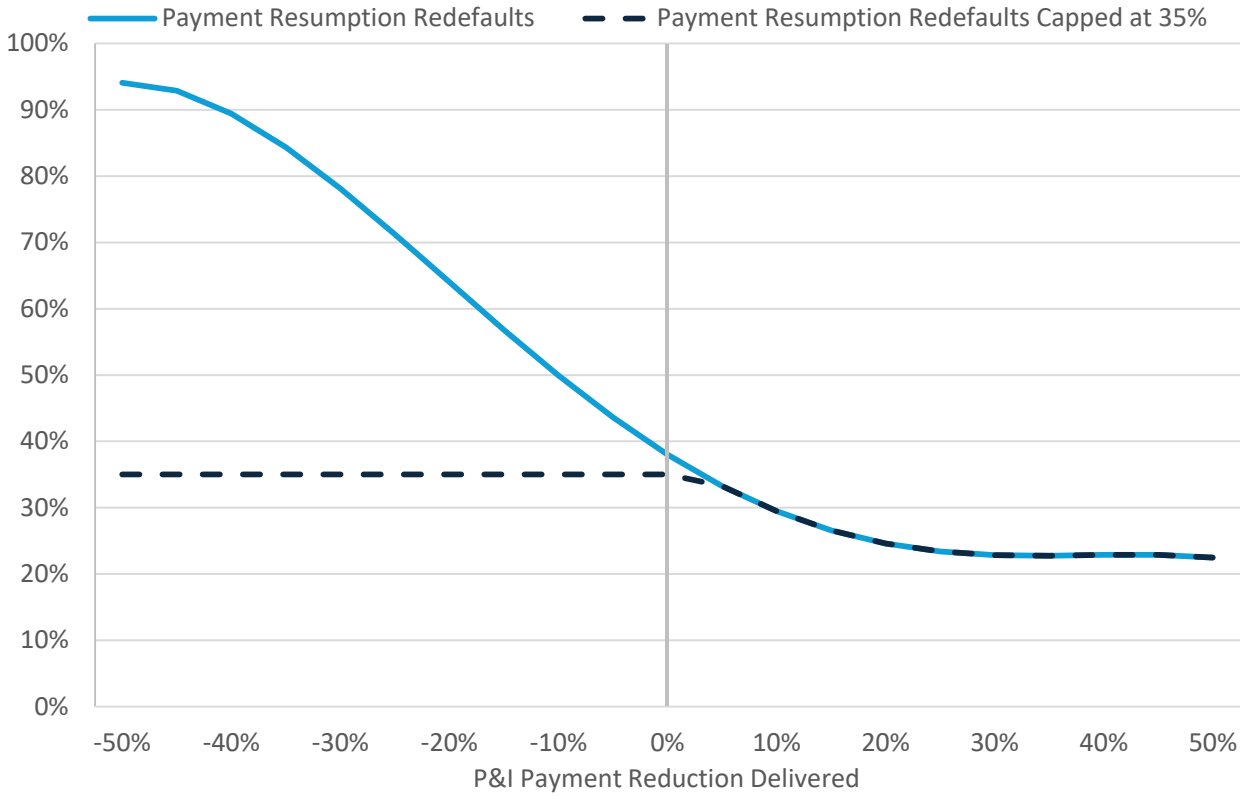
However, the expected cost of PS is sensitive to the post-PS redefault rate. The PS only provides a temporary payment reduction and, after the 3-year PS term is complete, some loans will redefault when the payment increases to its original level. However, even if we double the causal impact of a 1 percentage point increase in interest rate on subsequent redefault rates for the PS, from 20% to 40%, the effect on our estimates is relatively small—the savings relative to disposition and market-rate modifications shown in Table 1 are reduced by about $1,000.

We test the sensitivity of our results to our payment resumption redefault function by eliminating any increase in projected redefault rates for payment increases and recomputing the savings created by the FHA home retention programs. We use this test to address any concerns that our overestimation of the impact of payment increases on payment resumption loans has biased our results, as described in Section A5. Our original payment resumption redefault function (solid line) and the payment resumption redefault function capped at 35% (dashed line) are shown in Figure A2.

Even with the redefault rate for payment resumption loans capped at 35%, the FHA home retention programs save an average of $6,100 per home retention action taken relative to market-rate

modifications. That is, even if we assume that payment resumption loans would be expected to reperform after a market-rate modification at the same rate **regardless of whether the modification in fact raised their payment or the size of payment increase**, the existing FHA home retention programs still result in savings for the MMIF.

Figure A2. Payment Resumption Redefault Rates Capped at 35%.



Source: Author's calculations.

Number of Missed Payments: we assume 12 missed payments for each of the first nine representative loans based on data provided by two large servicers and 9 missed payments for loans originated in 2024. However, if we double our estimate of missed payments, the savings from FHA's home retention programs relative to disposition decrease to $19,500. The savings relative to market-rate modifications increase to $20,400.

Loan Durations: if we underestimate the duration of loans that are resolved with a PC (either on a standalone basis, as part of a modification, or PS), we will underestimate the cost of FHA's home retention alternatives. However, our model results show little sensitivity to duration—even if we increase our model duration by five years, the savings created by the current home retention alternatives relative to dispositions and market-rate modifications decrease by about $3,200.

Remaining PC Balance: we set the remaining PC balance for each representative loan as shown in Table A1, with the goal of matching the 20% average provided by two large servicers. If instead we reduce the remaining PC balance for each representative loan to half the amount shown in Table A1, which would produce an average remaining PC balance of 10% of UPB at default, the savings generated by the FHA home retention programs vs. dispositions and market-rate modifications are largely unchanged.