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Forbearance Worked during Covid-19. Does it Always?

BY ANDREY PAVLOV AND SUSAN WACHTER

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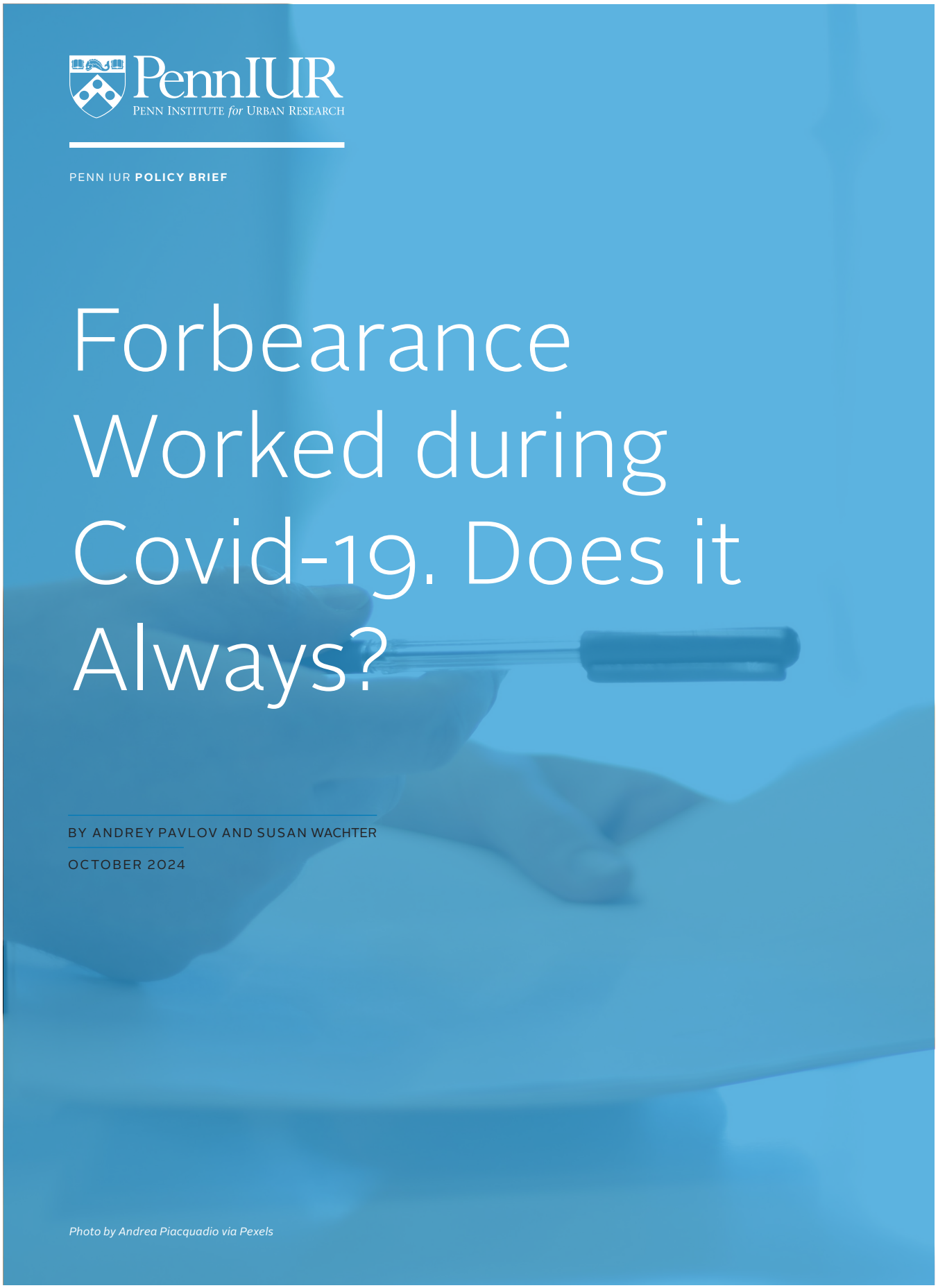

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Abstract

Forbearance implemented under the Coronavirus Aid, Relief, and Economic Security (CARES) Act benefited borrowers by pausing their mortgage payments, enabling them to stay in their homes. Mortgage defaults were avoided and most of the forborne loans were repaid. Forbearance worked during Covid-19, but does it always? Forbearance provides liquidity, but this did not effectively decrease the nationwide surge in defaults during the Great Financial Crisis, which was an insolvency crisis. We build on recent literature to show the efficacy of forbearance policies during Covid-19. We also report results demonstrating that investors did not expect this outcome. We conclude that the success of forbearance in avoiding unnecessary foreclosures depends on program design and the strength of the housing financial system.

Introduction

We assess the impacts of forbearance programs on mortgage and housing markets. We present data showing how forbearance programs benefited many during Covid-19 by delaying mortgage payments and decreasing foreclosures. We show, however, that the success of forbearance policy depends on program design and market conditions.

Definitionally, a successful forbearance policy is one whose NPV is positive with benefits exceeding costs. The empirical literature focuses on measuring the benefits of forbearance in reducing default and foreclosure rates, although the costs in lost interest and the potential for moral hazard, that is, encouraging nonpayment going forward, matter. A full evaluation would include consideration of social costs, externalities, and general equilibrium outcomes. These include, importantly, the potential for forbearance policy to mitigate social costs arising from the loss of a home and

house price instability, after foreclosures, including the potential for negative house price feedback effects. We will consider broader factors in our discussion, including moral hazard and housing market impacts, but we will focus on the NPV definition in our extension of recent empirical work.

There is a longstanding empirical literature on the impact of the use of forbearance using data from the Great Financial Crisis (GFC) and exploiting different outcomes in judicial versus non-judicial states, which we review. This literature shows that forbearance related policies dampen house price declines and volatility in the short run by slowing liquidation sales but do not affect prices or the default rate in the longer run. Several studies note this implies moral hazard may be higher in judicial states, since the effect of dampened price declines would be expected to diminish default.

The recent literature on forbearance during Covid-19 (Goodman and Zhu, 2024; Gerardi et al. 2022, Cherry et al. 2021) focuses on lessons learned from the implementation of forbearance under the Coronavirus Aid, Relief, and Economic Security (CARES) Act. Borrowers with federally backed mortgages (more than 70% of the market) including GSE, FHA, and VA loans), were allowed to pause their mortgage payments with no penalties, including no harm to credit scores, upon request, with no documentation needed.[1] The program enabled the delay of mortgage payments for 12 months, which was later extended for an additional 6 months. A waterfall of repayment options included a payment deferral until the end of the loan. The substantial equity in homes at the onset of Covid-19 and the strength of the housing finance system made additions to the amount due through forbearance a feasible and low risk solution for borrowers and lenders, faced with pandemic disruptions in the job market.

1 Banks followed quickly with most of the market covered by forbearance (Cherry et al. 2021; Wachter, 2021).

The repayment requirement and the large amount of outstanding home equity minimized moral hazard. Expanded unemployment insurance and other income support facilitated a return to payment of the monthly amount of mortgage due, after a period of delay prior to the distribution of funds. Liquidity was extended when it was needed in a fundamentally sound financial system (Cherry et al., 2021; Wachter, 2021; Gerardi et al., 2022). Forbearance policies instituted under the CARES Act differed from those adopted during the GFC and market conditions differed as well.

We review the literature on forbearance and show how market conditions and program design matter for the efficacy of forbearance policies. We begin in Section 1 with a review of the evolution of forbearance programs, discussing how market conditions and program design developed over time. We turn in Section 2 to the issue of moral hazard and information asymmetries (IA) and show how these matter for forbearance policy design. Section 3 follows with a review of the evidence on how forbearance affects housing markets and house price dynamics, in the short and long term. We then examine in Sections 4 and 5 the impact of forbearance on borrowers and lenders, respectively, with a focus on what we can learn from the Covid-19 period.[2]

In Section 4, we replicate a pathbreaking study by Goodman and Zhu (2024), using data from the Covid-19 period, which shows that borrowers and lenders gain from forbearance as liquidation rates are far lower for forborne delinquent loans as compared to similar delinquent loans originated in 2016 (without forbearance) and non-forborne loans during Covid-19. Our replication of the empirical analysis supports these results but also delves into the month-by-month dynamics of loan repayment versus loan liquidation.

2 We provide additional detail of the literature in the Appendix.

In Section 5 on impacts on lenders, we provide data on holding costs which increase linearly with time prior to liquidation. We also examine a limited literature on how investors exposed to mortgage losses expected forbearance to affect outcomes. McGowan and Nguyen (2022) shows that interest rates on non-GSE securitized loans and GSE securitization rates are higher in judicial than in nonjudicial states. Consistent with this, Gete et al. (2024) presents data for the immediate period after the introduction of the CARES Act, which appear to show that Credit Risk Transfer (CRT) investors required higher yields, with larger ex ante expected losses in judicial states. These findings are consistent with market expectations of higher default costs and losses under forbearance, particularly in judicial states. Nonetheless, despite these expectations, forbearance was effective in responding to the Covid-19 health emergency.

Forbearance can reduce losses associated with default for both borrowers and lenders. However, information asymmetries between mortgage borrowers and lenders, and incomplete insurance markets, may preclude its implementation by individual firms. Moreover, lenders and servicers do not consider the social harm and housing price effects of foreclosure. Hence, we note the potential positive impact of implementing standard policies that require forbearance relief upon delinquency.[3] A forbearance first program enables borrowers to overcome temporary financial distress.[4]

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3 Researchers have proposed using forbearance as an automatic stabilizer in periods of high unemployment. This would involve redesigning the mortgage contract to include an ex ante automatic forbearance period which would come into effect during economic crises. See Collinson et al., 2021; Eberly and Krishnamurthy, 2014; Foote et al., 2009; Guren et al., 2021; Orr et al., 2011.

4 Moulton et al. (2022) uses the outcomes of a state subsidized insurance program to study default impacts. Tracy (2024) provides a detailed discussion of how an insurance policy could work.

This can benefit borrowers and lenders, despite higher time and pecuniary costs.[5]

This paper points to the need to evaluate the optimal design policies and the need to take into account mortgage and housing market conditions. The positive net benefit of liquidity depends on the capacity of borrowers to resume mortgage payments and on loan-to-value ratios, that is, whether the loan remains collateralized. Market conditions and program design matter for the success of forbearance.

Forbearance in Context

Lessons learned from the past use of forbearance vary and depend on the period in which forbearance was implemented. Much of the literature on forbearance derives from heightened default or expected default episodes, including the Great Financial Crisis (GFC) and Covid-19. The efficacy of forbearance depends in part on what drives default, which differed greatly in these two shocks. The context in which forbearance is deployed, as well as program design, matter for findings.

The GFC led to a wave of delinquencies and foreclosures, as shown in Figures 1 and 2, respectively. As the US economy entered the recession of 2009, following the private-label mortgage-backed securities collapse, the two-fold impact of rising unemployment and negative equity, due to declining house prices, engaged the so-called "double trigger."[6] Price declines lowered neighboring house

5 Tracy (2024) describes the current FHFA Enhanced Payment Deferral program. While too soon to study, the outcomes of this program are very relevant to the question at hand.

6 Acoca et al. (2012) summarizes an extensive literature on two theories of default behavior. As described there, "one theory, the option theory of default, treats default as a put option that is in the money whenever the borrower has negative equity. Under the strictest version of the option theory, distressed borrowers with positive equity will not default because they can pay off their mortgages by selling their homes;

price values and caused negative house price feedback loops, which destabilized mortgage and housing markets and the overall economy (Levitin et al., 2020). Research based on data from this period shows that defaults rose due to the combined effects of borrower financial distress and negative equity, but that, when, sufficiently large, negative equity itself caused defaults to rise.[7] This has been termed strategic default. Beyond current negative equity, the expectation of falling prices is an important contributor to strategic default (Kau et al., 1994). More recent work has confirmed these findings. Gerardi et al. (2018) shows that job loss had an impact on default in the GFC equivalent to a decline in equity of 35%, and, separately, that strategic default was important as more than 38% of households in default were able to make mortgage payments while maintaining their previous levels of consumption.

Because many homes were "underwater" in the GFC, forbearance, which added to negative equity, was of limited value as a universal solution to defaults.[8] Lowered mortgage payments were key to the resolution of the default crisis and ultimate GFC recovery. Interest rate declines enabled mortgage refinancing. Loan modifications that lowered required mortgage payments were instrumental in bringing mortgages current.[9] Forbearance without loan forgiveness did

conversely, borrowers will default whenever their mortgages exceed the value of their homes. A competing theory, the "double trigger" theory, holds that underwater borrowers generally will not default unless they also suffer some life event, often a liquidity shock."

7 Guiso et al. (2009) finds that when negative equity is less than -20%, both financial distress and negative equity are needed for default to occur, but above that, negative equity is an independent cause of default. More recent work has confirmed these findings.

8 As Adelino et al. (2013) shows that loan modifications, offered by servicers, capitalized arrears into the balance of the loan. Adelino et al. show that loan servicers infrequently offered loan modifications, whether the loan was securitized or not.

9 The Making Home Affordable Program enabled automatic refinancing which was very helpful as mortgage rates declined in the aftermath of the GFC; the Home

not address the problem of negative equity, hence, without mortgage payment and principal decreases, modified loans re-defaulted at high rates (Acoca et al., 2012).

After the GFC, new policies adopted to prevent systemic crises transformed housing finance (Levitin and Wachter, 2020; Levitin and Wachter, 2011). These reforms and the ensuing growth and prevalence of the GSEs, which standardized the use of low-risk mortgages, strengthened the housing finance system (Cooperstein et al., 2021; Wachter, 2024; Deng et al., 2025).

New forbearance policies that had been implemented by servicers, particularly in response to natural disasters, contributed to the resiliency of the US mortgage market during the pandemic. Prior to Covid-19, the GSEs standardized post-natural disaster mortgage forbearance policies (Kousky et al., 2020). In response to the Covid-19 health crisis, the GSEs quickly put into place a similar forbearance program. This policy was then incorporated into the Coronavirus Aid, Relief, and Economic Security (CARES) legislation enacted on March 27, 2020. Under this legislation, borrowers with federally backed mortgages could self-certify their need for forbearance, ensuring immediate relief with no penalty simply upon request without documentation of financial distress. This relief was in place as the unemployment rate registered its fastest recorded rise, amid a worsening public health emergency. The policy assured borrowers could stay in their homes despite income losses as the pandemic spread. Missed mortgage payments could be repaid in a waterfall of options, including deferral of repayment until the end of the loan, repayment over time, or negotiated loan modification. Affordable Modification Program, financed by the Troubled Asset Relief Program, enabled lower mortgage payments through negotiated loan modification (Acoca et al. 2012)..

Borrowers' credit scores would not be impacted by nonpayment of mortgage or other debt. The fast implementation of self-certified forbearance, with no transaction costs, ensured that borrowers could remain in their homes and insured against Covid-19 related income losses as the health crisis deepened, even as unemployment and income losses increased.

The rapid onset of Covid-19 caused a spike in unemployment to 15% in the first months of 2020. Historically, higher unemployment rates are the primary cause of an increase in mortgage delinquency. As shown in Figure 1, delinquencies did increase as expected in the first few months of 2020, prior to forbearance, but then declined. Cherry et al. (2021) identifies this decline as "missing defaults," that is, defaults that would have been expected to occur and that could be accounted for by the rise in the unemployment rate in a default regression using historical data, but that did not eventuate during the pandemic. Cherry et al. (2021) shows how borrowers, particularly those in financial distress, used forbearance and how this use explained the missing defaults in the data. The fast implementation of self-certified forbearance enabled borrowers to take advantage of forbearance early in the pandemic when fears of increasing unemployment and economic turmoil were greatest.[10]

Gerardi et al. (2022) shows how the use of the forbearance program steadied the economy.

With job losses and decreased income, the aggregate ratio of mortgage payments relative to income would have been expected to increase, even in the absence of mortgage rate increases, due to income declines. Financial distress would result

10 The CARES Act also included a moratorium on foreclosures through July 31, 2021. While not required to do so, lenders that were not federally insured followed suit and implemented forbearance.

in defaults, which, without forbearance, would set in motion foreclosure and the potential for house price declines. Based on the difference in the expected versus the actual evolution of scheduled mortgage payments to personal disposable income (using data from the National Income and Product Accounts), Gerardi et al. describes the mechanisms that limited defaults during Covid-19. They show the extent to which forbearance allowed mortgage payments to decline, offsetting income losses. They then show that expanded unemployment benefits and other income support outlays eventually exceeded the income losses associated with the pandemic.[11] Assisting in this, the Federal Reserve pushed down interest rates, with the Federal Open Markets Committee taking the Fed Funds rate down to nearly zero, accompanied by open market purchases of mortgages, which lowered mortgage rates to slightly higher than 3%. Refinancings spiked and lowered payments, assisted by GSE action in support of servicers.[12] Income support exceeded the impact of mortgage declines and forbearance combined.[13] Nonetheless, the fast implementation of forbearance enabled borrowers to take advantage of this relief when most needed before income support was in place.[14]

The forbearance program design and the economic strength of the housing sector[15] and the housing finance system during Covid-19 helped to encourage

11 Benefits directed to the rental market were not nearly as efficient or timely. See Goodman et al. (2023).

12 Golding et al. (2021) estimates a $100 Billion gain to borrowers due to the refinanced lowered borrower mortgage payments. Fuster et al. (2022) points to capacity constraints as instrumental in rising spreads of mortgages over 10-year treasuries and shows the importance of the GSEs' support of servicers in limiting the divergence of mortgage rates.

13 Gerardi et al. attributes the limited effect of lower mortgage rates on the aggregate mortgage payment-to-income ratio to mortgage balance growth.

14 Gerardi et al. notes that many borrowers in forbearance, particularly those that enrolled early, remained current on their mortgage payments. These borrowers used forbearance as a form of insurance against employment uncertainty.

15 Schwartz et al. (2023) shows that Covid-19 itself led to higher housing prices,

repayment. The CARES Act required borrowers to repay missed mortgage debt payments. The paused mortgage payments had to be paid back through higher mortgage payments, negotiated loan modification, or in a lump sum at the end of the mortgage. The last option, a payment deferral of the increased mortgage principal balance due, was the most used and the most feasible option for households in financial distress. As of the end of 2022, as shown in Figures 1 and 2, defaults and foreclosure filings were at low historic levels.

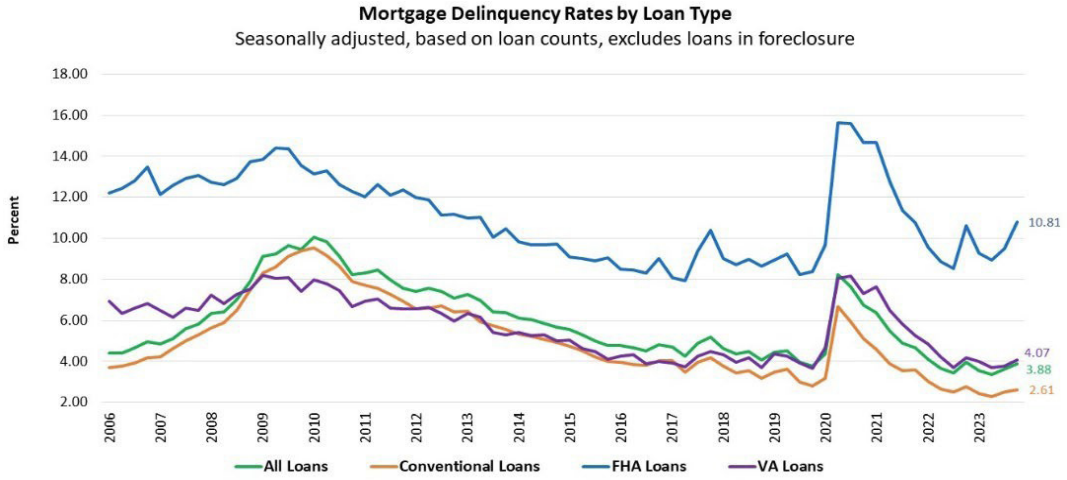

Figure 1: Mortgage delinquency rates by loan type. Source: MBA National Delinquency Survey.[16]

due to the pandemic and remote work effects in increasing housing demand..

16 We do NOT yet have permission to reproduce this figure, but will seek permission from the NBA. https://newslink.mba.org/mba-newslinks/2024/february/mba-newslink-tuesday-may-9-2022/mba-chart-of-the-week-delinquency-rates-by-loan-type/

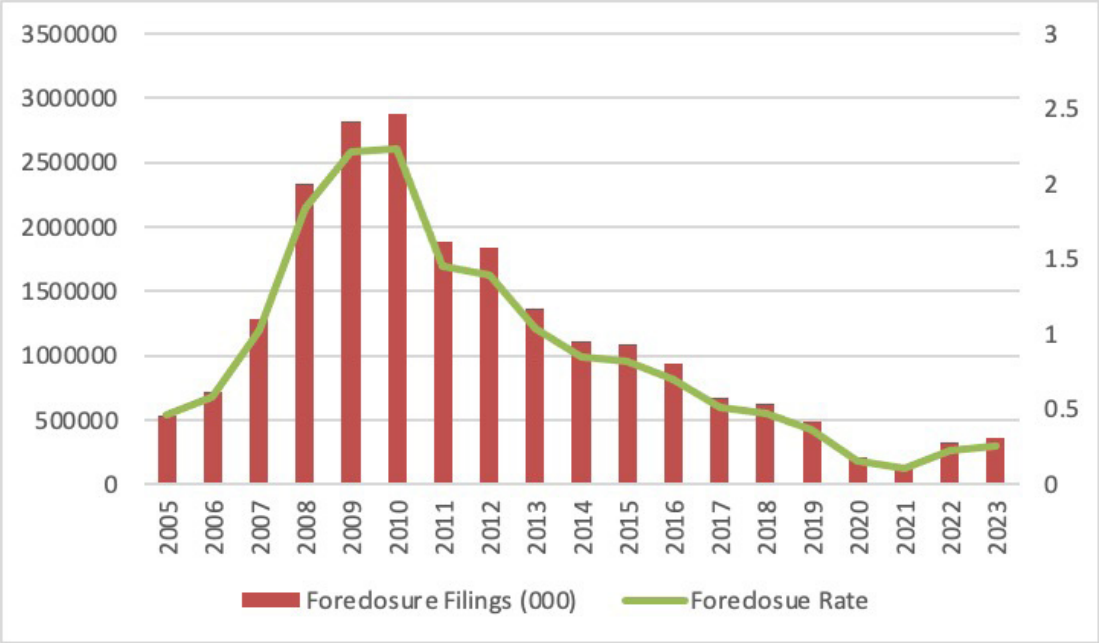

Figure 2: GFC foreclosure filings and rates. Source: ATTOM data.

There were several structural reasons for this good outcome. First, the mortgage system, prior to the onset of Covid-19, was stable and strong; with loans that were well underwritten with the result that the level of home equity economy-wide was at a high. There was little danger, unlike in the GFC, that additional mortgage balances would increase strategic default (Wachter, 2021). Second, the quick adoption of the forbearance program was enabled by the GSEs (Wachter, 2021), while FMOC mortgage market intervention and GSE servicer support contained mortgage rate rises, avoiding disruption to the mortgage finance system. Third, as in natural disasters, income assistance was forthcoming and aided borrowers in mortgage payments.[17] Expanded unemployment and other income

17 While there was a sharp rise in unemployment in March 2020, and the NBER declared the shortest recession in history, fiscal and monetary stimulus prevented a full-blown recession. As the Federal Reserve Board tightened monetary policy in the response to inflation, despite higher mortgage rates, housing prices rose significantly at a rate more than double that of the CPI. Even as mortgage rates rose in the US with the inflation that followed Covid-19, the fixed-rate mortgage system decreased supply through inventory decline due to the "locked in" effect and home prices and home

benefits enabled borrowers to resume mortgage payments.

Moral Hazard, Adverse Selection and Information Asymmetries

Foreclosure results in the loss of a home, which has life-altering negative effects for the welfare of homeowners and society.[18] As discussed in the following section, the forced sale of homes after foreclosure lowers housing prices for neighboring homes and for the market, leading to possible negative price spirals. Lenders also bear costs upon foreclosure (Goodman and Zhu, 2024). A period of forbearance may enable borrowers to overcome temporary financial distress and return to paying their mortgages on time, with the missed payments added to the balance due at the end of the loan, without increasing the risk of redefault. Because there are significant costs associated with foreclosure, this may be optimal for lenders as well as borrowers.

Given information asymmetries, adverse selection may prevent individual firms from optimizing forbearance policy. The difficulty for lenders and servicers arises because such forbearance is an extension of a no cost loan. This no cost loan option may be taken up by borrowers who can pay their loans but choose not to, or who could, although at some additional limited cost; other borrowers may take up the offer of forbearance even though they are not able to return to their payment schedule (Adelino et al., 2013). This raises the costs of mortgages for all borrowers. Information asymmetries may preclude identification of borrowers who need and can benefit from forbearance. Moreover, this makes it unlikely that competitive firms would offer this option without penalties, even if offering such an option would lower costs to the firms themselves. Mandating a period

equity continued to rise to all-time highs (Wachter 2024).

18 For example, Green and White (1997) shows how moves (which are unavoidable with foreclosure) harm children's educational attainment.

of forbearance may be socially desirable but may require program design that overcomes information asymmetries.

The existence of information asymmetries is likely to impact the efficacy of forbearance. The classic paper by Stiglitz and Weiss (1981) first demonstrated the role information asymmetries (IA) play in limiting mortgage lending. They show that IA limit lending and lead to credit rationing, for example, in the form of downpayment requirements, because borrowers cannot convey to lenders their likelihood of repaying their mortgage. Similarly, IA are likely to prevent insurance markets from developing which would enable borrowers to pre-pay for insurance against financial distress and temporary illiquidity, even though the provision of such insurance would be socially optimal. Forbearance programs are essentially a form of such insurance.[19]

Thus, a concern with mortgage forbearance programs and related policies that extend borrower protection is the possibility that they create a moral hazard, both at origination and during the life of the mortgage. The anticipation of future forbearance may induce home buyers to over-extend themselves, buy bigger homes, and borrow more than they otherwise would. If enough buyers do this, the price of housing would increase, especially in supply-constrained markets. This, in turn, would benefit current homeowners, but leave new buyers worse off and increase the risks to the financial system.

Forbearance also has the potential to introduce moral hazard in the maintenance

19 FHFA and FHA have instituted new forbearance programs recently. Both would be useful to study but are too new to do so here. Below we examine the impact of the use of forbearance under the CARES Act during Covid-19 on liquidation and cure rates.

of existing mortgages. If borrowers have little or no incentive to service their loans, they may rationally choose to prioritize other debt obligations. This, in turn, has the potential to worsen default outcomes when they occur. Higher risk borrowers' loss of equity may foreclose future home ownership. Shi (2022) discusses the adverse effects of low-risk borrowers using the programs to accumulate liquidity or pay other debts, in the absence of program incentives built in to encourage borrowers to exit forbearance.

The housing finance system in the US is particularly subject to moral hazard, especially in states and circumstances in which loans are effectively non-recourse. Unlike in other countries where borrowers must cover the mortgage amount due that remains after foreclosure sale (Heejin, et al. forthcoming), mortgage loans in the US may be non-recourse (Ghent, 2011). While detecting moral hazard in historical data in the US is difficult because we do not observe the counter-factual outcomes in loans with recourse, the literature does offer some guidance.[20]

Researchers use the division of states in the US into nonjudicial states (or power of sale states in which lenders can foreclose without the court system) versus judicial states (those in which judicial assent is necessary) to identify the impact of forbearance on moral hazard. Mian et al. (2014), using this data from the GFC, deduces that moral hazard in judicial states was a factor in defaults. While prices fell less in judicial states, as discussed below, they found that default rates were about the same as in non-judicial states. Gerardi et al. (2013) also uses data

20 For example, research for the GFC shows that most employed borrowers who were able to pay their mortgage did so, even those whose homes were "underwater." McCoy et al. (2008) show the role of the underpricing of the "put option" that is embedded in the standard US mortgage in risky lending.

from the aftermath of the GFC and comparisons of default outcomes in judicial and non-judicial states' contiguous counties with controls. They find that cure rate is lower in judicial states, although foreclosure rates are lower and that the difference is due to persistent delinquency.[21]

As a direct test for evidence of moral hazard, Mayer et al. (2014) studies the impact of a legal settlement in which Countrywide Financial Corporation agreed to offer modifications to seriously delinquent borrowers in the GFC. They find that the monthly delinquency rate increased by 0.54 percentage points—a ten percent relative increase—immediately after the settlement's announcement.[22] Since delinquency was required to access the settlement funds, the authors attribute this increase to moral hazard. Gerardi et al. (2022) finds a similar program design feature result, tracking mortgage payment assistance during the GFC. The GFC assistance to borrowers required default which appealed to distressed and non-distressed borrowers alike but was only accessible to those borrowers who defaulted.

On the other hand, Gabriel, et.al. (2021) using data from the implementation of California Foreclosure Prevention Laws following the 2008 financial crisis, finds no evidence of moral hazard. These laws required lenders to lengthen the forbearance period and to maintain homes in foreclosure, with large penalties for nonperformance. In short, findings of moral hazard depend on market conditions and show the importance of incentive-compatible program design in the preven-

21 Demiroglu et al. (2013) finds that borrowers with negative home equity are significantly more likely to default in states with borrower-friendly foreclosure laws.

22 Mayer et al. (2014) finds that the increase in default rates was largest among borrowers who were least likely to default, as further evidence that some borrowers may strategically default when such programs are offered.

tion of moral hazard. Policies to prevent foreclosures and the consequent social harm and losses to lenders need to be designed to avoid moral hazard.

Forbearance Impact on Housing Markets

By slowing down the effect of sales of foreclosed homes and forced short sales on housing prices, the studies we have examined conclude that forbearance programs have a positive impact on housing markets. Using data from the GFC, Fout et al. (2017) finds that extending the average foreclosure timeline by one month reduces cumulative home price decline by 1%. The authors also find that price declines were substantially less in judicial states but that this was a short-run response, and that overtime price outcomes were similar. Mian et al. (2014) also shows that the greater likelihood of forbearance slowed price declines in judicial states relative to non-judicial states.[23]

Passmore and Sherlund (2021) also using data from the GFC reports that "counties with greater participation in precrisis government mortgage programs experienced less-severe economic downturns during the Great Recession." This is attributed to pre-existing mortgage programs with more stable underwriting standards, credit risk pricing, liquidity, and program design that supported stability. Separately from intentional program design, the prevalence of more stable sources of mortgage financing during the GFC helped to maintain housing price stability,

Recent evidence from the Covid-19 period also shows that forbearance helped to stabilize housing prices. Although housing prices did not fall nationally after the onset

23 Gabriel et al. (2021) finds that the California Foreclosure Prevention Laws mitigated foreclosure externalities through increased maintenance spending on homes that entered foreclosure (as required by servicers under the legislation) and thus substantially benefited the housing markets.

of Covid-19, Anenberg and Scharlemann (2021) shows that prices were higher by 0.6 percentage points annualized than they would have been in the absence of forbearance, due to avoided forced sales.

Additionally, Shi (2022) suggests that some borrowers may have used mortgage forbearance during the Covid-19 pandemic to save for downpayments for new home purchases, thereby not only limiting the extent of the downturn but also leading to higher house prices during the recovery period.

Beyond forbearance, there are substantial literature studies on the link between financial conditions and housing markets. For instance, Pavlov and Wachter (2006) documents that loose financial conditions and especially the presence of aggressive lending products magnify the market cycles, both during increases and declines. Similarly, Dreger (2023) documents that liberal financial conditions have a positive impact on worldwide housing markets.

Most of the above literature also identifies very strong localized contagion impact. For instance, Passmore and Sherlund (2021) and Pavlov and Wachter (2006) specifically focus on local financing discrepancies to demonstrate price impacts that extend beyond simply capitalizing the financing terms available. Other studies, such as Anenberg and Scharlemann (2021) and Dreger (2023) are more national or global in nature but also have substantial implications for localized contagion effects.

Forbearance Impact on Borrowers

Background: Pandemic and GFC Studies

Forbearance programs can help borrowers stay in their homes and prevent unnecessary foreclosures, as studies of the use of forbearance during Covid-19 show. Good-

man and Zhu (2024), Shi (2022), Li et al. (2022), Gerardi et al. (2013), and Cherry et al. (2021) find that Covid-19 forbearance programs had this positive impact overall. Other studies demonstrate this held especially for those who were most vulnerable during the pandemic. Shi (2022) shows this result for vulnerable borrowers based on credit scores and unemployment rates, Li, Low, and Ricks (2022) use race to do so, and Goodman and Zhu (2023) use marital status.[24]

On the other hand, using data from the GFC, Acoca, et.al. (2012) examines the impact of a wide range of loan modifications and documents that reduction in interest rates and/or loan balance reduction were more effective than postponing payments through forbearance.[25] Using an identification strategy of comparing judicial to non-judicial states on ultimate borrower outcomes, also based on data during the GFC, other studies find no impact of borrower protections. For instance, by comparing judicial and statutory legal jurisdictions, Fout et al. (2017) documents "no meaningful impact of extended foreclosure timelines on borrower performance outcomes, but materially greater loss severities, in judicial states." Similarly, Mian et al. (2014) finds that defaults did not differ in judicial versus non-judicial states. Finally, Gerardi, et. al. (2013) also finds that borrower protection laws, such as the requirement for judicial foreclosure and the Massachusetts right to cure law, only help borrowers temporarily. They document that borrower protection lengthens the foreclosure process but does not improve the ultimate borrower outcomes.[26] These findings suggest

24 Boehm and Schlottmann (2022) using earlier data from the Panel Study of Income Dynamics for the period of 1984-1992 find little direct evidence that mortgage modifications effectively deal with the payment problems faced by protected or at-risk households.

25 Gabriel et al. (2021) documents that the California Foreclosure Prevention Laws which were designed differently than the HAMP programs did reduce foreclosures by as much as 20%.

26 Studies using data from the GFC also address long-term financial outcomes of greater indebtedness that resulted from the use of forbearance for some borrowers.

that extended foreclosure timelines did not prevent foreclosure outcomes in the GFC.

Loan outcome analysis: Goodman and Zhu (2024)

A recent groundbreaking paper, Goodman and Zhu (2024) (hereafter GZ) demonstrates the impact of forbearance during Covid-19 by comparing the outcome of loans made in 2016 without forbearance protections to those made during Covid-19, and by comparing outcomes for borrowers who chose or who did not choose to request forbearance during Covid-19. We replicate and extend GZ's work using, as they do, the Fannie Mae Single-Family Loan Performance Data. This loan-level database includes data on almost all 30-year fixed-rate fully amortizing conventional mortgages insured by Fannie Mae. This data series is available through the Fannie Mae's credit risk transfer program. It offers detailed loan-level information which provides insights into the credit performance of Fannie Mae's single-family portfolio.

Using this data, GZ documents that loans that enter forbearance during 2020 have vastly lower liquidation rates relative to loans that do not. Using the same data and approach, we replicate GZ's overall conclusion in Table 1 with the following modifications: we limit the data to 2019 originations and include loans that enter forbearance at any time after 2020 in the forbearance group, rather than just in 2020 as GZ do. The table reports liquidation rates through the end of 2023 for the forbearance and non-forbearance groups, with the latter rate being multiple times higher, replicating the GZ results.

Herndon (2023) finds that during and after the Great Recession, "loan modifications weakened household balance sheets by adding $20 billion to household debt, with the net amount of debt added per modification doubling from 2010 to 2014."

	Loan count	Liquidation rate	Median FICO score	Median LTV ratio	Median interest rate	Median DTI ratio
Forbearance in 2020-2023	89534	1.82%	725	80%	4.38%	42%
No Forbearance in 2020-2023	1848	15.48%	716	80%	4.53%	40%

Table 1: Our replication of Goodman and Zhu (2024) with the following modifications: limit the data to 2019 originations and include loans that enter forbearance at any time after 2020 in the forbearance group.

Table 1 reports 1,848 loans that did not enter forbearance. While this count is lower than that of GZ due to our data selection, the ratio of loans that enter forbearance and that do not is like that of GZ.[27]

To focus on the issue of interest to us, we employ the approach of GZ but limit the data to 2019 originations to create the most uniform initial sample possible. We select loans that were exactly 90 days delinquent at the end of a particular month each month and follow those loans through December 2023. We classify loans that left the dataset because they were sold or repurchased or because they remained delinquent through December 2023 in a separate category, as there is no final status available for them. As GZ, we define recovery as having 6 months of current payments and we measure it at the start of the 6-month period. Prepaid loans are included in the "recovery" group, even if they do not have 6 months of current payments.

Table 2 reports the outcome of this analysis for loans that were 90 days delinquent in each month of 2020 and originated in 2019. This data selection shows results from

27 This is not surprising as the 2020 forbearance program was easy to enter and very advantageous for borrowers. This does generate the possibility that the no-forbearance loans are different in some meaningful way. For instance, the borrowers who fell behind but did not enter forbearance may be expecting to refinance or sell their home imminently. On the other hand, those borrowers could be in a serious personal or financial situation that prevents them from filing the required declaration to enter forbearance. Either way, forbearance and no forbearance groups may differ in substantial ways, both in ours and in GZ's analysis.

loans originated in a uniform economic environment, with similar underwriting requirements, and a borrower equity position that had not materially changed due to property price movement and amortization. We report the results for loans that were 90 days delinquent for all months of 2020.

The last row in each group, "Liquidation + delinquent" is analogous to the GZ definition of liquidation, which included loans that were 6-months delinquent at the end of their data sample. Our preferred definition is reported on the second line of each category, "Liquidation rate," which uses the liquidation definition in the data. Loans that left the data because of repurchase or sale are reported on the third line, "Removal rate," and loans that were still delinquent as of December 2023 are reported in the fourth line.

The last line of Table 2 reports rates that are roughly consistent with GZ's summary table (Table 1 in their paper, with our replication reported in Table 1 above). The liquidation rates reported in Table 2 are slightly higher because we are limiting the data to loans acquired in 2019, which are likely to have less equity and are therefore subject to higher liquidation risk. The overall loan count in Table 2 is slightly higher relative to that in Table 1 because here we construct the data directly from the raw files with no additional filters, other than those described in the caption of Table 2. Table 1, on the other hand, follows GZ's approach as closely as possible.

		Loans exactly 90-days delinque						
		Jan	Feb	Mar	Apr	May	June	July
Forbearance in 2020-2023	Loan count	257	304	362	590	2760	41130	26266
	Liquidation rate (%)	3.89	2.32	3.31	1.53	1.05	0.15	0.15
	Removal rate (%)	8.17	9.93	10.22	8.31	3.31	0.64	0.46
	Still delinquent (Dec 2023, %)	15.95	23.51	19.89	17.46	11.41	1.69	1.65
	Liquidation + delinquent (%)	19.84	25.83	23.20	18.99	12.46	1.84	1.80
	Loan count	248	305	270	224	186	241	196
	Liquidation rate (%)	8.87	9.45	12.22	12.95	11.40	3.32	2.58

Table 2: This table reports the outcomes of loans that were 90 days delinquent in each month of 2020, split into forbearance and "no forbearance" groups. Each loan is followed until it leaves the data or until December 2023, whichever happens first. Recovery is defined as 6 months of current payments, measured at the start of the 6-month period, or loan prepayment, whichever happens first. Recovery represents the remainder of loans in the table to 100%. The last row in each group, "Liquidation + delinquent" is analogous to the Goodman and Zhu (2024) definition of liquidation, which includes loans that were 6 months delinquent at the end of their data sample. Our preferred definition is reported on the second line of each category, "Liquidation rate," which uses the liquidation definition in the data. Loans that left the data because of repurchase or sale are reported on the third line, "Removal rate," and loans that were still delinquent as of December 2023 are reported in the fourth line.

Our preferred measure of the liquidation rate, reported on lines 2 and 7 of Table 2, yields results similar to those of GZ in the January-May period, with "no forbearance" loans having vastly higher liquidation rates. Table 2 extends the work of GZ in demonstrating that loans that became 90 days delinquent in June and after have substantially lower liquidation rates for both groups. While this result is not surprising for the loans in forbearance–the point of the forbearance program is to prevent liquidations–it is surprising for the loans that have no forbearance. The liquidation rate for "no forbearance" loans fell from 9-11 percent to 3-7 percent. The forbearance program may have had a positive impact on the loans with no forbearance, either because some of those borrowers knew they were on the verge of becoming current on their payments or because lenders likely postponed liquidation for those loans even if they were not part of the forbearance program. The drop in liquida-

tions could also be due to the Covid-19 related shutdowns or foreclosure moratoriums.

Table 2 also shows the major impact of the CARES Act, which was passed in March, as loans in default for 90 days or more increase in June to more than 41,000 loans a month, an astonishing rise from the prior several hundred a month. In the uncertainty of March, with Covid-19 spreading rapidly and unemployment hitting 15%, the ability to pause mortgage payments without harm to credit scores provided major relief as many availed themselves of the lifeline provided. The data also show the success of the quick move to forbearance, as the economy recovered and most of these defaulted loans were reinstated. The share of forborne loans still delinquent by December 2023, the end of the data period, was at 5% or less. The delinquency rate of no forbearance loans was also lower than prior to the CARES Act but still significantly higher than those loans which entered into forbearance. The monthly liquidation rate data show that liquidation rates were far lower for loans in forbearance than for those not in forbearance.

To provide further insight on the final disposition of these loans, Figure 3 depicts the evolution of the liquidation rate for forbearance loans and "no forbearance" loans that were 90 days delinquent at the end of January 2020. Both lines start at zero and at the end of the graph, 48 months later, reach the total liquidation rates of 3.9 and 8.5 percent for forbearance and no forbearance loans. These final liquidation rates are as reported in the first column of Table 2. In other words, Figure 3 tracks the liquidations of the same group of loans as they occur over time.

Figure 3 shows that the "no forbearance" liquidation rate increases steadily over

time. The forbearance loans, on the other hand, experience no material liquidations for the first two-and-a-half years. After that, liquidations increase at a rate very similar to that of the "no forbearance" group. In other words, forbearance delays the start of the liquidation curve but does not flatten it. While this finding is most pronounced for the period depicted in Figure 3, the Appendix offers similar figures for alternative data selection periods.

This finding can be interpreted in two ways. On the one hand, the final liquidation period, depicted by the last observations on each curve, shows that loans in forbearance have a lower liquidation rate. On the other hand, the slope of the cumulative liquidation curves is very similar for the two groups. If these trends continue, then the liquidation rate for forbearance loans may reach the liquidation rates for "no forbearance" loans.

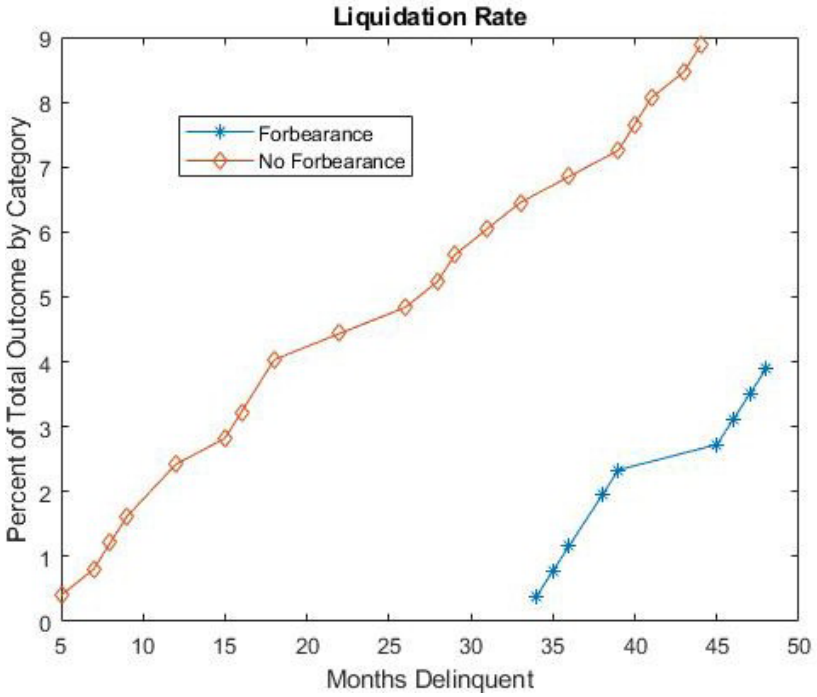

Figure 3. This figure depicts the liquidation rate over time for loans that were 90 days delinquent at the end of January

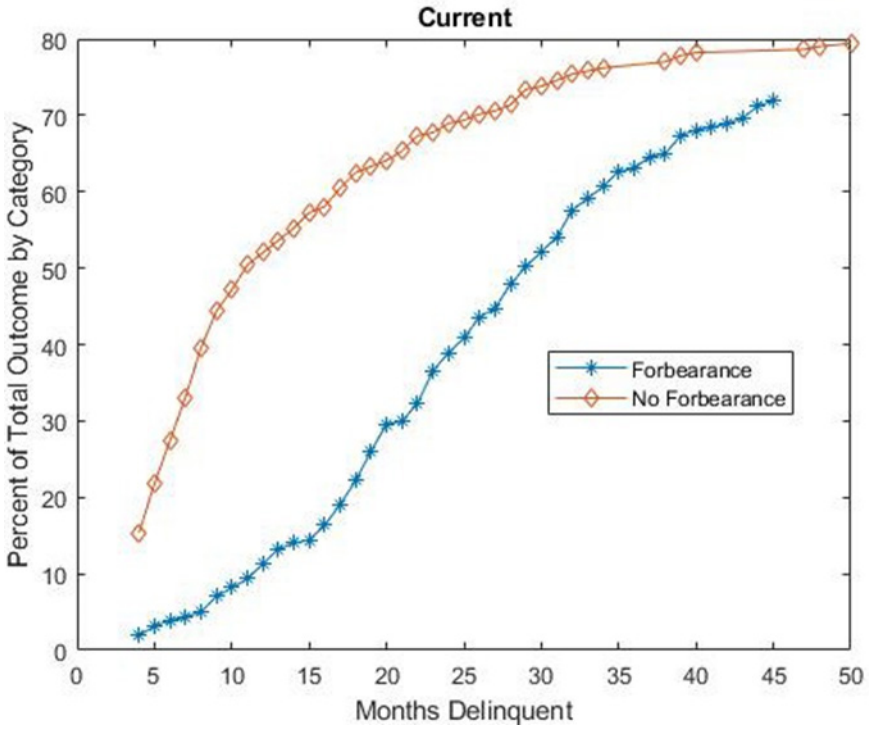

Figure 4. This figure depicts the recovery rate over time for the forbearance and "no forbearance" loans that were 90 days delinquent at the end of January 2020.

Figure 4 compares the recovery rate, defined as loans that become current for 6 months, measured at the start of the 6-month period, for the forbearance and "no forbearance" loans. The data are again limited to loans that were 90 days delinquent at the end of January 2020.[28] Loans that do not fall into the liquidation or recovery rates depicted on Figures 3 and 4 continue to be delinquent and remain in the data, or leave the data because of loan sale, before they meet the definition of recovery or liquidation. Figure 4 demonstrates that recovery rates are higher for "no forbearance" loans (80 versus 70 percent) and "no forbearance" loans get back to current faster. The recovery rate depends on time: at 1 year the recovery rate is approximately 10% for forbearance loans and 50% for no forbearance loans.[29]

28 We provide figures for later months in the appendix.

29 This is particularly surprising given that "no forbearance" loans typically had to make up all missed payments before they could be classified as current, while

We replicate the GZ liquidation regression and perform a regression analysis with recovery rate as the dependent variable. Results are provided in Table 3, with controls listed in Table 4. We obtain similar results. We retain GZ's modelling and estimation choices as much as we can to facilitate the comparison of the findings. Future work could include alternative variable definitions, estimation functional form, or error treatment. Nevertheless, we note that performing this estimation with no covariates at all does not change the main findings of our replication. Consistent with GZ, we find a negative effect of forbearance on liquidation. We also find a positive relationship between forbearance and recovery.

forbearance loans only had to make current payments for 6 months to enter that classification. The missed payments for forbearance loans were added to the mortgage balance, due at time of sale, refinancing, or maturity.

	Dependent Variable:	
	Liquidated	Recovered
Forbearance Group	-0.0749***	0.1246***
	(0.0018)	(0.0046)
Observations	49773	49773
R Squared	0.046	0.045
Adj R Squared	0.045	0.044
Other Controls	Yes	Yes

Table 3: This table reports the coefficient on forbearance as an explanatory variable for loan liquidations and recoveries. Table 4 lists the control variables employed in this regression.

Control	Notes
Original Interest Rate	Continuous Variable
Borrower FICO	Continuous Variable
First Time Home Buyer Indicator	Categorical Variable (2 categories)
Occupancy Status	Categorical Variable (3 categories)
Property State	Categorical Variable (54 categories)
High Balance Loan Indicator	Categorical Variable (2 categories)
Forbearance Group	Categorical Variable (2 categories)
Original Loan Term >= 20 Years	Categorical Variable (2 categories)
Original LTV > 80%	Categorical Variable (2 categories)
Original DTI > 35%	Categorical Variable (2 categories)

Table 4. Control variables employed in the regressions reported in Tables 3, 5, and 6.

We also perform these regression analyses using monthly data, with the results shown in Tables 5 and 6. Table 5 reports the coefficient on forbearance as an explanatory variable for loan liquidations for additional time periods that follow the CARES Act. Each column limits the data to loans that became exactly 90 days delinquent at the end of the respective month. Table 6 reports the coefficient on forbearance as an explanatory variable for loan recoveries. Each column limits the data to loans that became exactly 90 days delinquent at the end of the respective month. These results show that forbearance was a positive and significant factor for those loans which went into default after the CARES Act announcement. However, for loans that were in default prior to this, forbearance had a negative or insignificant impact on recovery. These findings suggest that post-CARES 90-day delinquent loans may be different from earlier 90-day delinquent loans. Moreover, the following table on loan recovery shows that forbearance has the expected positive and significant coefficient only for loans that went into forbearance after May 2020. The timing associated with this result is consistent with the large cohort of loans that went into forbearance but then that paid off as pandemic assistance surged. This suggests that the success of forbearance is associated with the increase in assistance provided in this period [30]

30 Our understanding of GZ's carrying cost calculation method leads us to believe that extending the typical time in forbearance by a factor of 4 or 5 eliminates the benefits of forbearance. The results depicted in Figure 4 suggest that it takes 30 months for loans in forbearance to reach a 50% recovery rate and 3.5 years to reach 70%. Similarly, it takes 3.5 years for loans to reach the liquidation rates documented in GZ and in our replication. We discuss carrying costs further below.

	Dependent Variable:										
Date	Liquidated Nov 2019	Liquidated Dec 2019	Liquidated Jan 2020	Liquidated Feb 2020	Liquidated Mar 2020	Liquidated Apr 2020	Liquidated May 2020	Liquidated Jun 2020	Liquidated Jul 2020	Liquidated Aug 2020	Liquidated All
Forbearance Group	-0.1002**	-0.016	-0.0564*	-0.0875***	-0.0858***	-0.1552***	-0.1091***	-0.0356***	-0.0162***	-0.0308***	-0.0749***
	(0.0489)	(0.0398)	(0.0318)	(0.0295)	(0.0312)	(0.0251)	(0.0126)	(0.0027)	(0.0024)	(0.0039)	(0.0018)
Observations	216	287	320	384	387	479	1759	23679	14970	7292	49773
R Squared	0.338	0.187	0.205	0.189	0.189	0.199	0.111	0.015	0.014	0.028	0.046
Adj R Squared	0.148	0.007	0.028	0.056	0.051	0.093	0.080	0.013	0.010	0.020	0.045
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. This table reports the coefficient on forbearance as an explanatory variable for loan liquidations, except it includes additional time periods that follow the CARES Act. Each column limits the data to loans that became exactly 90 days delinquent at the end of the respective month.

	Dependent Variable:										
Date	Recovered Nov 2019	Recovered Dec 2019	Recovered Jan 2020	Recovered Feb 2020	Recovered Mar 2020	Recovered Apr 2020	Recovered May 2020	Recovered Jun 2020	Recovered Jul 2020	Recovered Aug 2020	Recovered All
Forbearance Group	-0.0573	-0.1274**	-0.041	-0.1014*	-0.0472	0.0577	0.1735***	0.0686***	0.063***	0.0371***	0.1246***
	(0.0731)	(0.0622)	(0.0556)	(0.0524)	(0.0534)	(0.0473)	(0.0348)	(0.0095)	(0.0089)	(0.0104)	(0.0046)
Observations	216	287	320	384	387	479	1759	23679	14970	7292	49773
R Squared	0.260	0.199	0.204	0.223	0.155	0.177	0.081	0.020	0.025	0.028	0.045
Adj R Squared	0.047	0.021	0.027	0.095	0.011	0.068	0.049	0.017	0.021	0.020	0.044
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6. This table reports the coefficient on forbearance as an explanatory variable for loan recoveries, except it includes additional time periods that follow the CARES Act. Each column limits the data to loans that became exactly 90 days delinquent at the end of the respective month.

Forbearance Impact on Lenders

Prior work

The long-term impact of forbearance on lenders, through moral hazard and/or increased risk and cost of capital, have only tangentially been addressed in the literature. For instance, Gabriel et al. (2021) finds that the California Foreclosure Prevention Laws had minimal impact on the availability of mortgage credit for new loans. On the other hand, Pence (2006) shows that mortgage supply was lower in judicial states, meaning that borrower-friendly foreclosure procedures do have a negative impact on credit availability. However, Pence (2006) and Levitin et. al. (2020) also show that the supply differences declined in the run-up to the GFC as risk differences mattered less.

As already mentioned above, Kousky et al. (2020) shows that the widespread use of forbearance and the presence of insurance mitigates the harm to homeowners and contains default after natural disasters. This is consistent with earlier work on natural disasters, such as Gallagher and Hartley (2017). Insured households are protected and either rebuild or, at the very least, repay their mortgages using insurance payouts. Forbearance is a key part of the process as it does not require borrowers to go into default while waiting for insurance payouts.

However, as Kousky et al. also shows, not all homeowners have insurance, or sufficient insurance, and, even if they do, it does not protect them against overall neighborhood decline due to persistent natural disasters, such as sunny-day flooding. Uninsured homeowners and homeowners in neighborhoods that are severely affected in their entirety may suffer substantial negative consequences which in many cases persist over time, and forbearance alone will not mitigate against losses.

Narajabad and Scharlemann (2024) shows that even as the impact of natural disasters are expected to increase, insurance, which pays off damages and mortgage balances, limits financial harm. Hence, forbearance which delays payments until insurance and other funds become available is effective. Note, however, that this conclusion could change if a large portion of homeowners become under-insured or entirely uninsured.[31]If this occurs,, lenders' exposure to natural disasters would substantially increase (Kousky et al. 2020). Nonetheless, to date, forbearance has been a successful policy in response to disasters, aiding individuals and communities in their recovery.

31 While maintaining proper insurance is a contractual obligation for the borrowers, it could occur in the future. Property insurance is renewed every year and property insurance companies can increase insurance rates or discontinue insurance altogether.

Many papers investigate the impact of mortgage risk, more generally, on mortgage rates. To name a few, Levitin et al. (2020) documents that the impact of common risk factors, such as FICO scores and LTV ratios, on origination mortgage spreads declined substantially in the leadup to the 2008 financial crisis. Similarly, Pavlov et al. (2021) characterizes the industry and market conditions under which credit default swap prices become insensitive to the risk of the underlying security. They also document that these market conditions were present in the lead-up to the 2008 crisis. Lacour-Little et al. (2023) shows that mortgage lenders do not alter their lending practices, including mortgage rates, in affected areas following a major natural disaster, although this may be because the expected future risk does not change, rather than because mortgage lenders do not respond to it. More broadly, Bi et al. (2023) quantifies the difference between market-implied guarantee fees and the fees GSEs charged. The authors document that the differences are small except during the 2008 crisis period and the onset of the Covid-19 pandemic. Housing and mortgage markets are vulnerable to bubbles and busts. Forbearance related policies for example, the maintenance of g-fees despite increased risk dampens price declines in busts and assists in the provision of liquidity in these episodes (Pavlov and Wachter, 2009; Levitin and Wachter, 2013; Pavlov, Wachter, and Zevelev, 2016).

Forbearance impact on holding costs

Property taxes, property insurance payments, maintenance, and utilities are major costs associated with non-performing mortgages. Those costs continue to accrue regardless of whether a mortgage is in forbearance or not. These costs are not generally considered in the above literature. Even when considered, as in Goodman and Zhu (2024), they are not directly estimated from payment data. This is understandable, as the carrying costs vary substantially by property and location and are not available

in a standardized form.

We use the value of Mortgage Servicing Rights (MSR) to provide an estimate of the lost net servicing revenue, which includes the mortgage carrying costs. Servicers are often expected to make property tax and insurance payments on behalf of the borrower even though the borrower is not making any mortgage payments. The accumulated amount is due when the loan is repaid, but servicers are put in a position to cover property tax and insurance costs without any cash inflow from the borrowers.

Furthermore, forbearance programs, at least as they were introduced in the CARES Act, allow borrowers to skip payments without invoking foreclosure. The cumulative skipped payments are due when the mortgage gets repaid, either through sale or refinancing, but they are not added to the mortgage balance for the purposes of servicing fee calculations.

In the wake of the CARES forbearance program, the loss to servicers was minimized through various methods and programs. Nevertheless, those carrying costs and reduction in revenues described above are real and substantial, regardless of who bears them. Therefore, the value of the MSRs captures the present value of the expected future carrying costs and lost servicing revenue. Figure 5 depicts the value of for the eight largest servicers over time and shows the expected decline of MSR value in the first and second quarters of 2020.

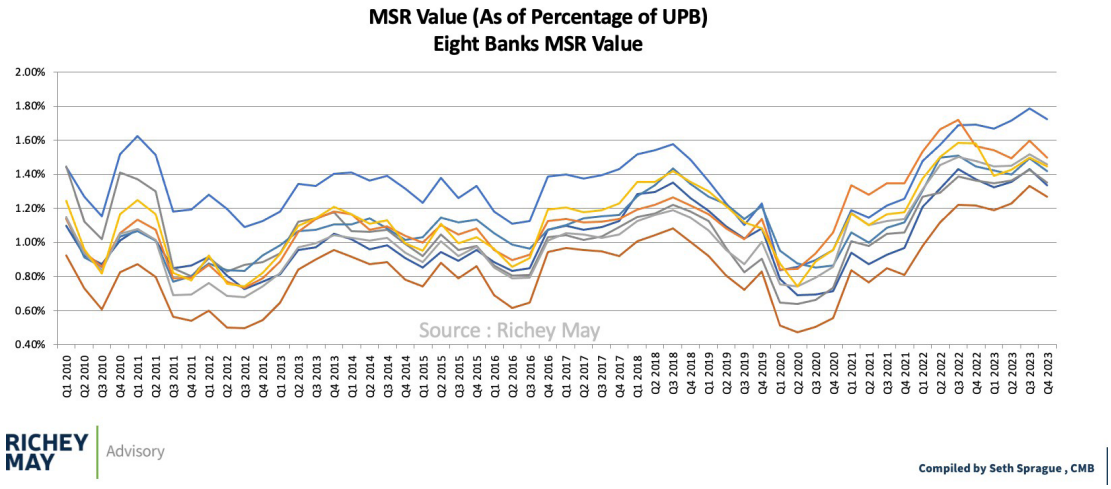

Figure 5. Mortgage Servicing Rights. (Re-printed with permission from Richey May)

The decline in MSR value experienced in 2020 demonstrates that the market expected future carrying costs and lost servicing revenue to be substantial. The recovery was relatively quick, but nevertheless the magnitude of the initial MSR value decline indicates a serious concern over the carrying costs of delinquent mortgages.

Expected forbearance impact on liquidation costs

The impact of forbearance on borrowers, housing markets, and servicers' obligations all have a direct impact on the losses lenders face. This, in turn, determines what effects forbearance has on mortgage risk and ultimately on mortgage costs. For instance, if forbearance reduces liquidations and improves recoveries, then forbearance reduces mortgage risk. This, in turn, reduces mortgage costs. If, on the other hand, forbearance worsens mortgage outcomes, then it increases mortgage risk and costs.

As discussed above, most of the literature concludes that forbearance reduces liqui-

dations and stabilizes housing markets. However, as we discussed in Section 1, these conclusions critically depend on the housing market and economic context. For instance, forbearance may have reduced liquidations following the CARES Act, but this finding is documented during a period of rising home prices.

To attempt to measure the ex-ante impact of forbearance on mortgage risks and costs, Gete et. al. (2024) investigates how the spreads on CRT securities moved after the CARES Act introduction of forbearance. This work builds on Zandi, et.al., 2017, who characterize how CRT spreads reflect the expected future liquidation costs and default losses.

This paper shows CRT spreads increased very substantially at the time of the CARES Act introduction. This increase was particularly strong for CRT securities with above-average exposure to judicial states, suggesting that investors may have expected the forbearance program to worsen the eventual default losses, especially in judicial states.[32] This is consistent with McGowan and Nguyen (2022), which shows that interest rates on non-GSE securitized loans and GSE securitization rates are higher in judicial than in nonjudicial states. Nonetheless, as discussed above, collective action prevented a wide-spread default crisis.

Conclusion

Forbearance has many social benefits. It keeps people in their homes longer and reduces house price volatility. Properly designed mortgage forbearance programs are appropriate and effective in response to health and natural disasters. Such policies incentivize repayment and enable borrowers who can eventually repay overcome

32 The 90-day delinquencies increased substantially exactly 90 days after the CARES Act introduction, but then declined.

temporary distress. Forbearance first policies and lengthened forbearance periods may be helpful as a standardized response to default. However, forbearance programs may increase holding costs and moral hazard, which can raise the cost of mortgage lending. Our work indicates the need for careful mortgage forbearance policy design that allows distressed borrowers to remain in their homes while at the same time maintaining access to affordable mortgages.

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Appendix

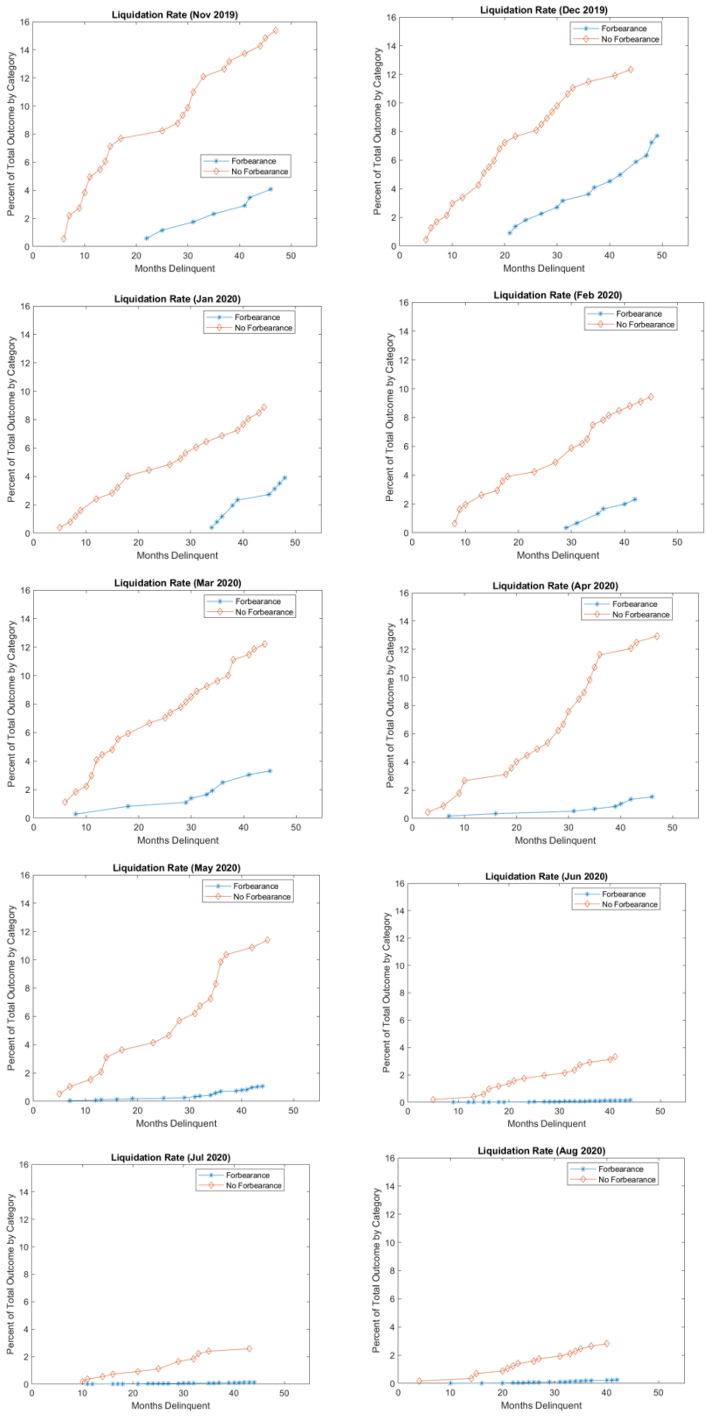
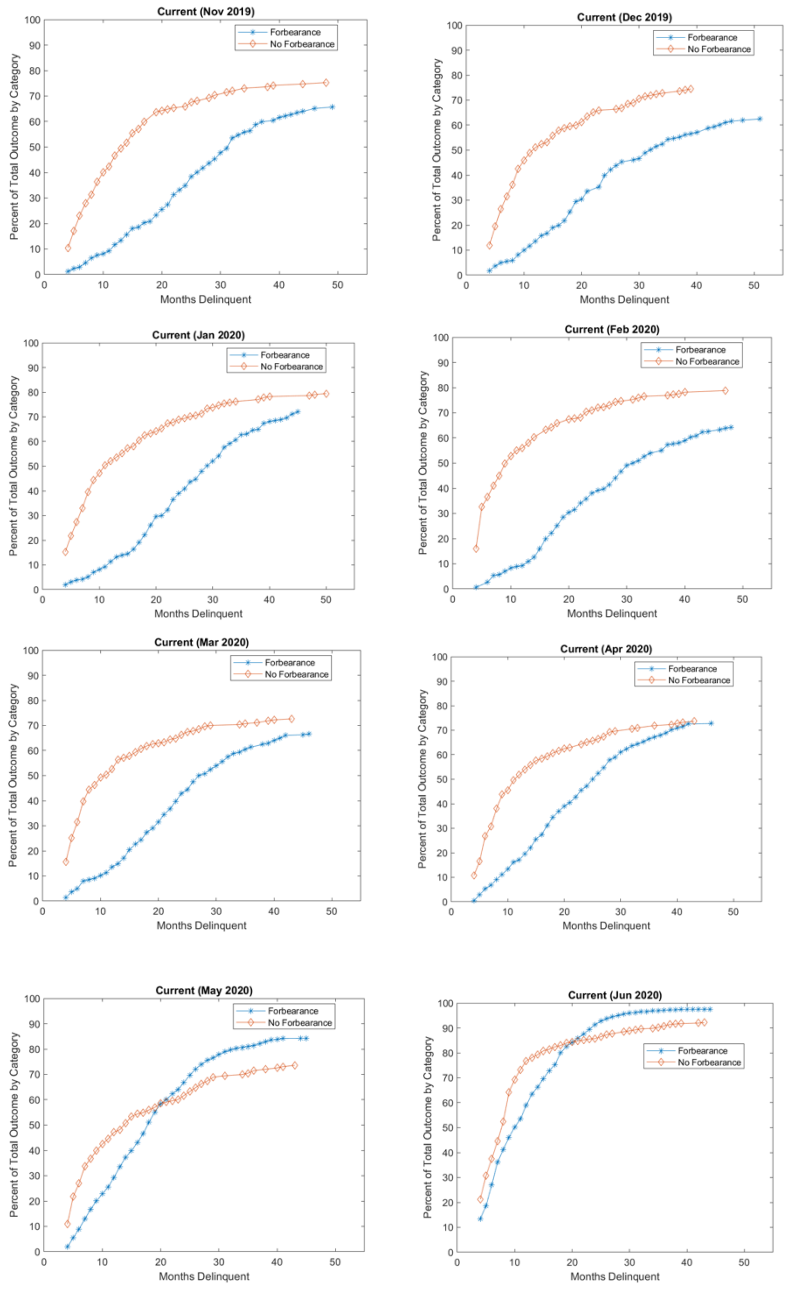


Figure A1: Liquidation rates for loans that became 90-days delinquent at different

points in time. This figure replicates Figure 3 for loans classified as exactly 90 days delinquent at the end of the month between November 2019 and August 2020. The figures for November through May are similar to each other and to Figure 3. Loans not in forbearance experienced higher liquidation rates that steadily increased over time. The figures for June 2020 and after present a different picture—they display far lower liquidation rates both for forbearance and non-forbearance loans.



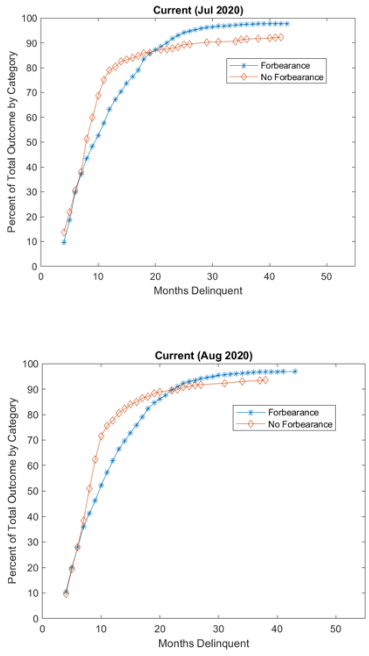


Figure A2: Recovery rates for loans that became 90 day delinquent at different points in time. This figure replicates Figure 4 for loans classified as exactly 90 days delinquent at the end of the month between November 2019 and August 2020. The figures for November through April are similar to each other and to Figure 4. Loans not in forbearance experienced slower recovery. The figures for May 2020 and after present a different picture. Loans in forbearance experience a lower recovery rate at start, but after a certain point outperform the non-forbearance loans.