Heterogeneity in the Effect of Covid-19 Mortgage Forbearance: Evidence from Large Bank Servicers

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> First Draft: September 17, 2021 This version: December 9, 2021

Abstract

Mortgage forbearance, where monthly scheduled payments are paused, was widely activated in response to the Covid-19 pandemic. This article offers an early examination of its effectiveness by examining borrower forbearance entry, exit, and post forbearance performance of residential mortgage loans held or serviced by largest national banks. We find that the forbearance rate is higher for borrowers with lower credit scores and in areas with higher unemployment rates. Some borrowers under forbearance have high credit scores and a significant proportion continued to pay. Borrowers who have higher credit scores, made more payments under forbearance, and experienced greater labor market recovery were the earliest to exit the forbearance. Borrowers exit forbearance via different forms with a large proportion delaying the payments of the forborne amount at maturity, refinance, or the property sale. One potential downside of non-payment under forbearance is its adverse impact on ability to be refinanced, for which we find some empirical evidence. However, the effect is short-lived likely due to programs that attempt to alleviate this adverse effect. These pieces of evidence support an interpretation that forbearance programs supported borrowers adversely affected by Covid-19 event but incentives should be built in to encourage exits to facilitate wealth accumulation.

Keywords: Mortgage, Forbearance, Debt Payment Relief, Loss Mitigation, Modification, Covid-19, Heterogeneity

^{*} I am grateful to Feng Li for extensive discussions in the early stage of this research project. I thank Natalie Tiernan, Angela Lindstrom and Bradley Biedermann for their insightful suggestions, and participants of the Economics Weekly Speaker Series of the OCC and the OFR research seminar series for their helpful comments. The views herein are those of the authors and do not necessarily represent the views of the Office of the Comptroller of the Currency or the U.S. Department of the Treasury.

I. Introduction

Mortgage forbearance in which borrowers in federally backed loans can pause the monthly payment is a prominent and integral part of the broad relief programs that congress and government agencies enacted in response to Covid-19 event besides the accommodating fiscal and monetary policies.¹ With the benefit of hindsight, the housing market turned out to be robust and may have contributed to the broad economic recovery amid the arrival of vaccinations and the associated economic reopening by end of 2020.

Understanding the effect of Covid-19 mortgage forbearance programs, including borrowers' entry, payment behavior, exits, and post-exit performance, is crucial for several reasons. For lenders or investors, understanding the borrower characteristics and behavior is instrumental to accurately forecast credit risk, set the right reserves, and make the appropriate credit provision decision. For servicers, understanding the characteristics of who remain in the forbearance would help servicers offer targeted loss mitigation options. For policy makers, understanding the heterogeneity effect across the spectrum of borrower income, neighborhoods, etc., besides the overall effect on the mortgage and housing market, is of critical importance in evaluating the effect of such programs on wealth accumulation.

There arises a burgeoning literature on the effect of Covid-19 forbearance programs (Farrell et al., 2020; Cherry et al., 2021) and this paper makes a unique contribution by examining first lien residential mortgage data from the largest 18 bank servicers.² Farrell et al. (2020) uses loan level mortgage data serviced by Chase bank that is merged with the checking accounts of the borrower in the bank. Cherry et al. (2021) uses credit bureau data and examines both mortgages and credit cards. The rich information from the bank servicers allows us to accurately identify not only Covid-19 forbearance entry and exit but also forms of exits. In addition, the data has its unique features, including how banks manage the costs of servicing forborne FHA/VA loans.

Our data is sourced from the FRB Y-14 data, which collects detailed loan- and borrower- level information from the largest depository mortgage servicers. As of December 2020, this data reports close to 17 million mortgage loans totaling \$3.4 trillion, approximately one third of the US mortgage market. Studies utilizing data on residential mortgages serviced by banks also serve to better understand behavior of banks amid sharply rising role of non-banks.³

We find that forbearance entry is higher in areas with greater unemployment and for borrowers with lower credit scores. We also find that a significant portion of borrowers under Covid-19 forbearance continue to pay. On forbearance exits, we find that the early exits from forbearance

¹ Servicers also developed relief programs for non-federally backed residential mortgages (Cherry et al., 2021).

² Other highly related articles include Agarwal et al. (2020) and Gerardi et al. (2021) which focus on heterogeneity across borrowers in refinance and wealth accumulation in the Covid-19 era. An et al. (2021) examined the borrower payment behavior by race and income in the Covid-19 event. Capponi et al (2021) examined the effect of Covid-19 forbearance on refinance. Anderson et al. (2021) used an experimental design to examine strategic forbearance. Fuster et al. (2021) examined the credit supply in the U.S. mortgage market in the Covid-19 event.

³ Refer to Kim et al. (2018), Buchak et al. (2018), e.g., for studies on the rising role of nonbanks in mortgage servicing and originations.

are borrowers of higher credit score and those facing improving employment conditions exit faster.

We also found that the entry sensitivity to unemployment shock was greater for higher credit score borrowers and in neighborhoods with a greater percentage of higher income households. And forbearance exit sensitivity to improving employment conditions was greater for lower credit score borrowers. These pieces of evidence together are consistent with an interpretation that while forbearance helped those adversely affected by the economic fallout from Covid-19, it also benefited borrowers who have greater means to shoulder such shocks.⁴

Forbearance exits take many forms. Some borrowers reinstate and pay all forborne amounts before they exit. A large portion exits by deferring the forborne payments with two types: i) deferring the forborne amount to a balloon payment until earlier of maturity, refinance, or the loan pay-off date; ii) extending the contractual maturity to allow for missed payments to be collected. Some received modifications with rate change, term change, or both.

Most of the borrowers who exit the forbearance are current after the exits – they are able to make monthly payments after the exits, likely assisted by the Covid-19 deferral programs and the improving labor market. Their serious delinquency rate is however higher than that of the group that never went into Covid-19 forbearance, reflecting the additional risk factors of these borrowers. One group particularly contributed to the elevated serious delinquency rate of forbearance exits – borrowers who were late in payments before the entry into forbearance.

One potential downside of forbearance and the non-payment it affords is that it might adversely affect the borrower's ability to refinance given the history of non-payment (under forbearance). We found evidence for it. However, government agencies including government sponsored enterprises (GSEs) put out programs to support refinance after borrowers exit. We did find evidence that the adverse effect of forbearance on refinance is short-lived.

We also found that banks, for FHA/VA loans in Ginnie Mae (or GNMA) securities, utilized buyouts to manage nonpaying FHA/VA loans under forbearance. Such nonpayment by borrowers, for servicers, means that servicers need to advance payment to investors. We find that servicers buy out such loans from GNMA securities and put them on their own book, avoiding the need to advance payments to investors in a declining interest rate environment.

The remainder of the article proceeds as follows. In section 2, we present the data and the sample. We examine forbearance entry decision in section 3, borrower payment behavior and exit decision and post-exit performance in Section 4. In Section 5, we examine the effect of forbearance on refinance likelihood; we then investigate how servicers manage the cost of servicing FHA/VA loans via the buying out from GNMA pools in Section 6. We conclude in Section 7.

⁴ We also find evidence that borrowers who did not pay before pandemic joined forbearance, thus effectively obtaining a respite brought about by the forbearance response in this pandemic.

2. Data, Sample, & Variable Constructs

2.1 Data

We use FRB Y14 (or Y14) first lien mortgage loans reported monthly by the largest 18 bank servicers. It contains both the bank held or serviced loans. It is updated monthly, with a lag of around 2-3 months. The Y14 data contains a rich set of borrower- and loan-level variables both for origination and for loan performance including delinquency status, loss mitigations, and liquidations, etc.

With a focus on Covid-19 event, we utilized the Y14 data for the period from February 2020 until the most recent performance updates. To facilitate data analyses, we constructed a 10 percent random sample: We select a random 10 percent sample for the report period of February 2020 and follow their performance; we then select a random 10 percent sample for originations in each following month and track their performance at monthly frequency.

Panel A of Figure 1, in the right y-axis, shows that the number of active loans in our sample declined from 18.1 million in March 2020 to 16.2 million in December 2020; the visible decline in loan counts in Y14 data reflect the significant number of refinancing, especially by non-banks, amid the unprecedented low interest rates starting in March 2020.

A key task is to identify the Covid-19 related forbearance. With CARES Act enacted in March 2020, an inter-agency guidance was issued to servicers on reporting of Covid-19 forbearance (and reporting of payment behavior while under forbearance to the credit bureaus). Servicers were instructed to record the Covid-19 forbearance under the variable "Loss_Mit_Performance_Status." However, since there were loans under loss mitigation prior to March 2020, we removed such loans in defining Covid-19 forbearance.⁵

Panel A of Figure 1, in the left y-axis, shows that the percent of first-lien residential mortgages under Covid-19 forbearance each month since March 2020. Consistent with the forbearance statistics from Mortgage Banker Association, BlackKnight Flash Statistics, and Urban Institute statistics, we find that it sharply jumped in April, peaked in May, and has since declined due to exits and fewer entries, as also shown in Panel C where loan counts under forbearance is plotted by entry month.

Panel B of Figure 1 shows that this pattern of forbearance applies to all investors, including GSEs, GNMA, and others. We find that, for the residential first-lien mortgages serviced by the 18 largest bank servicers, the largest block, GSE, saw a significant decline in loans under forbearance (the peak number of 0.85M in May 2020 declined to 0.42M by December 2020), and so did loans in private-label securitizations (or PLS) and bank-held portfolio.

The total number of loans under forbearance, however, is the result of both forbearance entry and exits. To further understand and assess the impact of forbearance, we thus look into forbearance

⁵ The inter-agency Guidance did not specify whether loans under loss mitigation in March 2020 shall be treated as Covid-19 forbearance or not. We observed a reasonable jump in loans under loss mitigation in March. In our baseline analyses, we treat such loans at Covid-19 forbearance. Our findings overall change little when we do not count these March 2020 loans as Covid-19 forbearance.

entry and exit, separately, in sections 2.2 and 2.3.⁶ To obtain macro-economic variables and geographic/demographic variations, we merge the loan level data with various data sources. For unemployment variables, we utilize the county-level unemployment rate variables for Bureau of Labor Statistics (or BLS). For variables that capture zip-level percentage of higher income households, we utilized the 2019 American Community Survey dataset.

2.2 Sample & Variable Constructs for Forbearance Entry Analyses

To examine entry into forbearance, we keep all observations from the raw data except for removing observations after a loan enters the forbearance. The dependent variable, forbearance_entry, will take the value of 1 in the month a loan enters forbearance.

CARES Act (2020) mandates that Covid-19 forbearance be readily available for federally backed residential mortgage loans, which include residential mortgage loans in GSE guaranteed mortgage backed securities (or MBS) and Federal Housing Agency (or FHA) or Veteran Affairs (or VA) insured mortgage loans typically packaged in GNMA MBS. Bank-held loans or those in private label mortgage backed securities (PLS) are not required by law to grant Covid-19 forbearance. We thus examine forbearance by investors. Row 1 of Panel A of Table 1 shows that GSE and portfolio loans have similar level of forbearance while those for GNMA and PLS are higher. The forbearance entry rate for loans bought out from GNMA securities is particularly high; this is not surprising as servicers, by GNMA rules, typically buy out non-paying loans including loans under Covid-19 forbearance that is contractually 90+ days past due (or DPD).

To capture potentially non-linear relation between borrower credit scores and forbearance entry, we binned borrower's current FICO score according to broadly accepted cutoff levels. We found that more than 60 percent of loan-month observations are for borrowers with FICO score greater than 760, suggesting largest national banks increasingly held on book or serviced borrowers with pristine credit score after 2008 Great Financial Crisis.

In terms of investors, 64% of loan-month observations are for conventional loans in GSE, 14% in GNMA, 16% in portfolio, and 3% for PLS. In terms of loan type, around 81% of GSE loans are conventional loans without private mortgage insurance (or PMI). Close to 70% of GNMA loans are FHA. Close to 89% of bank held loans are conventional loans with 3% being FHA/VA. The majority of loans in early buyouts (or EBO) are FHA/VA loans.

The share of borrowers with the current FICO score at or above 740 are highest for GSE and portfolio loans, much lower for GNMA and PLS loans, and are close to be 0 for EBO loans. Of particular interest is that the portion of current credit score lower than 680 in EBO loans is close to half (more on EBO in Section 6).

The variation in the share of loans in refreshed loan to value ratio (LTV) above 80% is much less across investors. Across all investors, only 7.3% have refreshed TV greater than 80%, reflecting

 $^{^{6}}$ For Covid-19 forbearance entry analyses, we focus on data from February 2020 to December 2020. For analyses on forbearance exits and particularly loan performance after forbearance exits, we utilized the data with the latest monthly – July 2021 – performance update.

the recovering house market after the 2008 Great Financial Crisis and the robust housing market through the pandemic. Only 6% of GSE and portfolio loans are of LTV greater than 80%, and so do 13% of GNMA and 11% of EBO loans. Variation across investor type on debt to income ratio (DTI) is large. For example, the share of missing DTI is 20% for all, 16% for GSE, 18% for portfolio, 33% for GNMA, and 39% for EBO loans.

Approximately 54% of loan-month observations are of refinance purpose; 41% are for purchase loans; GSE has the highest in refinance – 40% in rate or term refinance and 20 percent in cashout refinance; GNMA (and EBO) loans have a higher proportion of purchase loans, reflecting their mission of supporting first-time home buyers. Close to 90% of all loans are fixed rates; portfolio loans have 21% in adjustable rate loans, with PLS loans coming next.

Three fourths of the loans are on single family detached residence, 8% in condo, 7% in townhouse, 3% in multi-family residential (2- to 4- units), 5% in PUD, and 1% in manufactured homes. Close to 90% of loans are for primary residence, 4% for second home, and 6% for investment properties.

Sources of loan origination vary across investor type. GSE loans have 52% originated via direct retail channel and 32% from correspondent channel. Bank serviced GNMA loans sourced heavily from correspondent channel at 56% with direct retail channel at 31%, suggesting the reliance on the correspondent channel for Agency loans. For portfolio loans, two thirds are originations via direct retail channel. PLS loans have a high percentage of broker originated loans, reflecting the prominent broker channel for loans originated prior to the 2008 Financial Crisis.

Ten percent of all loans have unpaid principal balance (or upb) greater than \$379,000. However, the share is much larger at 38% for portfolio loans, reflecting that banks hold jumbo loans on book. On the contrary, close to 90% of GNMA loans have upb lower than \$231k.

Seasoning of loans across investor type varies. Close to 89% of PLS loans are originated more than 10 years ago, reflecting in general their originations prior to the 2008 Financial Crisis; portfolio loans have a higher percentage of less than one year of seasoning, reflecting the fact that a newly originated loan typically stays on the bank's book for a few months before it is sold to GSE or packaged into GNMA securities.

Interest only loans are only of 2 percent of all loans; the rate is higher at 14% for PLS loans and 7% for portfolio loans. Loans with a balloon payment feature are close to zero; but the rate is 2.3% for PLS loans. Close to 78% of loans are full-documentation loans, with a lower level at 42% for PLS loans. Similarly, loans with negative amortization feature is 1%, but the rate is 10% for PLS loans and 4% for portfolio loans. The payment option ARM percent for all is 1%, but 9% for PLS and 3% for portfolio loans. Lastly, 2% of all loans have prepayment penalty clause, but 10% of PLS and 9.5% of portfolio loans do.

On community-level variables, we collected the number of mortgage borrowers having distinct level of household income from 2019 American Community Survey (or ACS) and constructed a variable measuring the percent of households having annual income greater than \$75,000. We

calculated this variable at the zip- level. Across the 31,623 zip-codes, the mean is 52% (the median 53%). That is, in an average zip, 52% of households carrying a mortgage have an annual income above \$75k in 2019. We then merge this data with our main analyses sample at zip- level with 99.8% of loan-month observations being matched.

We find that an average loan in our data is in a zip where 65% of households have an annual income greater than \$75k in 2019. An average GNMA loan is in a zip where 58% of households have an annual income greater than \$75K; an average portfolio loan is in a zip with 69% having an annual household income greater than \$75K.

We sourced the unemployment data from Labor Department; the most granular is at the county level. The mean unemployment rate (weighted by labor force) across Feb-Dec 2020 is 8.4%. We then merge this county-month level data with our loan-level sample which has a zip-code identifier using the zip-county crosswalk file available through HUD. Shown in the last row of Table 1, the mean unemployment rate across all loan-months is 8.5%.

2.3 Sample & Variable Constructs for Forbearance Exit Analyses

To examine exit from forbearance, we keep the loan-month observations from the sample for loans that entered forbearance, only for the months after it enters forbearance. The dependent variable, forbearance_exit, takes the value of 1 in the months when and after it exits the forbearance. The exit also shows up in the mean of the forbearance variable as it takes the value of 0 after the borrower exits. Across investors, GSE loans have the lowest value, meaning they have the highest rate of exiting.

The pattern of the borrower and loan level characteristics for the exit sample is distinct from that for forbearance entry analyses sample. For example, in the exit analyses sample, 41% of GSE loans and 38% of borrowers are of current FICO greater than 760 while those numbers are 68% and 63%, respectively in the entry analyses sample (reflecting the overall sample to a large degree). This suggest that borrowers with lower FICO scores enter the forbearance disproportionately more; it also shows even borrowers with high FICO entered forbearance. We investigate this in depth in Section 3 below.

3. Forbearance Entry

We examine bi-variate relationships between forbearance entry and factors in Section 3.1 and conduct regression analyses in Section 3.2.

3.1 Bi-Variate Analyses

We first examine how forbearance entry responds to sharply rising unemployment rates and then investigate how the behavior varies across borrowers by credit scores.

A. Forbearance Entry and Unemployment Shock

We first look at time-series correlation between national forbearance rate and the national unemployment rate. Panel A of Figure 2 shows that the increase in forbearance entry directly coincides with the increase in unemployment: The largest forbearance entry was in April 2020 – 1.2M borrowers entered forbearance in April and 0.2M did in May while the national unemployment rate climbed from 6.9% in March to 11.1% in April and 13.9% in May before it started subsiding in Jun 2020.

Panel B of Figure 2 plots the forbearance entry rate by the deciles of the unemployment rate variable. That is, we pool all loan-month observations and create 10 deciles by the level of the unemployment rate variable. Therefore, the variation across the deciles include both the time-series and the cross-sectional (across county/zip) variation. For county-months that experienced unemployment rates ranging from 5th decile (or 50th percentile) of 7.4% to the 9th decile (or 90th percentile) of 14.7% or higher, forbearance entry rate increases significantly with the unemployment rate. The forbearance entry rate for those areas with lower level of unemployment rate is relatively flat.

B. Forbearance Entry and Borrower Credit Score

Panel C of Figure 2 plots the forbearance entry rate as a function of the borrower's current FICO scores. Borrowers with lower refreshed FICO entered forbearance significantly more than those with higher scores; for example, borrowers with FICO lower than 579 have a forbearance entry rate that is 9 times of that of borrowers with FICO greater than 760.⁷

C. Forbearance-Unemployment Sensitivity as a Function of FICO

Of particular interest is the heterogeneity in borrower's forbearance entry response to the unemployment shock. Is it stronger for borrowers with lower credit score as they likely benefit more from the payment respite provided by the forbearance? Panel D of Figure 2 offers a visual inspection of this relationship. Confirmed is the finding that borrowers with lower credit score utilized the forbearance more. Also confirmed is the finding that entry rate is higher when unemployment rate is higher.

We observe that while lower FICO borrowers utilized forbearance more in response to higher unemployment rate, the relative responsiveness is slightly greater for higher FICO borrowers. For example, for borrowers with the lowest credit score, the forbearance rate changed from 1.7% to 10.6%, an increase of 5.4 fold when the unemployment rate moved from lower than 3.6% to greater than 14.7%, the forbearance rate for the highest FICO group was from 0.2% to 1.8%, an increase of 7.3 fold.⁸

⁷ Not reported in tables or figures, we found that the pattern slightly changes for FHA borrowers mainly for the lowest FICO bands, reflecting the heterogeneity in forbearance entry by loan type (and various dimensions).

⁸ Another dimension that we examine but did not present in tables or figures is the borrowers who were already delinquent prior to their entry to Covid-19 forbearance. We found that comparing noncurrent ones that entered forbearance with current ones that entered, the former's FICO is approximately 100 points lower than the latter ones.

3.2 Econometric Regression Analyses

While we presented bi-variate relation between forbearance entry and borrower credit scores and unemployment rates, the relation abstracts from difference in many other borrower and loan characteristics. We thus conduct regression analyses where we include these characteristics. Variables were discussed in Section 2; summary statistics of them were presented in Table 1.

We estimate the following equation to examine factors that affect forbearance entry:

$$Ln(\frac{p_{ict}}{1-p_{ict}}) = \beta_x X_{i,t} + \beta_u UR_{c,t} + \gamma UR_{c,t} * X_{i,t} + \alpha_s + \alpha_{sv} + \varepsilon_{ict}$$
(1)

where

*p=probability(Enter=*1) where Enter changes from 0 to 1 when a borrower enters Covid-19 forbearance;

i is loan; *c* is county; *t* is month;

X: borrower-, loan-, or community- level characteristics as detailed in Table 1;

UR: county-level unemployment rate (merged to zip-level in Y14);

s: state; sv: servicer

We include state and servicer fixed effects in our baseline specification to capture time invariant state- and servicer-level heterogeneity in forbearance practices. Since the dependent variable is an indicator variable, we estimate it using a Logistic regression – the dependent variable in the regression is the log of odds of entering.

Panel A of Table 2 presents the estimation results using the full sample. Column 1 shows the result from the baseline specification, columns 2 and 3 add the unemployment variable interacting with borrower FICO and community-level variable, respectively. Each specification shows the coefficient estimate, the robust standard error, and the p-value, respectively. A p-value lower than 0.01, e.g., implies the statistical significant at the 1 percent level.

Across the 3 specifications, borrowers with greater credit scores utilize forbearance less. For example, borrowers with FICO score greater than 760 (lagged one month), controlling for the explanatory variables, have a log-odds ratio of entering forbearance that is 0.97 lower than those with score lower than 579 (the omitted group). This is consistent with borrowers with greater score have a less need for payment forbearance in face of pandemic induced economic disruption.

The unemployment shock unleashed by the response to the pandemic has a large impact on borrower's forbearance entry. The estimated coefficient on the unemployment rate variable (in %), 0.15, suggests that moving from a 25th percentile level of 5.0 percent to 75th percentile of 11.2 percent is associated with an increase in log odds of forbearance entry of 0.15*6.2 = 0.93, a

level comparable to the log-odds difference between borrowers with credit score below 579 vs above $760.^9$

Other explanatory variables are of expected signs. Borrowers with greater LTV ratio utilize forbearance more, but the impact of LTV variable is of lower magnitude than that of FICO variation. Borrowers with greater debt to income ratio utilize forbearance more, reflecting a potentially greater need for support in case of an unemployment shock. The investor of the loan turns out to have little impact on forbearance utilization, possibly because other borrower and loan characteristics capture the key variations as well as that servicers also offered forbearance to privately held loans. Compared with conventional loans, FHA loans have higher forbearance rate, consistent with their greater need for forbearance support due to generally lower income of FHA loan borrowers.

Mortgages for investment purpose have higher forbearance rate than those for primary residence. Broker originated mortgages are associated with a greater forbearance rate. Compared with 30year term, those having 15-year term have lower forbearance rate. Loans with low- or nodocumentation have higher forbearance rate than full-doc loans, and so do mortgages with negative amortization product feature.

Do borrowers already late in payments utilize forbearance? According to CARES Act (2020), as long as a borrower experiences hardship due to the pandemic, he or she can qualify. Therefore a borrower already late in payment could utilize this support; we find that indeed borrowers with a delinquency in last month has greater likelihood of entering forbearance.

We further examine whether borrowers' forbearance response to unemployment shock vary with borrower characteristics. Column 2 reports regression results including the unemployment variable interacting with the FICO category variables. We find that the compared with borrowers with FICO score lower than 580, those with scores 680-719, 720-760, and especially 760+ have additional forbearance responsiveness to unemployment – the log-odds of forbearance entry response to unemployment for those with FICO 760+ is higher by an additional 0.02 on a base of 0.17. This regression result thus resonates with the visual presentation in Panel D of Figure 2.

These results from this forbearance entry analysis are consistent with an interpretation that while forbearance supported borrowers with the highest vulnerability, it also provided borrowers from the full credit score spectrum a means to weather the economic shock resulting from the pandemic and borrowers with higher credit scores disproportionately utilized it.¹⁰ However, this result could be unique to this data, and it would be illuminative to see whether this holds for the broader mortgage market, including those serviced by non-banks.

⁹ Not shown are results using the unemployment rate lagged by 1 month. The negative coefficient suggests that it is not what transpired in the labor market, but rather what is transpiring that propels borrowers into forbearance. This evidence is thus consistent with interpretations that forbearance supported borrowers hit by unemployment but also provided a means to take precautionary action by entering forbearance.

¹⁰ We also examined the sample focusing on the period up to May 2020 when the forbearance entry was the most prominent and found the same pattern.

Communities vary in the proportion of mortgage holders whose household income is greater than \$75,000. We include this zip-level variable and its interaction with the unemployment rate. Not surprisingly, we find that coefficient on the variable is negative, that is, mortgagees in higher income zip-codes utilized forbearance less. We also find that the coefficient on the interaction term is positive, implying that the forbearance entry response to unemployment shock in wealthier communities is greater than those in less wealthy ones.

3.3 Sub-sample Forbearance Entry Regression Analyses

Panel B of Table 2 presents results from sub-sample regression analyses of forbearance entry. We examine GSE loans, FHA/VA loans, portfolio loans, and loans in PLS separately.¹¹ We focus on the specification with unemployment and borrower credit score interaction. We find that across the sub-samples, borrowers with greater credit score have a lower likelihood of entering forbearance. In addition, the finding that the borrowers of greater credit score are more responsive in their forbearance entry in face of the unemployment shock persists across the sub-samples.

4 Payment Under Forbearance, Forbearance Exit, and Performance Post Exit

4.1 Sample

In this section we focus on the forbearance entrants' payment behavior, their exits, and performance after exits; therefore the sample of analyses for this section are only borrowermonth observations after the forbearance entrance month. The number of borrower-month observations as of December 2020 in the 10 percent sample is 1,532,116, reflecting the 1.9 million forbearance entrants since March 2020 with reporting month ending December 2020. Approximately 1.0 million, have ever exited forbearance as of December 2020. A small portion, around 0.05 million, exited but re-entered forbearance. As of December 2020, 0.95 million or 5.8% percent of active borrowers, remained under forbearance.¹²

Specifically, for forbearance exit and payment analyses by forbearance entrants, we remove loan month observations after a loan exits the forbearance. For loan performance analyses after forbearance exits, we use loan month observations after forbearance exit month and also compare their loan performance with the overall sample for all loan months.

¹¹ This is not an exactly mutually exclusive way of dividing investors; however, this way helps highlight the party who ultimately bears the (credit) risk.

¹² These numbers are very closely in line with what is reported by external vendors (given that banks serviced close to a third of the U.S. market); <u>https://occ.bulletinintelligence.com/briefing?d=2021-01-07&doctypecode=occ</u> reports that an estimated 2.7M borrowers remain under forbearance.

4.2 Borrower Payment Behavior under Forbearance

The goal of the forbearance program is to pause monthly payments and allow borrowers a respite before they can regain economic footing and resume payment. Non-payment is thus expected; CARES Act (2020) mandate that non-payment under Covid-19 forbearance shall not be reported as further delinquency to the credit bureau. Servicing platform data, such as Y14 data, continued to track contractual delinquency and is different from data reported to the credit bureaus.

Panel A of Figure 3 shows the non-payment rate by investor type over time.¹³ Not surprisingly, EBO loans had the highest non-payment rate; the high nonpayment probably was a main driver for doing the buyouts by the servicer in the first place. GSE loans had a non-payment rate of 0.62 in May 2020, implying 38% of those under forbearance still were paying. It declined to 0.32 in December 2020. Portfolio loan consistently had the lowest non-payment rate over time; for example, close to 60% of those in forbearance paid in May 2020. The increase in nonpaying rate over time was true across investor type, likely reflecting the exits of those with greater ability to pay and the stay of borrowers with a lower ability (or willingness) to pay.

The non-paying behavior for borrowers under forbearance could be due to the borrower's inability to pay due to the unemployment shock; it could also be due to borrowers' strategic choice to not pay in order to accumulate liquidity for future potential income or unemployment shocks. Panel B of Figure 3 plots the non-payment rate per month following borrowers who exit in different months. For example, for borrowers who exit forbearance in July 2020, we find that nonpaying rate is consistently high until Jun 2020 before it drops in July when the borrowers exit the forbearance and it remains low afterwards. This pattern is consistent for exits in different exit months (with the earlier exits overall had a lower non-current rate post exits.) It appears that once borrower exits the forbearance, their payment behavior distinctly changes. In below sections we therefore focus on borrower forbearance exit and their performance post exit.

4.3 Exiting Forbearance

A. Summary Statistics

We can already have a glimpse of the forbearance exits from Panel C of Figure 1 which plots the number of loan remaining under forbearance by entry month. For example, 1.2M entered forbearance in April, and by the last reporting month, 0.5M remained for these April entrants, i.e., 0.7M of the April entrants exited by December 2020. The pattern is similar for loan entering forbearance in later months.¹⁴

Panel C of Figure 3 offers an explicit examination of forbearance exit rate over time and by investor type. The y-axis is the percent of current number of borrowers under forbearance that exits in the month. We find that GSE loans had the highest exit rate, particularly in July 2020,

¹³ In this subsection on payment behavior under forbearance, the non-payment is used interchangeably with noncurrent.

¹⁴ Timing of exits is partially due to servicers' designs of forbearance programs; we thus include servicer fixed effects in our regression analyses. We also conduct analyses by investor type as applicable.

likely reflecting the 3-month mark for the April entrants. Portfolio loans also had a relatively high exit rate in July 2020. The second highest exit rate for GSE loans was September 2020, after which the exit rate declined. Portfolio loans, while having overall lower exit rate than GSE loans, had more stable exit rate since July 2020. GNMA loans had similar level of exit rate than portfolio loans, but as we discussed in previous sections, it is because of the early buyouts by servicers. And we observe consistently low forbearance exit rates for EBO loans, similar to the level for loans in private label securities.

B. Forms of Forbearance Exits

Borrowers exit forbearance in different forms. First, some forborne borrowers are able to get refinance (and naturally exits forbearance). Of the 1.0M borrowers who exited forbearance as of December 2020, 0.11M or 11% are prepaid at exit.¹⁵

Exiting for borrowers who have been paying all along under forbearance is straightforward – the principal amortizes as scheduled and the monthly payment amounts remain intact upon exits. 0.42M borrower exits are of this category.

For borrowers who did not make all monthly payments under forbearance, of which there are 0.46M, they could pay off the accumulated missed monthly payments, bring the loan back to the original amortization schedule in the month of forbearance exits, and resume their regular payment after exits. Approximately 0.15M borrowers are of this category, also called "re-instatement."

However, such one-time payment of forborne monthly pay at exit is not required for exiting forbearance; a popular form, termed Covid-19 deferral, is to resume prior (to forbearance) monthly payment upon exiting with the accumulated missed monthly payments upon maturity, refinance, or property sale.¹⁶ It does not involve change in rates or loan term (and thus monthly pay after forbearance exits remains intact). Approximately 0.23M borrowers exited in this fashion.

Lastly, a borrower, often unable to exit and resume the original monthly pay, might exit with a modification in term or rate or most often in combination that typically results in a lower monthly payment. Slightly above 1 percent of all exits were with a rate or term modifications from March to December 2020.¹⁷

¹⁵ Approximately 0.078M or 7.8% exited with a prepayment while the forbearance variable take the value of 1.

¹⁶ These deferred payments can be spread across the number of months of missed payments at the end of the original term. For example, suppose the borrower stays in forbearance for 12 months and did not make a single payment. Suppose the monthly pay is \$2000 and the loan is currently year 10 of a 30-year term. The forborne borrower will be expected to pay the \$2000 over the course of 12 months when the term ends. Approximately 0.02M borrowers had an explicit extension of this sort.

¹⁷ Approximately 0.02M of borrowers who entered forbearance received a modification as of December 2020; some of these modified loans remain under forbearance.

Panel D of Figure 3 plots the number of forbearance exits by exit type using data as of July 2021. Notable is that the exits in earlier months (April – June) were majorly those who were paying under forbearance. In July 2020, the exit due to the Covid-19 deferral became the dominant type; within it were mainly GSE loans. Exits via modification became to appear late in the sample. The "other" category encompasses exits without these forms of assistance. Also noticeable is the slowdown of exits over time.

C. Bi-variate Analyses

What determines forbearance exits? We first examine the determinants via bi-variate analyses and then conduct regression analyses. Panel E of Figure 3 shows that forbearance exit rates increase with borrower FICO score; borrowers with FICO greater than 760 have exit rates that are close to 3.5 times that of borrowers with FICO lower than 580. Shown in different angle, Panel F of Figure 3 shows that borrowers who exit earlier have higher FICO scores. For example, the July exits have the median FICO at 753 and the December exits are at 716.

Panel G of Figure 3 plots the forbearance exit rates by unemployment rate percentile: Borrowers in lower unemployment rate counties have higher exit rate. Moving from 10th to 90th percentile, borrowers' exit rate decreased by close to two thirds.

We also examined the relation between exit rate and borrower credit score by exit type. We find that the relation is very close for the exit types of Covid19 deferral and re-instatement. Prepay also increase with credit score and the relation is not as strong. Exit by modification does not appear to vary much with credit score. The category Other appears to have a weakly positive relation between exits and credit score.

In addition, we investigate the relation between exit rate and unemployment rate by exit type. Again, the relation is close for the exit by Covid19 deferral and re-instatement. Below in regression analyses we start by examining exits in total and investigate individual type of exit when applicable.

4.4 Regression Analyses of Forbearance Exits

Table 3 shows the regression analyses of forbearance exits. Beyond the explanatory variables used in forbearance entry, we add an important variable – number of month under forbearance. Forbearance termination can be voluntary or because of expiration of forbearance plan; including such variable helps capture the impact of forbearance plans.

Column 1 of Panel A shows results from a specification where the dependent variable equals 1 if the exits is non-prepay (via refinance) which comprises of re-instatement, deferral, modification, or others. Its uses a specification where the lagged payment behavior is fully specified – 30+DPD, 60+DPD, etc.¹⁸ Column 2 has the same specification as that in column 1 except that it includes the interaction between unemployment rate and FICO bins, and column 3 includes

¹⁸ Not all estimated coefficients are shown in the tables for brevity reason.

instead the interaction with percent of higher income in a zip-code. Table A2 in Appendix presents results using alternative specifications. For example, columns 2 & 3 of Table A2 are from a multinomial logit specification where prepayment and non-prepayment exits are treated as competing events.

Across columns in Panel A of Table 3 (and columns 1-2 in Table A2), we find that forbearance exits in the form of non-prepayment increase with borrower credit score and decreases with past non-payment behavior under forbearance. The exit rate is highest when the borrower has been under forbearance for 6 months, reflecting the CARES Act (2020) mandatory initial forbearance period of 6 months.

The coefficient on unemployment rate in non-prepayment exit is consistently negative at around - 0.03. A 10 percentage point increase in unemployment rate would be associated with a decrease in exit log-odds of 0.3, a magnitude similar to the effect of having credit score below 580 vs 760+.

Column 2 in Panel A further shows that the response of forbearance exit on unemployment is strongest for borrowers with credit scores of 620-679 and smallest for those with score above 760. It suggests that borrowers with lower credit scores depend on improvement in labor market in exiting forbearance more than their higher score counterparts.¹⁹

Column 3 in Table A2 examines the exit in the form of prepayment (in multinomial logit). The effect of credit scores appears different from prepayment exit vs non-prepayment exit; relative to borrowers with lower credit scores, borrowers with credit score of 720-759 and 680-719 are relatively more likely to exit via prepayment than they do via non-prepayment exits; we further examine prepay in more depth in Section 5.

Panel B presents results from sub-sample analyses of forbearance exits. We focus on the specification with unemployment and borrower credit score interaction. We examine the non-prepay exits for GSE loans, FHA/VA loans, portfolio loans, and PLS loans, respectively. Across the 4 columns, we find that borrowers with greater credit score have a higher likelihood of exiting forbearance. We also confirm the finding that greater unemployment reduces the exit likelihood across the sub-samples. The finding that the smaller impact of unemployment rate on exit for borrowers with greater credit score appears to emanate from the GSE sub-sample.²⁰

4.5 The Performance After Forbearance Exits A. Summary Statistics

One prominent feature of Covid-19 forbearance is that borrowers who exited can re-enter forbearance. Panel H of Figure 3 plots the number of borrowers who missed three payments for those who ever entered forbearance. Not surprisingly, the largest chunk of this group are those

¹⁹ Shown in Column 6, the effect of unemployment on forbearance exit is smaller for borrowers in higher income zip codes. However, the coefficient is statistically insignificant.

²⁰ We conducted a series of robustness checks. First, our findings are robust to clustering standard errors at the servicer-reporting month level. Second, we examined an alternative way of forming the forbearance analysis sample – dropping observations after a loan exits the forbearance; results are robust to this treatment.

who are still in forbearance. A small portion of these are those who re-entered, reflecting that those who found difficulty in paying after exits can request to re-enter.²¹ Less than 0.02M of forbearance exits & non-re-entrants are in serious delinquency as of Dec. 2020.

B. Regression Analyses

Panel A of Table 4 provides results from regression analyses of loan-month observations after a forborne loan exits using performance data as of December 2020. Column 1 shows results where the dependent variable is an indicator variable for re-entry to forbearance; column 2 has an indicator variable for prepay as the dependent variable; column 3 has an indicator variable for serious delinquency as the dependent variable. The specification is the same as that in the equation for forbearance entry analyses except for the dependent variable.

We find that borrowers with higher credit score are less likely to re-enter forbearance, have lower serious delinquency rate, and are more likely to prepay. The impact of higher credit score is largest in reducing serious delinquency rate than in reducing re-enter. Borrowers with credit score of 720-759 are particularly prone to prepay (more than those with 760+).²²

The effect of unemployment has statistically insignificant effect on either re-enter or prepay. The coefficient for unemployment variable in the serious delinquency regression, on the surface, is counter-intuitive, at a negative value. However, this could be a result that borrowers, facing higher unemployment, resorted to forbearance re-entry as a means to manage payments, creating an unusual relationship. The result could also be partially due to the quite short performance history after borrower exits since the performance data used here is as of December 2020. In next sub-section, we use performance data as of July 2021 to further examine performance of borrowers who exited Covid-19 forbearance and compare them with those who never entered.

4.6 Comparing Performance of Never Forborne Borrowers versus Forbearance Exits

Besides examining loan performance of borrowers who exited forbearance, we also compare them with borrowers who never entered forbearance.²³ Panel A of Figure 4 shows that the serious delinquency rate for never-forborne borrowers, in each report month, is at a level lower than 1% while that for the forbearance exits are at a level around 3% (and declining over time). However, also notice that the number of borrowers who never entered forbearance is the majority, shown via the right axis.

As a result, excluding those still under forbearance, the number of borrowers in serious delinquency is still mainly from borrowers who never entered forbearance. In Panel B, we separate the borrower exits by whether they were delinquent prior to forbearance entrance and

²¹ Of the 1M exits, 0.05M re-entered.

²² The area under ROC (or AUC) for the prepay regression is very high, which arises from that the prepayment almost exclusively went to borrowers who had the lowest refreshed loan to value ratios (after they exit forbearance).

²³ Kim et al. (2021) examined the potential information friction in servicers' provision of debt payment reliefs in Covid-19 event.

find that those who were already behind in payments prior to forbearance entry persist in their serious delinquency post forbearance exits even as the economy started recovery in 2021.

In Panel B of Table 4, we report regression results on loan performance using data as of July 2021. The sample of analyses exclude loan-month observations when a borrower is under forbearance; our focus is to compare repayment behavior of those who exited the forbearance with those who never entered. The total number of observation for this analysis is 20.6 million, reflecting the 10 percent random sample of report months from February 2020 to July 2021.

The dependent variable is entering serious delinquency, i.e., it takes the value of 1 when a loan becomes 90 days or more past due or in foreclosure or REO; we drop the observations after the loan becomes seriously delinquent. The explanatory variable of interest is Ever_In_Forbearance which takes the value of 1 if the loan has ever entered Covid-19 forbearance (and has now exited) and 0 otherwise. The variable Dlq_Before_Enter_FB takes the value of 1 if the borrower was non-current prior to entering Covid-19 forbearance and 0 otherwise. We also include a comprehensive list of borrower and loan attributes as in Equation (1); the coefficient on Ever_In_Forbearance thus captures the additional (possibly hard-to-measure) risk factors that are not reflected in the loan and borrower characteristics included in the regressions.

Columns 1 and 2 include all investors while the next three columns focus on GSE loans, FHA/VA loans, portfolio loans, and PLS or other investors. Column 1 includes Ever_in_Fobearance alone and Column 2 includes both variables of interest. We find that the coefficient on Ever_In_Forbearance is 1.83, at a magnitude very close to that of the borrower having a current FICO score lower than 580 (relative to those 720-759).

In addition, we find in column 2 that the coefficient on Ever_In_Forbearance remains positive and the coefficient on Dlq_Before_Enter_FB is significant positive and with a magnitude of close to that of the borrower having a current FICO score of 580-619 (relative to 720-759). And this pattern of findings persist in the sub-sample results by (final) investors. These evidence together supports an interpretation that i) borrowers that ever utilized Covid-19 forbearance have higher serious delinquency risk than those who never entered beyond what are captured by typical borrower and loan characteristics, and ii) those who were delinquent prior to forbearance entry have additional serious delinquency risk than those who were current prior to the entry.

5. Unintended Consequence of Forbearance: Reductions in Refinance?

The above analyses highlight the benefit of the forbearance programs: Borrowers flocked into it in response to sharp rise in unemployment rate; borrowers with higher credit score exited it earlier; borrowers in general exited forbearance as unemployment rate declines; borrowers who exited the forbearance, despite with serious delinquency rates higher than those who never utilized forbearance, mostly paid (likely with the assistance from deferral programs). In this section, we examine a potential unintended consequence of the wide-spread forbearance programs for federally guaranteed or insured mortgages and non-public mortgages as well: By giving a borrower an insurance against decline in credit score while not paying under forbearance, as mandated in CARES Act (2020), it might in-advertently reduced such borrowers' ability and opportunities to refinance and thus build greater wealth.²⁴

5.1 Summary Statistics

Figure 5 examines, by under Covid-19 forbearance or not, the percent of loans that are eligible and would benefit from a refinance, defined as rate difference greater than 75 bps, combined mark-to-market loan to value ratio (CLTV_MTM) lower than 0.8, and borrower current FICO greater than 720.²⁵ Appendix Figure A1 shows that FICO, instead of CLTV, restricted the refinance eligibility to a larger degree.

The figure shows that i) a greater percentage of borrowers not under forbearance are eligible for refinance than those under forbearance, and ii) still, close to 30% of borrowers under forbearance are eligible for refinance. However, the lower rate for those under forbearance could be due to lower credit score. In the regression analyses below, we thus control for such factors and examine how forbearance especially nonpayment under forbearance affects refinance likelihood.

5.2 Regression Analyses

A. Using Forbearance and Payment Status, Lagged 1 Month

We aim to examine whether borrowers' prepayment likelihood varies with the borrower under forbearance and whether he/she pays while under forbearance. The sample for this analysis is thus the full sample. The final number of loan-month observations used in the regression is 16.9M. The basic econometric specification thus includes these variables – under forbearance and their payment behavior while under forbearance - besides the basic borrower/loan characteristics variables.

Table 5 shows the regression results; the dependent variable is 1 if borrower prepays. The first 3 columns use the status of the borrower's forbearance and payment status lagged one month. Column 1 uses all observations while columns 2 and 3 use the sub-sample of federally backed and privately owned mortgages, respectively. The former includes those with investors being GSE or GNMA or loan type being FHA or VA; the latter are the remains.

Across the columns, we find that borrowers with greater credit score have higher likelihood of being prepaid via refinance. On the impact of forbearance status as of last month, it reduces the log-odds of prepayment by 0.85, greater than the impact of the borrower having credit score of 760+ (relative to those with 579 or less). However, making the payment while under the forbearance greatly alleviated the adverse impact of forbearance on prepay: The log-odds

²⁴ Farrell et al. (2019) and Ganong & Noel (2018) examined the role of borrower liquidity and equity in consumer loan defaults.

²⁵ The mark-to-market or refreshed property value in Y-14 is the original property value adjusted with the zip-level housing price index changes from the closing month to the reporting month; the HPI is sourced from Loan Processing Services Applied Analytics. For the nominator, we combine the outstanding principal balance of the first-lien mortgage and the balance of the 2nd-lien mortgage. Lacking details on the amortization of the 2nd-lien loan; we use the origination amount of the 2nd-lien loan; the calculated CLTV is thus an upper bound of the true value.

increases by 0.49. Looking across the private vs the public backed mortgages, such pattern persists with the magnitude smaller for private mortgages.²⁶

Possibly anticipating this effect, agencies such as GSEs promulgated policies that greenlighted the refinance for borrower under forbearance but still pays and also borrowers who exit the forbearance and make three consecutive payments.²⁷ In the below analyses, we thus use the forbearance and payment status, lagged by 3 months.

B. Using Forbearance Status, Lagged 3 Months

Columns 4 and 5 of Table 5 show the results; column 4 examines the federally backed loans while column 5 looks at privately owned loans. We find that for federally backed loans, being in forbearance 3-month prior has much weaker negative impact on prepay likelihood, a result distinct from being in forbearance 1 month ago. The results for private owned loans using 3-month lag in forbearance and payment status are distinct from those using 1-month lag. These results together suggest that a distant nonpayment under forbearance has distinctly less negative impact on refinance probability as an immediate one, particularly for federally backed ones where programs exist to foster refinance accessibility after forbearance experience.

Summarizing these results, i) being in forbearance reduced borrowers' prepayment likelihood, ii) paying under forbearance mitigates the adverse effect of forbearance on borrower prepayment likelihood, iii) the adverse effect of forbearance on prepayment is diminished when payments are made consecutively, likely reflecting the agency policy that qualify such borrower for refinance.

6. Servicers' Use of Early Buyouts

The majority of the article examines payment relief provided by Covid-19 forbearance. However, servicers are still obligated to remit payments to investors.²⁸ In this section we investigate how bank servicers manage the costs associated with servicing borrowers in forbearance. FHA/VA loans have the highest non-current rate. For example, across May-September 2020, the non-current rate of FHA/VA loans were consistently at 18%, and the majority of these non-paying loans are those under forbearance.

Panel A of Figure 6 shows that the number of loans in early buyouts (or EBO) status started to increase in July 2020 and have since stayed elevated; its rise directly coincided with the decline

²⁶ We conducted a series of sub-sample analyses using forbearance and payment status lagged 1month; results suggest that the negative effect of forbearance on prepay and the salvaging effect of payment under forbearance is larger for borrowers with higher credit score. The negative effect of nonpayment under forbearance is greater for portfolio loans than for FHA loans, but the salvaging effect of payment under forbearance is comparable between portfolio loans and FHA loans.

²⁷ https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Announces-Refinance-and-Home-Purchase-Eligibility-for-Borrowers-in-Forbearance.aspx.

²⁸ GSEs and GNMA have policies on the length that servicers face such obligations; programs are also in place to support servicers.

in GNMA loans. Approximately 0.2M borrowers with approximately \$40B balance are in EBO status as of December 2020.

Panel B shows that the median (current) FICO score of GNMA borrowers under forbearance were at 660 and declined over time, reflecting the exit of borrowers with greater score. Starting in June and stabilizing in July, the median borrowers in EBO who are under forbearance sharply increased, from 530 in early 2020 to close to 630 in later 2020, reflecting the fact that FHA/VA borrowers with relatively high credit score also entered forbearance. Overall, EBO loans have lower FICO scores than GNMA loans, consistent with an interpretation that FHA/VA borrowers with lower credit scores are more adversely affected by the pandemic – utilizing forbearance more and making fewer payments – and thus are disproportionally eligible to be bought out.

Why do servicers engage in buying out loans in GNMA securities and put them on their own balance sheet? A major factor is the lower funding costs of holding them on balance sheet due to the historically low interest rate during the Covid-19 era. Second, servicers can save the advance expenses that they incur on the nonpaying borrowers including those under Covid-19 forbearance. Third, servicers can attempt to complete modification/cure and securitize them again with possible favorable gains on sale. Further examining servicers' behavior in the economics of EBO during the Covid-19 era can be a fruitful research area.²⁹

7. Conclusion

This article aims to examine the benefits and the potential costs of the Covid-19 mortgage forbearance programs. By examining forbearance entry, exit, and performance after exit using the loan level data serviced by the 18 largest depository servicers, we have several findings. First, borrowers with lower credit score and facing greater unemployment shocks utilized forbearance more; borrowers with greater credit score exit forbearance faster and forbearance exits were responsive to improving labor market; borrowers' post forbearance serious delinquency rates, while higher than those who never entered forbearance especially by those who were delinquent prior to the forbearance entry, is low with the assistance from Covid-19 deferral programs. This evidence supports an interpretation that the Covid-19 forbearance served its intended goal.

Second, there exists heterogeneity in borrowers' entry and exit response to the unemployment shock; borrowers with the highest scores had extra positive entry response to rise in unemployment but were less responsive to improvement in employment in their exits; borrowers with lower credit score were more responsive to improvement in employment in their exits. This evidence points to the importance of understanding the heterogeneity in borrowers' utilization of forbearance.

²⁹ With EBO loans on servicers' balance sheet, whether EBO and GNMA loans perform differently and how loans exit EBO are questions worth examining. We leave them for future research when more performance data is available.

Third, non-payment under forbearance had adverse impact on borrower's ability to refinance, but this effect is materially alleviated by the renewed consecutive payments after exiting forbearance. This evidence highlights the importance of designing policy to provide forborne borrowers access to opportunity to accumulate wealth while enabling borrowers payment pauses.

There remain many questions unanswered about forbearance: Might forbearance generate an unintended consequence of ameliorating borrowers' incentives to look for jobs? Did borrowers utilizing mortgage forbearance to pay down other debts or save them for down-payment for new home purchases and thus contribute to the imbalance in the housing market? We leave these questions for future research.

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Figure 1: Forbearance Rates and Numbers by Calendar Month

The figures in the below panels use the full data sample, with observation months from March to December 2020 unless otherwise noted. Covid-19 (or Covid) forbearance is defined as 1 if "Loss_mit_perf_status" takes the value of "Active", following the inter-agency guidance on Covid-19 forbearance reporting; we excluded those borrowers whose were "Active" already in Feb 2020.





Panel B: Forbearance Rate by Investor Groups







Panel C: Forbearance Number by Forbearance Entry Month

Ent 03 refers to entering forbearance in March 2020, and so on.

Figure 2: Forbearance Entry by Unemployment Rate and Borrower FICO

Unless otherwise noted, the figures in the below panels, on forbearance entry, use as source data all loanmonth observations but exclude observations after a borrower enters forbearance.



Panel A: Forbearance and Unemployment Rate - Over Time Relation

Panel B: Forbearance Entry Rate by Unemployment Rate (UR) Percentiles, March-Dec 2020

Plotted is the average monthly forbearance entry rate as the (county-level) unemployment rate moves from lower than 10th percentile to the highest. Data is as of Dec. 2020.



Panel C: Forbearance Entry and FICO_Current

Plotted is the averaged monthly forbearance entry rate of borrowers as a function of their current FICO scores, using data as of Dec. 2020.



Panel D: Relation between Forbearance and Unemployment Rate, by FICO Bands

Plotted in the figure is the average monthly forbearance entry rate as the (county-level) unemployment rate (based on the collateral location) moves from the lowest 10th percentile to the highest percentile, using data as of Dec. 2020.



Figure 3: Borrowers' Payment Behavior under Forbearance & Forbearance Exits

Unless otherwise noted, the figures in the below panels use loan-month observations after a borrower enters forbearance.



Panel A: Percent NonCurrent under Forbearance, by Investor Type

"NonCurrent" includes the nonpayment under forbearance.

Panel B: "NonCurrent" Rate by Forbearance Exit Month

Report is the percent of forborne borrowers who are "non-current" by the month they exit forbearance. Xaxis is report month. Jun exiters refer to forborne borrowers who exit forbearance in Jun 2020, and so on. Non-Current includes nonpayment under forbearance.



Panel C: Forbearance Exit by Investor Type

Reported y-axis is the percent of borrowers under forbearance that exits in the month; x-axis is report month. GNM: Ginne Mae. EBO: early GNM buyouts. PLS: private label securities. PTF: portfolio loans.



Panel D: Forms of Forbearance Exits

Y-axis is the number of forbearance exits by exit type each month. CurrentBeforeExit refers to loans under forbearance that borrowers continued to make payments. ReinstatementAtExit refers to borrowers who did not make all payments but brought the loan to current at exit (called "reinstatement"). CovidDeferral refers to exits where the forborne monthly payments were deferred to loan maturity, refinance, or sale of the property. Modification refers to exits where the borrower exits via a modification (rate or term or a combination) where monthly payment is reduced after the modification.



Panel E: Forbearance Exit Rate by FICO

Reported on left Y-axis is the average monthly exit rate for borrowers under Covid forbearance using data as of Dec 2020. Right Y-axis is the number of loan-month observations.



Panel F: Forbearance Exits and Borrower Credit Scores Over Time

Reported on the left Y-axis is the median FICO of borrowers who exited in the respective month on the X-axis, as of Dec. 2020. Right Y-axis reports the number of forbearance exits.



Panel G: Forbearance Exit and Unemployment Rate

Reported in the figure is the forbearance exit rate as the (county-level) unemployment rate moves from 10th percentile to the highest percentile using data as of Dec. 2020.



Panel H: Serious Delinquency for Ever Covid-19 Forborne Borrowers

Plotted in Panel H is the number of borrowers who missed three payments for those who ever entered forbearance, by month. ReEntry refers to those who have once exited forbearance but reentered. Exits refers to those who exited and remain so.



Figure 4: Performance of Covid-19 Forbearance Exits vs Never-forborne Borrowers

Panel A: Serious Delinquency Rate and Number of Never Forborne Borrowers vs Exits Plotted below are the serious delinquency rate each month for those who exited forbearance versus those who never utilized forbearance; also plotted are the number of borrowers who never utilized Covid-19 forbearance (or FB) and the number who exited the forbearance. Serious delinquency (SD) is 90+DPD or in foreclosure/REO.



Panel B: Loans in Serious Delinquency with Delinquency Status Prior to Entering Forbearance

Plotted below is the number of loans in serious delinquency of borrowers who never utilized Covid-19 forbearance, forbearance exits who were current before entering forbearance, and forbearance exits who were delinquent prior to entering forbearance. Those who remain in Covid-19 forbearance are excluded. Serious delinquency is DPD90+ or in foreclosure/REO.



Figure 5: Refi Eligibility & Covid-19 Forbearance

Plotted below are, by under Covid-19 forbearance or not, the percent of loans where borrowers are eligible for and would benefit from a refinance, defined as rate difference greater than 75 bps, LTV lower than 0.8, and borrower FICO greater than 720. X-axis is the report month.



Figure 6: Banks' Use of GNM Buyouts

Panel A



Panel B:



Appendix: Figure

Figure A1: Refinance Eligibility

Plotted is the percent of loans that are refi-eligible in the sample by month until December 2020. To capture different degree of stringency for refinance eligibility, blue curve requires rate difference, the difference between the carried rate and the market mortgage rate for the loan type, to be greater than 75bps. The orange curve adds to the blue curve the requirement that refreshed CLTV be lower than 0.8; the grey curve adds to the blue curve the requirement that the current FICO be greater than 720; the purple curve requires all.



Table 1: Summary Statistics of Sample for Forbearance Entry Analyses

This table reports the mean of variables for forbearance entry analyses. The sample is formed from a ten percent random sample of the raw FRB Y-14 first-lien monthly data; to focus on forbearance entry, we removed observations after a loan enters forbearance (we report summary statistics on forbearance exit analysis sample in Table A1). The reporting dates in this sample are from February to December 2020. The number of observations in the forbearance entry analysis sample is 17.67 million (M).

Variable	Total	GSE	GNM	PLS	Portfolio	GNM Buyout
Under forbearance	1.1%	0.9%	1.8%	2.2%	1.0%	4.8%
Investor	100%	64.0%	14.2%	2.8%	16.1%	0.7%
FICO_Current Less than 579	3.6%	1.7%	6.9%	16.0%	3.0%	48.9%
580-619	2.5%	1.3%	5.7%	9.1%	2.0%	13.5%
620-679	7.0%	4.9%	14.7%	17.1%	5.6%	14.6%
680-719	9.1%	8.0%	14.4%	13.3%	7.4%	5.0%
720-759	13.9%	13.7%	16.5%	13.6%	13.1%	2.7%
760+	60.9%	68.3%	38.8%	27.6%	62.6%	1.7%
Missing	3.0%	2.0%	2.9%	3.2%	6.4%	13.7%
Refreshed LTV less than 30%	24.6%	28.4%	9.3%	21.0%	24.5%	11.7%
30% - 40%	13.3%	14.8%	8.5%	14.7%	11.7%	8.2%
40% - 50%	14.9%	15.3%	14.4%	16.9%	13.7%	13.2%
50% - 60%	15.1%	14.1%	19.8%	15.9%	14.8%	18.5%
60% - 70%	13.4%	11.6%	19.8%	12.9%	14.6%	20.4%
70% - 80%	10.8%	9.4%	13.7%	8.7%	14.2%	14.7%
80% - 90%	4.7%	4.2%	7.9%	4.7%	3.6%	7.8%
90% - 100%	2.4%	1.8%	5.2%	2.2%	1.9%	3.0%
>100%	0.3%	0.1%	0.4%	2.3%	0.3%	1.8%
Missing	0.4%	0.2%	1.0%	0.7%	0.6%	0.6%
Debt to income less than 0.15	22.2%	23.1%	13.5%	37.2%	25.7%	8.0%
0.15 - 0.21	19.3%	21.1%	16.3%	7.9%	18.3%	11.2%
0.21 - 0.29	20.7%	21.4%	20.3%	12.1%	20.3%	20.6%
0.29 - 0.41	14.7%	14.5%	14.5%	12.9%	15.4%	18.1%
> 0.41	3.4%	3.8%	2.7%	3.6%	2.4%	3.5%
Missing	19.6%	16.0%	32.8%	26.3%	17.9%	38.6%
Loan type: Conventional w/o PMI	69.2%	81.1%	0.0%	78.5%	85.9%	0.1%
FHA	11.7%	0.1%	69.8%	8.6%	2.6%	80.6%
VA	3.7%	0.0%	23.7%	1.3%	0.5%	12.9%
Conventional w/ PMI	12.9%	18.7%	0.0%	5.5%	3.3%	0.4%
Other	2.5%	0.2%	6.4%	6.1%	7.6%	6.0%
Loan Purpose: Purchase	41.2%	35.8%	63.2%	43.0%	39.9%	74.5%
Refi: rate	35.4%	39.9%	23.8%	17.2%	33.0%	17.7%
Refi: cash-out	19.0%	20.0%	7.3%	37.3%	22.7%	6.8%
Refi: home improvement	1.7%	1.8%	0.9%	1.2%	2.0%	0.1%
Other	2.7%	2.4%	4.7%	1.1%	2.4%	0.9%
Loan Product: FRM 30 year	69.0%	69.0%	92.4%	61.5%	48.0%	80.2%
FRM 15 year	21.9%	27.6%	5.0%	3.0%	19.5%	2.1%
FRM 40 year	1.9%	1.1%	1.3%	7.6%	3.7%	15.0%
ARM	5.5%	2.0%	1.3%	18.0%	20.8%	2.2%
Other	1.8%	0.3%	0.0%	9.8%	7.9%	0.5%
Property Type: Single Family	75.2%	74.3%	82.3%	74.3%	72.4%	86.3%

Townhouse	6.5%	7.4%	6.5%	3.0%	3.4%	4.1%
Condo	7.8%	8.5%	3.1%	7.6%	9.7%	2.3%
Manufactured	0.8%	0.6%	2.0%	0.8%	0.8%	1.3%
Multi-unit	2.6%	2.6%	1.9%	5.7%	2.6%	2.0%
PUD	5.0%	4.8%	2.5%	5.3%	8.4%	3.6%
Other	2.0%	1.8%	1.6%	3.3%	2.8%	0.4%
Occupancy: Primary Residence	89.2%	87.5%	96.8%	85.3%	89.0%	98.9%
Secondary home	4.1%	4.7%	0.1%	2.6%	6.0%	0.1%
Investment property	5.8%	7.2%	0.9%	8.7%	4.5%	0.4%
Other	0.9%	0.6%	2.2%	3.4%	0.4%	0.6%
Loan Source: Retail	49.8%	51.6%	31.2%	26.1%	66.1%	24.1%
Broker	4.4%	2.8%	4.5%	24.4%	6.2%	7.3%
Correspondent	31.3%	31.4%	56.4%	17.4%	10.0%	59.9%
Servicing right purchased	9.8%	11.7%	7.0%	24.3%	1.8%	3.8%
Other	4.7%	2.6%	0.8%	7.7%	15.9%	5.0%
Unpaid principal balance<=\$37k	10.0%	9.8%	7.5%	13.2%	11.9%	11.9%
\$37k - \$73k	14.9%	14.8%	18.4%	16.6%	11.1%	20.4%
\$73k - \$134k	25.2%	25.6%	35.7%	21.1%	14.4%	35.7%
\$134k - \$231k	25.0%	27.8%	27.1%	18.6%	13.4%	23.8%
\$231k - \$379k	15.1%	17.5%	9.3%	14.3%	11.0%	7.0%
\$379k - \$538k	5.0%	4.0%	1.6%	8.9%	11.6%	1.0%
>=\$538k	5.0%	0.6%	0.4%	7.2%	26.6%	0.2%
Loan Age <=1 year	10.7%	10.4%	4.3%	1.2%	20.3%	0.2%
1-2 year	5.9%	6.1%	3.4%	2.0%	8.4%	1.2%
2-3 year	7.0%	7.5%	4.9%	1.7%	8.0%	2.6%
3-4 year	8.7%	9.3%	6.2%	1.2%	9.9%	3.4%
4-5 year	7.4%	7.7%	6.5%	1.1%	8.4%	4.3%
5-6 year	5.9%	6.2%	6.5%	1.5%	5.3%	4.8%
6-7 year	6.1%	6.6%	7.3%	0.5%	4.3%	5.3%
7-8 year	13.0%	14.6%	16.0%	0.6%	7.1%	8.0%
8-9 year	8.7%	9.8%	12.2%	0.4%	3.3%	7.7%
9-10 year	5.7%	6.4%	8.1%	0.7%	2.3%	7.7%
>=10 years	21.0%	15.6%	24.6%	88.9%	22.7%	54.7%
Interest Only: No	98.4%	99.8%	100.0%	86.3%	93.3%	99.9%
Yes	1.6%	0.2%	0.0%	13.6%	6.5%	0.0%
Balloon Payment: No	94.4%	95.2%	98.9%	56.1%	94.3%	98.1%
Yes	0.2%	0.0%	0.0%	2.3%	0.7%	0.0%
Unknown	5.4%	4.8%	1.1%	41.5%	5.0%	1.9%
Documentation: Full	78.3%	77.4%	80.9%	42.4%	86.5%	86.6%
Low doc	4.8%	3.4%	14.0%	2.9%	2.5%	2.9%
No doc	16.9%	19.2%	5.1%	54.6%	10.8%	10.5%
Negative Amortization: NO	99.0%	99.8%	100.0%	90.3%	96.4%	99.6%
Yes	1.0%	0.2%	0.0%	9.7%	3.6%	0.0%
Optional payment ARM: Yes	99.2%	99.9%	100.0%	91.3%	97.2%	100.0%
Yes	0.8%	0.1%	0.0%	8.7%	2.7%	0.0%
Prepayment Penalty: No	98.0%	99.9%	100.0%	89.8%	90.3%	100.0%
Yes	1.9%	0.1%	0.0%	10.0%	9.5%	0.0%
Unemployment rate (%)	8.5	8.5	8.1	9.2	8.8	8.5
Pct_HHInc_abv_75k_zip	64.8%	65.6%	57.8%	61.0%	69.4%	55.4%

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variable	Class	Estimate	Staerr	p value	Estimate	StdErr	p value	Estimate	StdErr	p value
Intercept	500 610	-4.72	0.19	0.00	-4.68	0.19	0.00	-4.63	0.20	0.00
FICO_Current (lag)	580-619	0.53	0.01	0.00	0.65	0.02	0.00	0.53	0.01	0.00
(omitted: <580)	620-679	0.40	0.01	0.00	0.39	0.01	0.00	0.40	0.01	0.00
	680-719	0.10	0.01	0.00	-0.01	0.01	0.46	0.10	0.01	0.00
	720-759	-0.26	0.01	0.00	-0.43	0.01	0.00	-0.26	0.01	0.00
	760+	-0.97	0.01	0.00	-1.18	0.01	0.00	-0.98	0.01	0.00
	missing	-0.40	0.01	0.00	-0.28	0.03	0.00	-0.40	0.01	0.00
Refreshed LTV	Missing	-0.09	0.03	0.01	-0.09	0.03	0.01	-0.11	0.03	0.00
(omitted: <=30%)	30 - 40	-0.13	0.01	0.00	-0.13	0.01	0.00	-0.15	0.01	0.00
	40 - 50	-0.05	0.01	0.00	-0.05	0.01	0.00	-0.07	0.01	0.00
	50 - 60	0.02	0.01	0.03	0.01	0.01	0.06	0.01	0.01	0.10
	60 - 70	0.09	0.01	0.00	0.08	0.01	0.00	0.09	0.01	0.00
	70 - 80	0.15	0.01	0.00	0.14	0.01	0.00	0.16	0.01	0.00
	80 - 90	0.23	0.01	0.00	0.22	0.01	0.00	0.25	0.01	0.00
	90 - 100	0.35	0.01	0.00	0.35	0.01	0.00	0.38	0.01	0.00
	>100	-0.24	0.03	0.00	-0.22	0.03	0.00	-0.18	0.03	0.00
Debt to income	0.15 –0.21	-0.16	0.01	0.00	-0.16	0.01	0.00	-0.16	0.01	0.00
(omitted group:<0.15)	0.21 –0.29	0.00	0.01	0.84	0.00	0.01	0.76	0.00	0.01	0.50
	0.29 -0.41	0.17	0.01	0.00	0.17	0.01	0.00	0.17	0.01	0.00
	> 0.41	0.32	0.01	0.00	0.32	0.01	0.00	0.32	0.01	0.00
	Missing	-0.04	0.01	0.00	-0.04	0.01	0.00	-0.04	0.01	0.00
Loan type (omitted grou	FHA	0.16	0.01	0.00	0.16	0.01	0.00	0.16	0.01	0.00
conventional w/o PMI	VA	-0.29	0.01	0.00	-0.29	0.01	0.00	-0.29	0.01	0.00
	Cvtl w PMI	0.06	0.01	0.00	0.06	0.01	0.00	0.05	0.01	0.00
	Other	0.11	0.01	0.00	0.11	0.01	0.00	0.11	0.01	0.00
Property Type	Townhouse	0.04	0.01	0.00	0.05	0.01	0.00	0.03	0.01	0.00
(omitted: Single Family	Condo	0.01	0.01	0.13	0.01	0.01	0.19	-0.01	0.01	0.20
	Manufactured	-0.04	0.02	0.09	-0.05	0.02	0.05	-0.04	0.02	0.12
	Multi-unit	0.08	0.01	0.00	0.08	0.01	0.00	0.12	0.01	0.00
	PUD	0.04	0.01	0.00	0.05	0.01	0.00	0.03	0.01	0.01
	Other	-0.16	0.02	0.00	-0.17	0.02	0.00	-0.17	0.02	0.00
Occupancy (Omitted:	Secondary home	-0.08	0.02	0.00	-0.09	0.02	0.00	-0.06	0.02	0.00
Primary Residence)	Investment property	0.34	0.02	0.00	0.34	0.02	0.00	0.33	0.02	0.00
	Other	-0.07	0.06	0.20	-0.07	0.06	0.20	-0.08	0.06	0.17
Loan Source	Broker	0.27	0.03	0.00	0.28	0.03	0.00	0.27	0.03	0.00
(omitted group: Retail)	Correspondent	0.20	0.03	0.00	0.21	0.03	0.00	0.20	0.03	0.00
	Svcg right purchase	0.12	0.03	0.00	0.12	0.03	0.00	0.12	0.03	0.00
	Other	0.00	0.03	0.98	0.01	0.03	0.73	0.00	0.03	0.91
Loan Product	FRM 15 year	-0.18	0.01	0.00	-0.18	0.01	0.00	-0.18	0.01	0.00
(omitted: FRM 30 year)	FRM 40 year	0.17	0.01	0.00	0.17	0.01	0.00	0.18	0.01	0.00
	ARM	-0.06	0.01	0.00	-0.06	0.01	0.00	-0.06	0.01	0.00
	Other	0.23	0.01	0.00	0.23	0.01	0.00	0.23	0.01	0.00
Status_Current_lag		-1.13	0.01	0.00	-1.12	0.01	0.00	-1.13	0.01	0.00
Unemployment Rate (UF	र)	0.15	0.00	0.00	0.14	0.00	0.00	0.12	0.00	0.00
UR*FICO Curr (lag)	580-619				-0.01	0.00	0.00			
	620-679				0.00	0.00	0.28			
	680-719				0.01	0.00	0.00			
	720-759				0.01	0.00	0.00			
	760+				0.02	0.00	0.00			
	missing				-0.01	0.00	0.00			
Pct_abv_75k (zip)								-0.19	0.04	0.00
UR*pct_abv_75k								0.06	0.00	0.00
Servier fixed effects		Yes			Yes			Yes		
State fixed effects		Yes			Yes			Yes		
AUC		0.814			0.815			0.81		

Table 2: Regressions on Forbearance EntryPanel A: Full Sample (sample size: 17.7M; variables' summary statistics are in Table 1)

Panel B: Sub-sample Analyses

			GSE			FHA			Portfolio			PLS	
Variable	Class	Estimate	StdErr	ProbChiSq	Estimate	StdErr	ProbChiSq	Estimate	StdErr	ProbChiSq	Estimate	StdErr	ProbChiSq
Intercept		-4.36	1.09	0.00	-6.96	59.09	0.91	-6.29	41.05	0.88	-32.83	14.13	0.02
FICO_Current (lag)	580-619	0.78	0.03	0.00	0.61	0.03	0.00	0.52	0.06	0.00	0.30	0.07	0.00
(omitted: <580)	620-679	0.46	0.02	0.00	0.34	0.02	0.00	0.29	0.04	0.00	0.17	0.05	0.00
	680-719	0.06	0.02	0.00	-0.14	0.03	0.00	0.13	0.04	0.00	-0.01	0.06	0.88
	720-759	-0.38	0.02	0.00	-0.51	0.03	0.00	-0.36	0.04	0.00	-0.36	0.07	0.00
	760+	-1.15	0.02	0.00	-1.23	0.03	0.00	-1.06	0.03	0.00	-0.78	0.06	0.00
	missing	-0.61	0.05	0.00	-0.01	0.04	0.78	-0.28	0.07	0.00	0.08	0.12	0.52
Refreshed LTV	Missing	-0.32	0.06	0.00	-0.11	0.05	0.02	0.22	0.09	0.02	0.07	0.12	0.54
(omitted: <=30%)	30 - 40	-0.22	0.01	0.00	-0.05	0.02	0.02	-0.12	0.02	0.00	0.09	0.03	0.01
, , ,	40 - 50	-0.11	0.01	0.00	-0.01	0.02	0.49	-0.06	0.02	0.00	0.15	0.03	0.00
	50 - 60	-0.01	0.01	0.30	0.02	0.01	0.09	-0.02	0.02	0.32	0.19	0.03	0.00
	60 - 70	0.08	0.01	0.00	0.10	0.01	0.00	0.07	0.02	0.00	0.07	0.03	0.02
	70 - 80	0.20	0.01	0.00	0.13	0.01	0.00	0.10	0.02	0.00	-0.01	0.03	0.72
	80 - 90	0.32	0.02	0.00	0.20	0.02	0.00	0.20	0.03	0.00	-0.04	0.04	0.39
	90 - 100	0.54	0.02	0.00	0.21	0.03	0.00	0.26	0.04	0.00	-0.23	0.06	0.00
	>100	-0.05	0.06	0.39	-0.18	0.05	0.00	-0.33	0.07	0.00	-0.22	0.05	0.00
Debt to income	0 15 -0 21	-0.18	0.00	0.00	-0.12	0.00	0.00	-0.04	0.02	0.00	-0.02	0.00	0.65
(omitted group:<0.15)	0.21 -0.29	0.02	0.01	0.00	-0.02	0.01	0.06	0.06	0.01	0.00	0.00	0.03	0.89
(0.29 -0.41	0.22	0.01	0.00	0.12	0.01	0.00	0.23	0.01	0.00	0.08	0.03	0.00
	> 0.41	0.41	0.01	0.00	0.21	0.02	0.00	0.19	0.03	0.00	0.04	0.04	0.36
	Missing	-0.21	0.01	0.00	0.02	0.01	0.02	-0.25	0.02	0.00	0.28	0.02	0.00
Loan type (omitted group	FHA	0.08	0.08	0.32				0.03	0.03	0.30	0.00	0.04	0.98
conventional w/o PMI	VA	0.23	0.08	0.00				0.12	0.03	0.00	0.16	0.05	0.00
	Cvtl w PMI	-0.11	0.06	0.04				-0.07	0.03	0.03	0.05	0.04	0.30
	Other	-0.02	0.21	0.92				0.08	0.05	0.11	-0.19	0.09	0.04
Loan Purpose	Cashout	0.09	0.04	0.02	-0.06	0.03	0.06	-0.03	0.12	0.81	-0.09	0.05	0.06
(omitted: Purchase)	Home Improve	0.09	0.04	0.02	-0.06	0.05	0.27	-0.06	0.13	0.65	-0.16	0.09	0.08
	Missing	0.07	0.18	0.71	0.06	0.14	0.66	0.27	0.61	0.66	0.17	0.17	0.32
	Other	-0.11	0.04	0.00	0.01	0.03	0.74	-0.05	0.13	0.68	0.11	0.10	0.26
D (T	Rate/term	0.00	0.04	0.93	0.02	0.03	0.57	-0.02	0.12	0.85	-0.05	0.05	0.29
Property Type	Condo	0.02	0.01	0.21	0.03	0.03	0.22	-0.06	0.02	0.02	0.11	0.04	0.01
(omitted: Single Family	Multi upit	0.10	0.04	0.01	-0.14	0.03	0.00	0.09	0.06	0.14	-0.35	0.15	0.02
	Other	-0.16	0.02	0.00	-0.12	0.03	0.00	-0.30	0.03	0.20	-0.02	0.05	0.71
	PUD	-0.06	0.02	0.00	0.07	0.04	0.00	0.00	0.04	0.00	0.11	0.00	0.02
	Townhouse	0.03	0.01	0.03	0.06	0.02	0.00	0.03	0.04	0.49	0.15	0.06	0.02
Occupancy (Omitted:	Secondary home	-0.15	0.03	0.00	0.16	0.13	0.22	-0.04	0.05	0.36	0.10	0.09	0.24
Primary Residence)	Investment property	0.27	0.02	0.00	0.00	0.06	0.98	0.41	0.04	0.00	0.32	0.08	0.00
	Missing	-0.12	0.04	0.00	-0.12	0.06	0.03	-0.38	0.12	0.00	0.05	0.08	0.58
	Other	0.20	0.08	0.01	0.00	0.12	0.97	0.63	0.08	0.00	-0.56	0.27	0.04
Loan Source	Broker	-0.07	0.06	0.25	0.20	0.04	0.00	0.47	0.08	0.00	0.01	0.07	0.93
(omitted group: Retail	Correspondent	-0.12	0.06	0.05	0.13	0.03	0.00	-2.15	0.40	0.00	0.04	0.07	0.57
	missing	0.73	0.30	0.01	-0.71	0.15	0.00	0.26	0.08	0.00	0.14	0.33	0.66
	Other	-0.22	0.06	0.00	0.21	0.05	0.00	0.24	0.09	0.01	-0.05	0.08	0.47
	Svcg right purchased	-0.14	0.06	0.02	0.10	0.04	0.01	-0.18	0.01	0.00	-0.16	0.07	0.02
Loan Product	ARM	0.05	0.02	0.02	-0.04	0.03	0.21	-0.43	0.02	0.00	-0.15	0.03	0.00
(omitted: FRM 30 year)	FRM15	-0.07	0.01	0.00	-0.24	0.03	0.00	0.68	0.02	0.00	-0.08	0.06	0.22
	FRM40	-0.15	0.02	0.00	-0.46	0.03	0.00	0.37	0.02	0.00	0.13	0.03	0.00
Desumentation	Other	0.25	0.04	0.00	1.06	0.06	0.00	0.41	0.04	0.00	0.22	0.03	0.00
Documentation Bronoumont populati	LOW	0.15	0.02	0.00	0.02	0.02	0.41	0.22	0.02	0.00	0.08	0.08	0.27
Status Current lag	res	-0.17	0.11	0.13	0.10 _1.14	0.17	0.30	-0.31	0.03	0.00	-0.12	0.04	0.00
Linemployment Rate (LIF	5)	0.15	0.01	0.00	0.14	0.01	0.00	0.35	0.02	0.00	0.05	0.00	0.00
UR*FICO Curr (lag)	-, 580-619	-0.02	0,00	0.00	-0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0,86
	620-679	0.00	0.00	0.85	0.00	0.00	0.53	0.01	0.00	0.34	0.01	0.00	0.15
	680-719	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	720-759	0.01	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.00
	760+	0.02	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00
Servier fixed effects		Yes			Yes			Yes			Yes		
State fixed effects		Yes			Yes			Yes			Yes		
AUC		0.812			0.794			0.82			0.77		
N obs		10.1M			2.40M			2.45M			0.44M		

Table 3: Regressions on Forbearance Exits

The number of loan-month observations for forbearance exit analysis is 1.53 million. All specifications include servicer and state fixed effects.

			(1)			(2)			(3)	
Dependent variable		Forbearance	exit by nor	n-prepav	Forbearan	ce exit by n	on-prepav	Forbearan	ce exit by	non-prepav
Variable	Class value	Estimate	StdErr	ProhChiSa	Estimate	StdErr	ProbChiSa	Estimate	StdErr	ProbChiSa
Intercent	Class value	1.62	3.24	0.62	1.80	5 34	0.72	1.91	5.34	0.74
FICO Current log	590 610	-1.02	0.01	0.02	-1.09	0.04	0.72	-1.01	0.04	0.74
FICO Culterit, lag	000-019	-0.12	0.01	0.00	-0.13	0.04	0.00	-0.15	0.01	0.00
	620-679	0.03	0.01	0.00	0.09	0.03	0.00	0.00	0.01	0.72
	680-719	0.17	0.01	0.00	0.16	0.02	0.00	0.14	0.01	0.00
	720-759	0.28	0.01	0.00	0.20	0.02	0.00	0.24	0.01	0.00
	760+	0.44	0.01	0.00	0.33	0.02	0.00	0.40	0.01	0.00
	missing	-0.49	0.02	0.00	-0.34	0.05	0.00	-0.32	0.02	0.00
DTI Ratio	0.21	0.05	0.01	0.00	0.06	0.01	0.00	0.06	0.01	0.00
	0.29	0.01	0.01	0.34	0.01	0.01	0.17	0.01	0.01	0.16
	0.41	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.10
	0.41	-0.04	0.01	0.00	-0.05	0.01	0.00	-0.03	0.01	0.00
	0,41+	-0.13	0.01	0.00	-0.14	0.01	0.00	-0.14	0.01	0.00
	missing	0.08	0.01	0.00	0.07	0.01	0.00	0.07	0.01	0.00
Investor Type	EBO	-0.86	0.04	0.00	-1.05	0.04	0.00	-1.05	0.04	0.00
(Omitted: portfolio)	GNM	-0.48	0.04	0.00	-0.61	0.04	0.00	-0.61	0.04	0.00
	GSE	0.49	0.04	0.00	0.42	0.04	0.00	0.42	0.04	0.00
	Missing	0.38	0.23	0.09	1.18	0.23	0.00	1.18	0.23	0.00
	Other	0.28	0.05	0.00	0.16	0.05	0.00	0.16	0.05	0.00
		0.20	0.03	0.00	0.10	0.03	0.00	0.10	0.00	0.00
	FLO	-0.05	0.04	0.21	-0.19	0.04	0.00	-0.19	0.04	0.00
Loan Type	FHA	0.40	0.01	0.00	0.42	0.02	0.00	0.42	0.02	0.00
	Other	0.11	0.02	0.00	0.15	0.02	0.00	0.15	0.02	0.00
	Conv't PMI	-0.33	0.02	0.00	-0.38	0.02	0.00	-0.38	0.02	0.00
	VA	0.17	0.02	0.00	0.22	0.02	0.00	0.22	0.02	0.00
Property Type	Condo	0.05	0.01	0.00	0.04	0.02	0.01	0.05	0.02	0.00
	Manufacture	-0.09	0.04	0.03	-0.02	0.04	0.72	-0.02	0.04	0.69
	Multi-unit	0.14	0.02	0.00	0.06	0.02	0.00	0.06	0.02	0.00
	Other	_0.02	0.02	0.55	_0.05	0.02	0.06	_0.05	0.02	0.00
		-0.02	0.03	0.00	-0.05	0.03	0.00	-0.05	0.03	0.07
	PUD	-0.08	0.02	0.00	-0.08	0.02	0.00	-0.08	0.02	0.00
	Iownhouse	-0.01	0.02	0.74	0.02	0.02	0.26	0.02	0.02	0.21
Occuapncy	2nd property	-0.04	0.03	0.17	-0.06	0.03	0.06	-0.06	0.03	0.05
	Investment	-0.03	0.03	0.20	-0.04	0.03	0.15	-0.03	0.03	0.20
	missing	0.11	0.04	0.01	0.13	0.04	0.00	0.13	0.04	0.00
	Other	-0.01	0.09	0.88	-0.01	0.09	0.94	-0.01	0.09	0.87
Loan source	Broker	-0.02	0.00	0.00	-0.03	0.00	0.04	-0.03	0.00	0.20
Loan source	Comercent	-0.02	0.02	0.20	-0.03	0.02	0.21	-0.03	0.02	0.20
	Corresponde	0.07	0.02	0.00	0.07	0.02	0.00	0.07	0.02	0.00
	missing	0.17	0.06	0.01	0.20	0.06	0.00	0.20	0.06	0.00
	Other	-0.16	0.02	0.00	-0.19	0.02	0.00	-0.19	0.02	0.00
	Svcg right p	-0.06	0.02	0.00	-0.06	0.02	0.00	-0.06	0.02	0.00
Loan Product	ARM	-0.02	0.02	0.20	-0.01	0.02	0.57	-0.01	0.02	0.69
	FRM15	0.15	0.01	0.00	0.15	0.01	0.00	0.15	0.01	0.00
	FRM40	-0.16	0.02	0.00	-0.18	0.02	0.00	-0.18	0.02	0.00
	Othor	0.05	0.02	0.06	0.10	0.02	0.00	0.10	0.02	0.00
Desugardant Law		-0.03	0.03	0.00	-0.04	0.03	0.11	-0.04	0.03	0.10
Docucment Low	LOW	-0.04	0.02	0.07	-0.04	0.02	0.08	-0.04	0.02	0.09
	No	-0.07	0.01	0.00	-0.06	0.01	0.00	-0.06	0.01	0.00
Interest Only	No	-0.06	0.03	0.06	-0.06	0.03	0.07	-0.06	0.03	0.06
	Other	0.61	0.26	0.02	0.65	0.27	0.01	0.66	0.27	0.01
Balloon	No	-0.17	0.07	0.02	-0.16	0.07	0.03	-0.16	0.07	0.03
Optional ARM	No	0.15	0.07	0.02	0.18	0.07	0.01	0.18	0.07	0.01
Negative amortization	No	-0.37	0.06	0.00	-0.41	0.06	0.00	-0.41	0.06	0.00
Prenavment penalty	No	0.30	0.03	0.00	0.27	0.03	0.00	0.27	0.03	0.00
Month in forboarance	2	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.03	0.00
wonun in iorbearance	2				-0.09	0.01	0.00	-0.09	0.01	0.00
(omittea is 0-1 month)	3				0.49	0.01	0.00	0.49	0.01	0.00
	4				0.04	0.01	0.00	0.04	0.01	0.01
	5				0.54	0.01	0.00	0.54	0.01	0.00
	6				0.62	0.01	0.00	0.62	0.01	0.00
	7				0.31	0.02	0.00	0.31	0.02	0.00
	8				0.35	0.02	0.00	0.35	0.02	0.00
	9				0.27	0.03	0.00	0.27	0.03	0.00
Delinguency status, log	30-50 dpd	-1.20	0.01	0.00	_1 12	0.00	0.00	_1 10	0.00	0.00
(omitted in Current)	60 804	-1.20	0.01	0.00	-1.12	0.01	0.00	-1.12	0.01	0.00
(onlined is Current)	00-89apa	-0.90	0.01	0.00	-1.18	0.01	0.00	-1.18	0.01	0.00
	90-119	-0.44	0.01	0.00	-0.76	0.01	0.00	-0.76	0.01	0.00
	120+	-1.11	0.01	0.00	-1.41	0.01	0.00	-1.41	0.01	0.00
	Foreclosure	0.40	0.06	0.00	0.41	0.06	0.00	0.41	0.06	0.00
	REO	-2.54	0.99	0.01	-2.77	1.01	0.01	-2.77	1.01	0.01
Unemplovemnt Rate		-0.09	0.00	0.00	-0.03	0.00	0.00	-0.04	0.00	0.00
LIR*EICO Currin	580-619	2.00		2.00	0.00	0.00	0.55	0.04	2.00	2.00
	620 670				0.00	0.00	0.00			
	020-0/9				-0.01	0.00	0.00			
	080-719				0.00	0.00	0.26			
	720-759				0.00	0.00	0.08			
	760+				0.01	0.00	0.00			
	missing				0.00	0.01	0.66			
pct HH inc>75k	5							-0.16	0.07	0.02
UR*pct HH inc>75								0.01	0.01	0.22
Borrower/loan controls			Voc			Voc		0.01	Voc	L
			0.70		1	0.70			0.70	
700			0.73			0.70			0.70	

Panel A: With interaction between unemployment rate and FICO

Panel B: Sub-sample Analyses of Forbearance Non-Prepay Exit

Variable Interropt Hermony FCO_CUPUTION CONDUCTION CONDUCTION FCO_CUPUTION CONDUCTION FCO_CUPUTION CONDUCTION FCO_CUPUTION CONDUCTION FCO_CUPUTIO		1		GSE			FHA			Portfolio	1		PLS	ĺ
Intencept	Variable	Class	Estimate	StdErr	p-value	Estimate	StdErr	p-value	Estimate	StdErr	p-value	Estimate	StdErr	p-value
FIGO_Current lagn 880.419 4.00 0.06 0.10 0.01<	Intercept		-3.38	1.80	0.06	-4.11	10.70	0.70	-3.34	25.43	0.90	-1.81	1094.66	1.00
(contiled - 580) (20.677) 0.00 0.01 0.02 0.01 0.07 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.02 0.01 0.02 0.05 0.01 0.01 0.01 0.02 0.01 0.02 0.01<	FICO_Current (lag)	580-619	-0.09	0.06	0.10	-0.27	0.06	0.00	-0.06	0.10	0.51	-0.26	0.14	0.06
eBb eBb 0 <td>(omitted: <580)</td> <td>620-679</td> <td>0.00</td> <td>0.04</td> <td>0.92</td> <td>0.12</td> <td>0.04</td> <td>0.01</td> <td>0.17</td> <td>0.07</td> <td>0.01</td> <td>0.20</td> <td>0.11</td> <td>0.08</td>	(omitted: <580)	620-679	0.00	0.04	0.92	0.12	0.04	0.01	0.17	0.07	0.01	0.20	0.11	0.08
120.769 0.19 0.03 0.00 0.24 0.05 0.04 0.05 0.05 0.06 0.05 0.06 0.05 0.06 0.05 0.06 0.05 0.06 0.05 0.06 0.05 0.06 0.07 0.02 0.07 0.07 0.03 0.07 0.07 0.03 0.07 0.07 0.08 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.04 0.07 0.05 0.07		680-719	0.13	0.03	0.00	0.26	0.05	0.00	0.21	0.07	0.00	-0.02	0.13	0.87
TPD 0.34 0.03 0.05		720-759	0.19	0.03	0.00	0.34	0.05	0.00	0.22	0.07	0.00	0.06	0.13	0.67
mean -0.50 0.00 -0.07 0.00 -0.07 0.00 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.02 0.01 0.02 0.02 0.02 0.02 0.02 0.03 0.00 0.03 0.00 0.03 0.01 0.03 0.01 0.03 0.03 0.00 0.03 <		760+	0.34	0.03	0.00	0.55	0.04	0.00	0.35	0.05	0.00	0.36	0.12	0.00
Belessed IV Missing 0-04 0.02 0.09 0.01 0.13 0.89 0.00 0.21 0.99 (ormite' - 02%) 0.0 0.04 0.02 0.08 0.01 0.03 0.03 0.01 0.03 0.01 0.03 0.01 0.03 0.01 0.03 0.01 0.03 0.05 0.00 0.01 0.03 0.03 0.05 0.00		missing	-0.50	0.09	0.00	-0.41	0.08	0.00	-0.55	0.13	0.00	0.15	0.23	0.51
(entile:: -0.4 0.40 0.40 0.40 0.61 0.02 0.04 0.61 0.05 0.05 40-50 -0.06 0.20 0.00 0.03 0.00 0.03 0.05 0.03 0.05 0.03 0.05	Refreshed LTV	Missing	-0.27	0.09	0.00	-0.11	0.08	0.17	-0.01	0.13	0.95	0.00	0.21	0.99
40-50 -0.60 0.02 0.00 0.03 0.00 0.05 0.03 0.01 0.03 0.05 0.05 0.05 60-70 -0.01 0.02 0.44 0.09 0.03 0.05 0.03 0.05 <t< td=""><td>(omitted: <=30%)</td><td>30 - 40</td><td>-0.04</td><td>0.02</td><td>0.08</td><td>0.11</td><td>0.03</td><td>0.00</td><td>-0.02</td><td>0.04</td><td>0.61</td><td>0.02</td><td>0.06</td><td>0.70</td></t<>	(omitted: <=30%)	30 - 40	-0.04	0.02	0.08	0.11	0.03	0.00	-0.02	0.04	0.61	0.02	0.06	0.70
shi - 6:0 -0.01 0.02 0.46 0.09 0.03 0.00 0.06 0.03 0.05 0.03 0.06 0.03 0.05 0.03 0.06 0.03 0.05 0.03 0.06 0.03 0.05 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.01 0.05 0.05 0.05 0.06 0.06 0.06 0.05 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.02 0.06 0.08 0.02 0.00 0.01 0.03 0.02 0.00 0.02 0.00 0.03 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.01 0.02 0.01 0.02 0.01 0.02 0.01 0.01 0.02 0.01 0.01 0.01 0.01		40 - 50	-0.06	0.02	0.00	0.09	0.03	0.00	0.01	0.03	0.86	-0.10	0.05	0.06
e0 0.70 0.01 0.02 0.54 0.09 0.03 0.00 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0		50 - 60	-0.01	0.02	0.46	0.09	0.03	0.00	0.05	0.03	0.11	-0.03	0.05	0.52
70-80 0.04 0.02 0.03 0.01 0.03 0.04 0.01 0.05 0.07 0.73 0.74 0.74 0.75 0.07 0.75 0.75 0.75 0.07 0.75 0.07 0.75 0.07 0.07 0.08 0.07 0.07 0.08 0.07 0.07 0.07 0.07 0.08 0.07 0.08 0.07 0.07 0.07 0.07 0.08 0.07 0.07 0.07 0.07 0.08 0.07 0.07 0.08 0.07 0.07 0.08 0.07 0.07 0.08 0.07 0.07 0.08 0.07 0.07 0.08 0.04 0.02 0.08 0.02 0.00 0.03 0.02 0.00 0.03 0.03 0.01 0.03 0.03 0.01 0.03 0.01 0.04 0.02 0.04 0.03 0.01 0.06 0.03 0.01 0.03 0.01 0.03 0.01 0.03 0.01 0.01 0.01 <t< td=""><td></td><td>60 - 70</td><td>-0.01</td><td>0.02</td><td>0.54</td><td>0.09</td><td>0.03</td><td>0.00</td><td>0.06</td><td>0.03</td><td>0.05</td><td>-0.03</td><td>0.06</td><td>0.60</td></t<>		60 - 70	-0.01	0.02	0.54	0.09	0.03	0.00	0.06	0.03	0.05	-0.03	0.06	0.60
80-90 0.06 0.03 0.02 0.11 0.04 0.00 0.15 0.03 0.01 0.07 <t< td=""><td></td><td>70 - 80</td><td>0.04</td><td>0.02</td><td>0.03</td><td>-0.01</td><td>0.03</td><td>0.84</td><td>-0.01</td><td>0.03</td><td>0.85</td><td>-0.07</td><td>0.07</td><td>0.31</td></t<>		70 - 80	0.04	0.02	0.03	-0.01	0.03	0.84	-0.01	0.03	0.85	-0.07	0.07	0.31
90 010 015 0.03 0.00 4.02 0.02 0.02 0.03 0.03 0.04 0.01 0.07 0.05 0.04 0.01 0.07 0.05 0.04 0.01 0.07 0.05 0.04 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.03 0.00 0.07 0.05 0.03 0.00 0.07 0.05 0.03 0.00 0.04 0.05 0.00 0.06 0.00 0.01 0.05 0.00 0.05 0.00 0.06 0.00 0.01 0.05 0.00 0.06 0.07 0.08 0.00 0.07 0.08 0.00 0.07 0.08 0.00 0.07 0.08 0.00 0.07 0.08 0.00 0.05 0.00 0.07 0.08 0.00 0.07 0.08 0.00 0.00 0.01 0.0		80 - 90	0.06	0.03	0.02	-0.11	0.04	0.00	-0.09	0.05	0.08	0.04	0.08	0.60
>100 0.17 0.09 0.07 0.04 0.12 0.72 0.18 0.13 0.15 0.04 0.01 0.05 (emilled group-0.15) 0.21-0.29 0.00 0.01 0.02 0.02 0.01 0.02 0.02 0.03 0.02 0.03 0.02 0.03 0.03 0.04 0.03 0.02 0.03 0.04 0.04 0.03 0.04 0.04 0.03 0.04 0.0		90 - 100	0.15	0.03	0.00	-0.25	0.06	0.00	-0.13	0.07	0.07	0.08	0.12	0.50
Delt binome 0.15-0.21 0.04 0.01 0.00 0.02 0.00 0.08 0.03 0.00 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.07 0.05 0.01 0.05 0.01 0.07 0.05 0.01 0.05 0.01 0.07 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.01 0.05 0.01 0.06 0.01 0.01 0.01 0.05 0.01 0.01 0.05 0.01 0.01 0.01 0.05 0.01 0.02 0.01		>100	0.17	0.09	0.07	-0.04	0.12	0.72	0.18	0.13	0.15	0.04	0.11	0.70
continued group:-0.15 021-0.29 0.00 0.01 0.07 0.02 0.03 0.02 0.04 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.05 0.03 0.01 0.06 0.03 0.01 0.06 0.03 0.01 0.05 0.03 0.01 0.05 0.03 0.01 0.05 0.03 0.01 0.05 0.03 0.01 0.05 0.03 0.01 0.05 0.03 0.01 0.06 0.07	Debt to income	0.15 -0.21	0.04	0.01	0.00	0.07	0.02	0.00	0.08	0.03	0.00	0.04	0.07	0.50
029-041 0.07 0.01 0.02 0.01 0.02 0.00 9.03 0.05 0.02 0.00 0.03 0.00 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.06 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.05 0.01 0.01 0.06 0.04 0.00 0.01 0.06 0.01 0.00 0.01 0.06 0.01	(omitted group:<0.15)	0.21 -0.29	0.00	0.01	0.87	0.02	0.02	0.36	-0.06	0.02	0.00	0.07	0.05	0.19
> 0.41 0.19 0.02 0.00 -0.01 0.05 0.78 -0.17 0.08 0.04 Loan type (united group, FHA 0.28 0.18 0.11 0.02 0.03 0.04 0.00 -0.16 0.05 0.05 0.03 0.01 0.04 0.00 0.21 0.04 0.00 0.22 0.04 0.00 0.23 0.04 0.00 0.23 0.04 0.00 0.23 0.04 0.00 0.23 0.04 0.00 0.23 0.04 0.00 0.23 0.04 0.00 0.02 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.04 0.00 0.06 0.04 0.00 0.06 0.01 0.03 0.00 0.00 0.00 0.01 0.03 0.00 0.01 0.03 0.01 0.03 0.01 0.03 0.01 0.01 0.03 0.01 0.03 0.01 0.01 0.01 0.01		0.29 -0.41	-0.07	0.01	0.00	-0.03	0.02	0.14	-0.10	0.02	0.00	-0.03	0.05	0.52
Missing 0.15 0.01 0.02 0.03 0.05 0.03 0.00 0.06 0.03 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.07 0.08 0.01 0.02 0.01 0.02 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01		> 0.41	-0.19	0.02	0.00	-0.10	0.03	0.00	-0.01	0.05	0.78	-0.17	0.08	0.04
Loan type (mitted group, FHA 0 Pter 0.28 0.18 0.11 conventional via PHA 0 Pter 0.28 0.15 0.06 1 - 0.44 0.04 0.00 0.23 0.00 0.07 0.08 0.40 0.40 0.43 0.43 0.43 0.44 0.43 0.43		Missing	0.15	0.01	0.00	-0.04	0.02	0.03	0.05	0.03	0.10	0.45	0.05	0.00
conventional wite PMI Other 9.28 0.15 0.06 Image: Second Secon	Loan type (omitted group	FHA	0.28	0.18	0.11				-0.44	0.04	0.00	-0.16	0.08	0.04
Converti: PMI 0.24 0.14 0.03 Pressor (omitted group: EBO 0.44 0.42 0.29 portfolio) GNM 0.44 0.42 0.29 0.00 1.22 0.06 0.00 0.06 0.46 0.72 portfolio) GNM	conventional w/o PMI	Other	-0.28	0.15	0.06				0.20	0.04	0.00	0.23	0.09	0.01
VA 0.44 0.42 0.29		Convent'l; PMI	-0.24	0.11	0.03				-0.43	0.05	0.00	0.07	0.08	0.40
Investor (onlited group: portfolio) EBO GSE Image of the second portfolio) Outs Image of the second portfolio) Image of the second group Image of the second g		VA	0.44	0.42	0.29				1.22	0.04	0.00	-0.06	0.16	0.72
portfolio) GSE GNM FLS C -0.56 -0.22 0.19 -0.40 0.02 -0.40 -0.00 -0.13 0.00 -0.00	Investor (omitted group:	EBO				-0.81	0.12	0.00	1					
GSE Purpose CSE Cash out -0.10 0.06 0.07 0.013 0.00 -0.13 0.10 0.13 0.10 0.18 0.07 0.08 0.47 (amiled: Purphase) Home Improve -0.09 0.66 0.07 0.01 0.08 0.87 -0.13 0.10 0.18 0.07 0.01 0.08 0.07 0.01 0.08 0.07 0.01 0.04 0.07 0.01 0.08 0.08 0.07 0.01 0.04 0.06 0.01 0.08 0.08 0.01 0.04 0.01 0.04 0.08 0.00 0.01 0.01 0.01 0.04 0.08 0.03 0.02 0.01 0.01 0.01 0.01 0.03 0.02 0.06 0.08 0.41 0.02 0.05 0.33 0.21 0.10 0.04 0.02 0.05 0.37 0.11 0.00 0.03 0.22 0.05 0.37 0.11 0.05 0.33 0.11 0.00 0.00 0.11	portfolio)	GNM				-0.56	0.12	0.00						
PLS		GSE				0.22	0.19	0.24						
Purpose Cash out -0.10 0.06 0.07 0.01 0.08 0.07 -0.13 0.10 0.18 0.07 0.013 0.02 0.013 0.02 0.013 0.02 0.013 0.02 0.013 0.02 0.013 0.02 0.011 0.45 0.046 0.041 0.055 0.06 0.041 0.055 0.06 0.041 0.055 0.06 0.041 0.050 0.06 0.041 0.011 0.044 0.031 0.090 0.065 Popcerty Type Condo 0.05 0.02 0.00 0.011 0.044 0.041 0.044 0.041 0.044 0.041 0.044 0.041 0.044 0.041 0.044 0.041 0.044 0.03 0.021 0.071 0.867 0.115 0.12 0.58 0.21 0.058 0.021 0.044 0.11 0.01 0.001 0.011 0.021 0.011 0.021 0.011 0.021 0.011 0.021 0.021 0.021		PLS				-0.40	0.13	0.00						
(ormitted: Purchase) Home Improve 40.99 0.06 0.11 0.20 0.11 0.07 0.01 0.12 0.93 40.44 0.17 0.81 Other -0.05 0.06 0.35 0.01 0.08 0.06 0.04 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.07 0.09 0.03 0.02 0.06 0.08 0.01 0.04 0.04 0.03 0.02 0.06 0.08 0.01 0.05 0.03 0.22 0.05 0.04 0.05 0.04 0.05 0.04 0.05 0.04 0.05 0.04 0.05 0.04 0.05 0.05 0.04 0.05 0.04 0.05 0.05 0.04 0.05 0.05 0.04 0.05 0.05 0.04 0.05 0.05 0.04 0.05 0.05 0.04	Purpose	Cash out	-0.10	0.06	0.07	0.01	0.08	0.87	-0.13	0.10	0.18	0.07	0.08	0.41
Missing 0.43 0.27 0.11 -0.31 0.36 0.38 0.37 0.46 0.42 -0.06 0.31 0.68 Property Type Condo 0.05 0.06 0.11 0.04 0.03 0.09 0.71 0.45 -0.10 0.84 0.03 0.09 0.72 Property Type Condo 0.05 0.02 0.01 0.07 0.88 -0.15 0.12 0.22 -0.58 0.37 0.11 0.04 0.03 0.23 0.11 0.05 0.02 0.07 0.79 0.03 0.21 0.10 0.05 0.04 0.07 0.02 0.07 0.79 0.03 0.11 0.06 Other -0.03 0.03 0.22 -0.06 0.04 0.02 0.04 0.21 0.05 0.04 0.03 0.03 0.11 0.04 0.77 0.79 0.03 0.11 0.04 0.21 0.05 0.05 0.04 0.05 0.05 0.04 <td< td=""><td>(omitted: Purchase)</td><td>Home Improve</td><td>-0.09</td><td>0.06</td><td>0.13</td><td>0.20</td><td>0.11</td><td>0.07</td><td>-0.01</td><td>0.12</td><td>0.93</td><td>-0.04</td><td>0.17</td><td>0.81</td></td<>	(omitted: Purchase)	Home Improve	-0.09	0.06	0.13	0.20	0.11	0.07	-0.01	0.12	0.93	-0.04	0.17	0.81
Other -0.05 0.06 0.35 0.01 0.08 0.08 0.04 -0.09 0.11 0.45 0.00 0.72 Procery Type Condo 0.05 0.02 0.00 0.11 0.04 0.01 0.04 0.03 0.02 0.00 0.11 0.04 0.01 0.04 0.03 0.02 0.05 0.02 0.05 0.02 0.05 0.02 0.05 0.08 0.11 0.05 0.03 0.02 0.03 0.01 0.05 0.87 0.11 0.05 0.03 0.02 0.03 0.01 0.05 0.87 0.11 0.05 0.03 0.02 0.03 0.11 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.05 0.05 0.07 0.43 1.65 0.65 0.02 0.02 0.02 0.02 0.02 0.01 0.03 0.13 0.56 0.37 -0.04 0.18 0.82 0.28 0.03 0.01 0.03		Missing	0.43	0.27	0.11	-0.31	0.36	0.38	0.37	0.46	0.42	-0.06	0.31	0.85
Retexherm refi -0.08 0.06 0.14 0.05 0.02 0.10 0.84 0.03 0.09 0.72 Condo 0.05 0.02 0.00 0.01 0.04 0.04 0.04 0.04 0.04 0.04 0.06 0.06 0.06 0.07 0.88 0.015 0.12 0.22 0.58 0.37 0.11 0.04 0.01 0.05 0.02 0.07 0.03 0.23 0.10 0.05 0.02 0.07 0.79 0.03 0.23 0.11 0.04 0.07 0.02 0.07 0.79 0.03 0.11 0.04 Other -0.01 0.02 0.69 -0.05 0.04 0.21 0.05 0.05 0.37 -0.04 0.13 0.78 Occupancy Second home 0.01 0.04 0.73 -0.14 0.13 0.17 0.04 0.05 0.03 0.11 0.04 0.05 0.03 0.18 0.38 0.02 0.05		Other	-0.05	0.06	0.35	0.01	0.08	0.86	-0.09	0.11	0.45	-0.10	0.18	0.60
Procentry Type (omitted: Single Fam) Conde Multi-unit 0.01 0.02 0.01 0.01 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.02 0.04 0.07 0.86 -0.15 0.11 0.02 0.03 0.11 0.05 0.83 0.02 0.03 0.01 0.06 0.86 -0.05 0.08 0.03 0.02 0.03 0.11 0.05 0.87 0.11 0.05 0.37 0.04 0.01 0.04 0.75 0.11 0.05 0.38 0.11 0.06 0.86 -0.05 0.06 0.36 0.21 0.10 0.04 0.73 0.04 0.13 0.76 Corupancy Second home 0.01 0.04 0.73 0.16 0.07 0.44 0.45 0.06 0.07 0.44 0.45 0.13 0.15 0.18 0.32 0.18 0.32 0.18 0.32 0.18 0.32 0.18 0.32 0.18 0.32 <td></td> <td>Rate/term refi</td> <td>-0.08</td> <td>0.06</td> <td>0.14</td> <td>0.05</td> <td>0.08</td> <td>0.47</td> <td>-0.02</td> <td>0.10</td> <td>0.84</td> <td>0.03</td> <td>0.09</td> <td>0.72</td>		Rate/term refi	-0.08	0.06	0.14	0.05	0.08	0.47	-0.02	0.10	0.84	0.03	0.09	0.72
(omitted: Single Fam) Manufactured -0.01 0.06 0.03 -0.01 0.07 0.08 -0.11 0.02 0.03 0.03 0.01 0.07 0.08 0.01 0.05 0.87 0.11 0.02 0.03 0.03 0.02 0.00 0.06 0.86 0.06 0.08 0.01 0.02 0.00 0.06 0.86 0.05 0.07 0.03 0.01 0.02 Townhouse -0.01 0.02 0.69 -0.05 0.04 0.21 0.05 0.05 0.07 0.43 1.65 6.95 0.81 (omitted: Primary) Investment 0.02 0.04 0.41 0.03 0.00 0.07 0.43 1.65 6.95 0.82 Cansource Broker 0.18 0.13 0.15 0.18 0.03 0.00 0.04 0.04 0.04 0.03 0.00 0.01 0.04 0.03 0.00 0.01 0.04 0.03 0.02 0.00 0.07	Prooerty Type	Condo	0.05	0.02	0.00	0.11	0.04	0.01	0.01	0.04	0.81	0.04	0.09	0.66
Multi-unit 0.07 0.02 0.01 0.05 0.67 0.11 0.05 0.03 0.23 0.10 0.02 Other -0.08 0.03 0.25 -0.01 0.06 0.86 0.41 -0.02 0.03 0.21 0.10 0.04 0.73 -0.04 0.13 0.78 Cocupancy Second home 0.01 0.04 0.73 -0.16 0.05 0.05 0.07 0.43 1.85 6.85 0.81 (omitted: Primary) Investment 0.02 0.04 0.73 -0.16 0.06 0.07 0.43 1.85 6.87 0.82 Loan Source Broker 0.18 0.13 0.15 -0.06 0.04 0.16 0.01 0.04 0.03 0.00 0.16 0.04 0.03 0.00 0.16 0.04 0.03 0.00 0.00 0.00 0.00 0.05 0.00 1.61 0.52 0.51 0.51 0.52 0.61 0.17	(omitted: Single Fam)	Manufactured	-0.01	0.06	0.93	-0.01	0.07	0.86	-0.15	0.12	0.22	-0.58	0.37	0.11
Other -0.08 0.03 0.02 -0.06 0.08 0.41 -0.05 0.07 0.79 0.03 0.11 0.76 Townhouse -0.01 0.02 0.69 -0.05 0.06 0.86 0.05 0.05 0.37 -0.04 0.13 0.78 Occupancy Second home 0.01 0.04 0.73 -0.18 0.24 0.45 -0.06 0.07 0.43 1.65 0.82 Comitted: Primary) Investment 0.02 0.04 0.64 -0.33 0.11 0.00 0.07 0.43 1.68 0.82 Laan Source Broker 0.18 0.13 0.15 0.018 0.02 0.02 0.01 0.04 0.08 0.00 0.01 0.04 0.03 0.03 0.05 0.03 0.25 0.18 0.18 0.04 0.03 0.00 0.00 0.00 0.03 0.00 0.01 0.04 0.03 0.00 0.03 0.02 0.84 <t< td=""><td></td><td>Multi-unit</td><td>0.07</td><td>0.02</td><td>0.01</td><td>0.01</td><td>0.05</td><td>0.87</td><td>0.11</td><td>0.05</td><td>0.03</td><td>0.23</td><td>0.10</td><td>0.02</td></t<>		Multi-unit	0.07	0.02	0.01	0.01	0.05	0.87	0.11	0.05	0.03	0.23	0.10	0.02
PUD -0.03 0.03 0.25 -0.01 0.06 0.06 0.05 0.03 0.21 0.01 0.04 Occupancy Second home 0.01 0.04 0.73 -0.18 0.24 0.45 -0.06 0.07 0.43 1.65 6.95 0.87 (omitted: Primary) Investment 0.02 0.04 0.73 -0.18 0.24 0.46 -0.06 0.07 0.43 1.65 6.95 0.82 Contrect 0.06 0.04 0.01 0.02 0.01 0.90 6.48 27.80 0.82 Loan Source Broker 0.18 0.13 0.15 0.06 0.04 0.16 0.16 0.01 0.04 0.33 0.11 0.03 0.00 0.01 0.03 0.00 1.16 0.30 0.30 0.18 0.32 0.22 0.33 0.30 0.18 0.22 0.22 0.14 0.33 0.02 0.30 0.00 0.30 0.00 0.22		Other	-0.08	0.03	0.02	-0.06	0.08	0.41	-0.02	0.07	0.79	0.03	0.11	0.76
Townhouse 0.01 0.02 0.69 -0.65 0.04 0.21 0.05 0.05 0.03 -0.04 0.13 0.78 Occupancy (omitted: Primary) Investment 0.02 0.04 0.64 -0.33 0.11 0.00 0.07 0.43 1.65 6.95 0.82 Conspondent 0.12 0.81 0.46 0.13 0.01 0.02 0.02 0.19 0.90 6.48 27.80 0.82 Lan Source Broker 0.18 0.12 0.13 0.11 0.03 0.00 0.10 0.04 1.04 0.03 0.03 0.18 0.33 (omitted: Retail) Correspondent 0.19 0.12 0.13 0.11 0.03 0.00 0.01 0.04 1.03 0.02 0.18 0.32 0.18 0.32 0.18 0.32 0.18 0.32 0.18 0.17 0.04 1.04 0.06 0.05 0.24 0.06 0.05 0.24 0.06 0		PUD	-0.03	0.03	0.25	-0.01	0.06	0.86	-0.05	0.06	0.36	0.21	0.10	0.04
Occupancy (omitted: Primary) Second home 0.01 0.04 0.73 -0.18 0.24 0.45 -0.06 0.07 0.43 1.65 6.95 0.81 (omitted: Primary) Investment 0.02 0.04 0.84 -0.03 0.11 0.00 0.00 0.07 0.97 1.61 6.95 0.82 Laan Source Broker 0.18 0.13 0.11 0.00 0.016 0.016 0.00 0.16 0.03 0.30 0.18 0.82 (omitted; Retail) Correspondent 0.19 0.12 0.13 0.11 0.03 0.00 0.04 0.03 0.30 0.18 0.12 Storg right purched 0.12 0.14 -0.16 0.04 0.03 0.00 0.44 0.35 0.17 0.04 1.08 0.22 0.18 0.17 0.18 0.21 0.14 0.01 0.04 0.03 0.00 0.17 0.12 0.33 0.00 0.17 0.11 0.13		Townhouse	-0.01	0.02	0.69	-0.05	0.04	0.21	0.05	0.05	0.37	-0.04	0.13	0.78
(omitted: Primary) Investment 0.02 0.04 0.64 0.03 0.11 0.00 0.07 0.97 1.61 6.95 0.82 Lan Source Broker 0.18 0.13 0.15 -0.06 0.04 0.16 -0.16 0.05 0.00 0.15 0.18 0.38 (omitted; Retail) Correspondent 0.19 0.12 0.13 0.11 0.03 0.00 0.10 0.04 -0.65 0.08 0.22 0.10 0.44 0.05 0.03 0.25 0.18 0.22 Other 0.12 0.13 0.34 -0.06 0.08 0.44 0.35 0.17 0.04 -1.04 0.85 0.22 0.03 0.02 0.07 0.77 0.01 0.18 0.92 Loan Product ARM 0.21 0.03 0.00 0.47 0.07 0.00 0.28 0.03 0.00 0.41 0.66 0.02 0.03 0.00 0.11 0.12 0.53	Occupancy	Second home	0.01	0.04	0.73	-0.18	0.24	0.45	-0.06	0.07	0.43	1.65	6.95	0.81
Other -0.03 0.12 0.81 0.46 0.19 0.02 0.19 0.00 6.48 27.80 0.82 Loan Source Broker 0.18 0.13 0.15 -0.06 0.04 0.16 -0.05 0.00 0.15 0.18 0.38 (omitted; Retail) Correspondent 0.12 0.13 0.11 0.01 0.04 0.35 0.17 0.04 -1.04 0.85 0.22 Other 0.12 0.13 0.14 -0.10 0.04 0.03 -0.02 0.07 0.77 0.01 0.18 0.94 Loan Product ARM 0.21 0.13 0.03 0.00 0.04 0.03 -0.02 0.03 0.00 0.17 0.12 0.15 0.13 0.17 0.14 0.10 0.04 0.03 0.00 0.24 0.03 0.00 0.24 0.03 0.00 0.24 0.03 0.00 0.11 0.12 0.12 0.12 0.12 0.12 <td>(omitted: Primary)</td> <td>Investment</td> <td>0.02</td> <td>0.04</td> <td>0.64</td> <td>-0.33</td> <td>0.11</td> <td>0.00</td> <td>0.00</td> <td>0.07</td> <td>0.97</td> <td>1.61</td> <td>6.95</td> <td>0.82</td>	(omitted: Primary)	Investment	0.02	0.04	0.64	-0.33	0.11	0.00	0.00	0.07	0.97	1.61	6.95	0.82
Loan Source Broker 0.18 0.13 0.15 -0.06 0.04 0.16 -0.16 0.05 0.00 0.15 0.18 0.38 (ornitled, Retail) Correspondent 0.19 0.12 0.13 0.11 0.03 0.00 0.04 0.03 0.00 0.14 0.03 0.00 0.14 0.03 0.00 0.04 0.03 0.00 0.04 0.03 0.04 0.04 0.03 0.04 0.04 0.03 0.04 0.05 0.03 0.25 0.18 0.17 Loan Product ARM 0.21 0.03 0.00 0.04 0.08 0.00 0.00 0.03 0.00 0.07 0.14 0.06 0.05 0.24 (ornittled; FRM30) FRM40 0.19 0.03 0.00 0.77 0.80 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.04 0.07 0.02 0.03 0.00 0.01 0.06 0.00		Other	-0.03	0.12	0.81	0.46	0.19	0.02	0.02	0.19	0.90	-6.48	27.80	0.82
(omitted; Retail) Correspondent 0.19 0.12 0.13 0.11 0.03 0.00 0.10 0.04 0.03 0.30 0.18 0.09 Missing -0.65 0.61 0.17 0.06 0.07 0.44 0.35 0.17 0.04 -1.04 0.85 0.22 Other 0.18 0.12 0.14 -0.10 0.04 0.03 0.02 0.04 -1.04 0.85 0.22 Loan Product ARM 0.21 0.03 0.00 0.44 0.03 0.00 0.07 0.07 0.01 0.18 0.24 (omitted: FRM30) FRM15 0.38 0.02 0.00 0.47 0.07 0.00 0.08 0.00 0.03 0.00 0.17 0.12 0.12 0.15 Other -1.08 0.07 0.00 0.08 0.00 0.03 0.00 -0.13 0.07 0.05 Documentation Low -2.26 0.04 0.07 <td< td=""><td>Loan Source</td><td>Broker</td><td>0.18</td><td>0.13</td><td>0.15</td><td>-0.06</td><td>0.04</td><td>0.16</td><td>-0.16</td><td>0.05</td><td>0.00</td><td>0.15</td><td>0.18</td><td>0.38</td></td<>	Loan Source	Broker	0.18	0.13	0.15	-0.06	0.04	0.16	-0.16	0.05	0.00	0.15	0.18	0.38
Missing -0.85 0.61 0.17 0.06 0.07 0.44 0.35 0.17 0.04 -1.04 0.85 0.22 Other 0.12 0.13 0.34 -0.06 0.08 0.45 -0.11 0.05 0.03 0.25 0.18 0.17 Loan Product ARM 0.21 0.03 0.00 0.40 0.08 0.00 0.00 0.02 0.84 0.06 0.05 0.24 (ornitted: FRM30) FRM15 0.38 0.02 0.00 0.47 0.07 0.00 0.28 0.03 0.00 -0.17 0.12 0.15 FRM40 0.19 0.03 0.00 0.57 0.08 0.00 0.03 0.00 -0.17 0.12 0.15 0.15 Documentation Low -0.26 0.04 0.00 -0.04 0.07 -0.22 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.03 0.00 -0.02 0.03	(omitted; Retail)	Correspondent	0.19	0.12	0.13	0.11	0.03	0.00	0.10	0.04	0.03	0.30	0.18	0.09
Other 0.12 0.13 0.34 -0.06 0.08 0.45 -0.11 0.05 0.03 0.25 0.18 0.17 Loan Product ARM 0.21 0.13 0.12 0.14 -0.10 0.04 0.03 -0.02 0.07 0.07 0.01 0.18 0.94 (omitted: FRM30) FRM15 0.38 0.02 0.00 0.47 0.07 0.00 0.28 0.03 0.00 -0.17 0.12 0.15 Other -1.08 0.07 0.00 0.28 0.03 0.00 -0.17 0.12 0.15 Documentation Low -0.26 0.04 0.00 -0.01 0.04 0.72 -0.22 0.06 0.00 -0.12 0.55 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.06 0.12 0.63 Interest Only Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 </td <td></td> <td>Missina</td> <td>-0.85</td> <td>0.61</td> <td>0.17</td> <td>0.06</td> <td>0.07</td> <td>0.44</td> <td>0.35</td> <td>0.17</td> <td>0.04</td> <td>-1.04</td> <td>0.85</td> <td>0.22</td>		Missina	-0.85	0.61	0.17	0.06	0.07	0.44	0.35	0.17	0.04	-1.04	0.85	0.22
Sveg right purchsd 0.18 0.12 0.14 -0.10 0.04 0.03 -0.02 0.07 0.77 0.01 0.18 0.94 Loan Product ARM 0.21 0.03 0.00 0.40 0.08 0.00 0.00 0.02 0.04 0.06 0.02 0.00 0.017 0.12 0.12 0.01 0.04 0.00 0.28 0.00 0.017 0.12 0.12 0.01 0.04 0.07 0.00 0.28 0.00 0.01 0.04 0.07 0.00 0.08 0.00 0.01 0.04 0.07 0.02 0.00 0.01 0.04 0.07 0.02 0.03 0.00 0.06 0.12 0.03 0.00 0.05 0.02 0.03 0.00 0.06 0.12 0.05 0.00 1.00 0.05 0.05 0.05 0.06 0.04 0.00 1.01 0.03 0.00 1.11 0.03 0.00 1.11 0.03 0.00 1.15 <td< td=""><td></td><td>Other</td><td>0.12</td><td>0.13</td><td>0.34</td><td>-0.06</td><td>0.08</td><td>0.45</td><td>-0.11</td><td>0.05</td><td>0.03</td><td>0.25</td><td>0.18</td><td>0.17</td></td<>		Other	0.12	0.13	0.34	-0.06	0.08	0.45	-0.11	0.05	0.03	0.25	0.18	0.17
Loan Product ARM 0.21 0.03 0.00 0.40 0.08 0.00 0.00 0.02 0.84 0.06 0.05 0.24 (omitted: FRM30) FRM15 0.38 0.02 0.00 0.47 0.07 0.00 0.28 0.03 0.00 -0.17 0.12 0.15 FRM40 0.19 0.03 0.00 0.57 0.08 0.00 0.03 0.00 0.01 0.04 0.76 -0.13 0.07 0.05 Documentation Low -0.26 0.04 0.00 -0.01 0.04 0.72 -0.22 0.06 0.00 -0.05 0.00 Interest Only Yes 0.03 0.08 0.76 -9.19 262.06 0.97 -0.04 0.05 0.35 0.05 0.06 0.43 Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.13 0.03 0.00 -1.14 0.00 -1.14 0.00		Svcg right purchsd	0.18	0.12	0.14	-0.10	0.04	0.03	-0.02	0.07	0.77	0.01	0.18	0.94
(omitted: FRM30) FRM15 0.38 0.02 0.00 0.47 0.07 0.00 0.28 0.03 0.00 -0.17 0.12 0.13 Other -1.08 0.07 0.00 -1.88 0.25 0.00 -0.39 0.03 0.00 -0.18 0.06 0.01 0.04 0.07 0.05 Documentation Low -0.26 0.04 0.00 -0.11 0.04 0.72 -0.22 0.06 0.00 -0.06 0.12 0.63 Interest Only Yes -0.12 0.02 0.00 -0.01 0.04 0.99 -0.02 0.03 0.62 -0.20 0.05 0.00 Interest Only Yes -2.61 0.45 0.00 -1.10 0.02 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.00 -1.00 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.22 0.03 0.00 -	Loan Product	ARM	0.21	0.03	0.00	0.40	0.08	0.00	0.00	0.02	0.84	0.06	0.05	0.24
FRM40 0.19 0.03 0.00 0.57 0.08 0.00 -0.39 0.03 0.00 0.18 0.06 0.00 Documentation Low -1.08 0.07 0.00 -1.88 0.25 0.00 0.01 0.04 0.76 -0.13 0.07 0.05 Documentation Low -0.26 0.04 0.00 -0.04 0.72 -0.22 0.06 0.00 -0.06 0.12 0.63 No -0.12 0.02 0.00 0.04 0.79 -0.02 0.03 0.62 -0.20 0.05 0.06 0.43 Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.08 0.11 0.49 Delinquency status, lag 30-59 dpd -1.10 0.02 0.00 -1.16 0.03 0.00 -1.14 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.	(omitted: FRM30)	FRM15	0.38	0.02	0.00	0.47	0.07	0.00	0.28	0.03	0.00	-0.17	0.12	0.15
Other -1.08 0.07 0.00 -1.88 0.25 0.00 0.01 0.04 0.76 -0.13 0.07 0.05 Documentation Low -0.26 0.04 0.00 -0.01 0.04 0.72 -0.22 0.06 0.00 -0.06 0.12 0.63 No -0.12 0.02 0.00 0.00 0.99 -0.02 0.03 0.62 -0.20 0.05 0.06 0.43 Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.08 0.11 0.49 Delinquency status, lag 30-59 dpd -1.10 0.02 0.00 -1.30 0.03 0.00 -1.14 0.04 0.00 -1.10 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.22 0.03 0.00 -1.14 0.04 0.00 -1.14 0.07 0.00 0.00 1.11 0.03<		FRM40	0.19	0.03	0.00	0.57	0.08	0.00	-0.39	0.03	0.00	0.18	0.06	0.00
Documentation Low -0.26 0.04 0.00 -0.01 0.04 0.72 -0.22 0.06 0.00 -0.06 0.12 0.63 No -0.12 0.02 0.00 0.00 0.04 0.99 -0.02 0.03 0.62 -0.20 0.05 0.00 Interest Only Yes 0.03 0.08 0.76 -9.19 262.06 0.97 -0.04 0.05 0.35 0.05 0.06 0.43 Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.00 -1.00 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.66 0.03 0.00 -1.14 0.00 -1.14 0.00 -1.14 0.00 -1.14 0.00 -1.14 0.00 -0.92 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.67 0.04 <t< td=""><td></td><td>Other</td><td>-1.08</td><td>0.07</td><td>0.00</td><td>-1.88</td><td>0.25</td><td>0.00</td><td>0.01</td><td>0.04</td><td>0.76</td><td>-0.13</td><td>0.07</td><td>0.05</td></t<>		Other	-1.08	0.07	0.00	-1.88	0.25	0.00	0.01	0.04	0.76	-0.13	0.07	0.05
No -0.12 0.02 0.00 0.00 0.04 0.99 -0.02 0.03 0.62 -0.20 0.05 0.05 0.06 Interest Only Yes 0.03 0.08 0.76 -9.19 262.06 0.97 -0.04 0.05 0.35 0.05 0.06 0.43 Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.08 0.11 0.49 Delinquency status, lag 30-59 dpd -1.10 0.02 0.00 -1.30 0.03 0.00 -1.14 0.04 0.00 -1.00 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.22 0.03 0.00 -1.14 0.00 -1.00 0.00 -1.20 0.03 0.00 -1.14 0.07 0.00 (omitted is Current) 60-83 0.00 -1.67 0.03 0.00 -1.129 0.03 0.00 -1.14 0.00 <td>Documentation</td> <td>Low</td> <td>-0.26</td> <td>0.04</td> <td>0.00</td> <td>-0.01</td> <td>0.04</td> <td>0.72</td> <td>-0.22</td> <td>0.06</td> <td>0.00</td> <td>-0.06</td> <td>0.12</td> <td>0.63</td>	Documentation	Low	-0.26	0.04	0.00	-0.01	0.04	0.72	-0.22	0.06	0.00	-0.06	0.12	0.63
Interest Only Yes 0.03 0.08 0.76 -9.19 262.06 0.97 -0.04 0.05 0.35 0.05 0.06 0.43 Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.08 0.11 0.49 Delinquency status, lag 30-59 dpd -1.10 0.02 0.00 -1.30 0.03 0.00 -1.14 0.04 0.00 -1.00 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.66 0.03 0.00 -1.15 0.04 0.00 -1.14 0.04 0.00 -1.14 0.00 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.00 -1.22 0.03 0.00 -1.47 0.06 0.00 120+ -1.51 0.02 0.00 -1.67 0.03 0.00 -1.29 0.03 0.00 -1.47 0.06 0.00 <t< td=""><td></td><td>No</td><td>-0.12</td><td>0.02</td><td>0.00</td><td>0.00</td><td>0.04</td><td>0.99</td><td>-0.02</td><td>0.03</td><td>0.62</td><td>-0.20</td><td>0.05</td><td>0.00</td></t<>		No	-0.12	0.02	0.00	0.00	0.04	0.99	-0.02	0.03	0.62	-0.20	0.05	0.00
Balloon Yes -2.61 0.45 0.00 -1.11 1.03 0.28 -0.15 0.15 0.30 -0.08 0.11 0.49 Delinquency status, lag (omitted is Current) 30-59 dpd -1.10 0.02 0.00 -1.30 0.03 0.00 -1.14 0.04 0.00 -1.00 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.66 0.03 0.00 -1.15 0.04 0.00 -1.14 0.07 0.00 90-119 -0.33 0.01 0.00 -1.22 0.03 0.00 -0.67 0.04 0.00 -0.92 0.07 0.00 120+ -1.51 0.02 0.00 -1.67 0.03 0.00 0.52 0.14 0.00 0.49 0.19 0.01 REO -11.79 137.92 0.93 -10.93 81.92 0.89 -1.60 1.02 0.12 -8.51 86.10 0.92 Month in forbearance	Interest Only	Yes	0.03	0.08	0.76	-9.19	262.06	0.97	-0.04	0.05	0.35	0.05	0.06	0.43
Delinquency status, lag (omitted is Current) 30-59 dpd -1.10 0.02 0.00 -1.30 0.03 0.00 -1.14 0.04 0.00 -1.00 0.07 0.00 (omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.66 0.03 0.00 -1.15 0.04 0.00 -1.14 0.07 0.00 90-119 -0.33 0.01 0.00 -1.22 0.03 0.00 -0.67 0.04 0.00 -0.92 0.07 0.00 120+ -1.51 0.02 0.00 -1.67 0.03 0.00 -1.29 0.03 0.00 -1.47 0.06 0.00 Foreclosure -0.23 0.15 0.13 0.35 0.10 0.00 0.52 0.14 0.00 0.49 0.19 0.01 Month in forbearance 0.17 0.00 0.00 0.22 0.00 0.00 0.16 0.01 0.04 0.01 0.00 Umemployment Rate (UR) -0.05 0	Balloon	Yes	-2.61	0.45	0.00	-1.11	1.03	0.28	-0.15	0.15	0.30	-0.08	0.11	0.49
(omitted is Current) 60-89dpd -0.64 0.01 0.00 -1.66 0.03 0.00 -1.15 0.04 0.00 -1.14 0.07 0.00 90-119 -0.33 0.01 0.00 -1.22 0.03 0.00 -0.67 0.04 0.00 -0.92 0.07 0.00 120+ -1.51 0.02 0.00 -1.67 0.03 0.00 -1.29 0.03 0.00 -1.47 0.06 0.00 Foreclosure -0.23 0.15 0.13 0.35 0.10 0.00 0.52 0.14 0.00 0.49 0.19 0.01 REO -11.79 137.92 0.93 -10.93 81.92 0.89 -1.60 1.02 0.12 -8.51 86.10 0.92 Month in forbearance 0.17 0.00 0.00 -0.04 0.00 0.00 0.04 0.01 0.00 0.04 0.01 0.00 0.04 0.01 0.00 0.01 0.00 0.00	Delinquency status, lag	30-59 dpd	-1.10	0.02	0.00	-1.30	0.03	0.00	-1.14	0.04	0.00	-1.00	0.07	0.00
90-119 -0.33 0.01 0.00 -1.22 0.03 0.00 -0.67 0.04 0.00 -0.92 0.07 0.00 120+ -1.51 0.02 0.00 -1.67 0.03 0.00 -1.29 0.03 0.00 -1.47 0.06 0.00 Foreclosure -0.23 0.15 0.13 0.35 0.10 0.00 0.52 0.14 0.00 0.49 0.19 0.01 REO -11.79 137.92 0.93 -10.93 81.92 0.89 -1.60 1.02 0.12 -8.51 86.10 0.92 Month in forbearance 0.17 0.00 0.00 -0.04 0.00 0.00 -0.04 0.00 0.00 -0.07 0.01 0.00 Unemployment Rate (UR) -0.05 0.00 0.00 -0.01 0.00 0.01 0.02 -0.02 0.01 0.05 620-679 0.00 0.00 0.01 0.01 0.02 0.01 0.02	(omitted is Current)	60-89dpd	-0.64	0.01	0.00	-1.66	0.03	0.00	-1.15	0.04	0.00	-1.14	0.07	0.00
120+ -1.51 0.02 0.00 -1.67 0.03 0.00 -1.47 0.06 0.00 Foreclosure -0.23 0.15 0.13 0.35 0.10 0.00 0.52 0.14 0.00 0.49 0.19 0.01 REO -11.79 137.92 0.93 -10.93 81.92 0.89 -1.60 1.02 0.12 -8.51 86.10 0.92 Month in forbearance 0.17 0.00 0.00 -0.22 0.00 0.00 0.16 0.01 0.00 0.04 0.01 0.00 Unemployment Rate (UR) -0.05 0.00 0.00 -0.04 0.00 0.00 -0.04 0.00 0.00 -0.07 0.01 0.00 BEO 580-619 0.00 0.01 0.88 0.00 0.01 0.56 -0.01 0.01 0.02 -0.02 0.01 0.07 680-719 0.00 0.00 0.01 0.41 -0.02 0.01 0.03	. ,	90-119	-0.33	0.01	0.00	-1.22	0.03	0.00	-0.67	0.04	0.00	-0.92	0.07	0.00
Foreclosure -0.23 0.15 0.13 0.35 0.10 0.00 0.52 0.14 0.00 0.49 0.19 0.01 REO -11.79 137.92 0.93 -10.93 81.92 0.89 -1.60 1.02 0.12 -8.51 86.10 0.92 Month in forbearance 0.17 0.00 0.00 0.22 0.00 0.00 0.16 0.01 0.00 0.04 0.01 0.00 Unemployment Rate (UR) -0.05 0.00 0.00 -0.04 0.00 0.00 -0.04 0.00 0.00 -0.07 0.01 0.00 UR*FICO_Curr (lag) 580-619 0.00 0.01 0.88 0.00 0.01 0.56 -0.01 0.01 0.59 0.03 0.01 0.05 620-679 0.00 0.00 0.41 -0.01 0.00 0.12 -0.02 0.01 0.02 -0.02 0.01 0.02 -0.02 0.01 0.04 0.07 680		120+	-1.51	0.02	0.00	-1.67	0.03	0.00	-1.29	0.03	0.00	-1.47	0.06	0.00
REO -11.79 137.92 0.93 -10.93 81.92 0.89 -1.60 1.02 0.12 -8.51 86.10 0.92 Month in forbearance 0.17 0.00 0.00 0.22 0.00 0.00 0.16 0.01 0.00 0.04 0.01 0.00 Unemployment Rate (UR) -0.05 0.00 0.00 -0.04 0.00 0.00 -0.04 0.00 0.00 -0.07 0.01 0.00 UR*FICO_Curr (lag) 580-619 0.00 0.01 0.88 0.00 0.01 0.56 -0.01 0.01 0.59 0.03 0.01 0.05 620-679 0.00 0.00 0.41 -0.01 0.00 0.02 -0.02 0.01 0.02 -0.02 0.01 0.02 -0.02 0.01 0.02 -0.02 0.01 0.01 0.07 680-719 0.00 0.00 0.00 0.01 0.41 -0.02 0.01 0.03 0.01 0.47 <		Foreclosure	-0.23	0.15	0.13	0.35	0.10	0.00	0.52	0.14	0.00	0.49	0.19	0.01
Month in forbearance 0.17 0.00 0.00 0.22 0.00 0.00 0.16 0.01 0.00 0.04 0.01 0.00 Unemployment Rate (UR) -0.05 0.00 0.00 -0.04 0.00 0.00 -0.04 0.00 0.00 -0.07 0.01 0.00 UR*FICO_Curr (lag) 580-619 0.00 0.01 0.88 0.00 0.01 0.56 -0.01 0.01 0.59 0.03 0.01 0.05 620-679 0.00 0.00 0.41 -0.01 0.00 0.12 -0.02 0.01 0.02 -0.02 0.01 0.07 0.07 0.01 0.07 680-719 0.00 0.00 0.50 0.00 0.01 0.41 -0.02 0.01 0.03 0.01 0.07 720-759 0.01 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00		REO	-11.79	137.92	0.93	-10.93	81.92	0.89	-1.60	1.02	0.12	-8.51	86.10	0.92
Unemployment Rate (UR) -0.05 0.00 0.00 -0.04 0.00 -0.04 0.00 -0.07 0.01 0.00 UR*FICO_Curr (lag) 580-619 0.00 0.01 0.88 0.00 0.01 0.56 -0.01 0.01 0.59 0.03 0.01 0.05 620-679 0.00 0.00 0.41 -0.01 0.00 0.12 -0.02 0.01 0.02 -0.02 0.01 0.072 0.72 0.77 0.	Month in forbearance		0.17	0.00	0.00	0.22	0.00	0.00	0.16	0.01	0.00	0.04	0.01	0.00
UR*FICO_Curr (lag) 580-619 0.00 0.01 0.88 0.00 0.01 0.56 -0.01 0.01 0.59 0.03 0.01 0.05 620-679 0.00 0.00 0.41 -0.01 0.00 0.12 -0.02 0.01 0.02 -0.02 0.01 0.07 680-719 0.00 0.00 0.50 0.00 0.01 0.41 -0.02 0.01 0.03 0.01 0.07 720-759 0.01 0.00 0.09 0.00 0.01 0.93 0.00 0.01 0.41 -0.02 0.01 0.03 0.01 0.67 760+ 0.01 0.00 0.00 0.00 0.00 0.77 0.00 0.00 0.01 0.93 Servier fixed effects Yes 0.72 0.77 </td <td>Unemployment Rate (UF</td> <td>2)</td> <td>-0.05</td> <td>0.00</td> <td>0.00</td> <td>-0.04</td> <td>0.00</td> <td>0.00</td> <td>-0.04</td> <td>0.00</td> <td>0.00</td> <td>-0.07</td> <td>0.01</td> <td>0.00</td>	Unemployment Rate (UF	2)	-0.05	0.00	0.00	-0.04	0.00	0.00	-0.04	0.00	0.00	-0.07	0.01	0.00
620-679 0.00 0.01 0.01 0.00 0.11 -0.02 0.01 0.02 -0.02 0.01 0.07 680-719 0.00 0.00 0.50 0.00 0.01 0.41 -0.02 0.01 0.02 -0.02 0.01 0.01 0.67 720-759 0.01 0.00 0.09 0.00 0.01 0.93 0.00 0.01 0.67 0.01 0.01 0.47 760+ 0.01 0.00 0.00 0.00 0.00 0.77 0.00 0.69 0.00 0.01 0.92 Servier fixed effects Yes	UR*FICO Curr (lag)	580-619	0.00	0.01	0.88	0.00	0.01	0.56	-0.01	0.01	0.59	0.03	0.01	0.05
680-719 0.00 0.00 0.50 0.00 0.01 0.41 -0.02 0.01 0.03 0.01 0.01 0.67 720-759 0.01 0.00 0.09 0.00 0.01 0.93 0.00 0.01 0.67 0.01 0.01 0.47 760+ 0.01 0.00 0.00 0.00 0.00 0.77 0.00 0.69 0.01 0.92 Servier fixed effects Yes		620-679	0.00	0.00	0.41	-0.01	0.00	0.12	-0.02	0.01	0.02	-0.02	0.01	0.07
720-759 0.01 0.00 0.09 0.00 0.01 0.93 0.00 0.01 0.67 0.01 0.01 0.47 760+ 0.01 0.00 0.00 0.00 0.77 0.00 0.00 0.01 0.93 0.00 0.01 0.67 0.01 0.01 0.47 Servier fixed effects Yes		680-719	0.00	0.00	0.50	0.00	0.01	0.41	-0.02	0.01	0.03	0.01	0.01	0.67
760+ 0.01 0.00 0.00 0.00 0.77 0.00 0.00 0.01 0.92 Servier fixed effects Yes Ye		720-759	0.01	0.00	0.09	0.00	0.01	0.93	0.00	0.01	0.67	0.01	0.01	0.47
Servier fixed effects Yes Yes Yes Yes Yes State fixed effects Yes Yes Yes Yes Yes AUC 0.72 0.77 0.77 0.72 0.72 No of obs 508.617 310.516 155.155 62.453		760+	0.01	0.00	0.00	0.00	0.00	0.77	0.00	0.00	0.69	0.00	0.01	0.92
Yes Yes Yes Yes Yes AUC 0.72 0.77 0.77 0.72 No of obs 508.617 310.516 155.155 62.453	Servier fixed effects		Yes			Yes			Yes			Yes		
AUC 0.72 0.77 0.77 0.72 No of obs 508.617 310.516 155 62.453	State fixed effects		Yes			Yes			Yes			Yes		
No of obs 508.617 310.516 155.155 62.453	AUC		0.72			0.77			0.77			0.72		
	No of obs		508 617			310 516			155 155			62.453		

Table 4: Performance Analyses

Panel A: Loan Performance After Forbearance Exits

This table examines the loan performance after forbearance exits using data as of Dec. 2020. The sample has 302,255 loan-month observations after a borrower exits forbearance. All regression are logit. Re-enter takes the value of 1 if the borrower re-enters forbearance after he/she exits. Serious delinquency is DPD90+ or in foreclosure/REO.

			(1)			(2)			(3)	
Dep. Var.:			Re-enter			PrePav		Serio	us Delinai	Jency
Variable	ClassValue	Estimate	StdErr	ProbChiSa	Estimate	StdErr	ProbChiSo	Estimate	StdErr	ProbChiSa
Intercept		-2.81	6 16	0.65	-15.97	37 40	0.67	-4 88	39.80	0.90
FICO Current Lag	580-619	0.33	0.10	0.00	-0.45	0.12	0.00	0.40	0.03	0.00
rioo_ounoni_eug	620-679	0.06	0.00	0.00	0.10	0.08	0.06	-0.15	0.03	0.00
	680-719	-0.15	0.02	0.00	0.36	0.00	0.00	-0.50	0.00	0.00
	720-759	-0.13	0.02	0.00	0.66	0.07	0.00	-0.80	0.00	0.00
	720-733	-0.43	0.02	0.00	0.00	0.07	0.00	1.00	0.03	0.00
	missing	-0.07	0.02	0.00	0.01	0.00	0.00	1.03	0.02	0.00
Define the stall TV	missing	0.22	0.05	0.00	-0.42	0.14	0.00	1.05	0.05	0.00
Relieshed LTV		-0.07	0.11	0.49	5.15	1.05	0.00	-0.44	0.14	0.00
	30 - 40	-0.27	0.03	0.00	-1.40	1.50	0.35	-0.45	0.04	0.00
	40 - 50	-0.17	0.03	0.00	-1.30	1.49	0.36	-0.35	0.03	0.00
	50 - 60	-0.11	0.03	0.00	-1.61	1.47	0.27	-0.21	0.03	0.00
	60 - 70	-0.05	0.03	0.07	-1.29	1.28	0.31	-0.15	0.03	0.00
	70 - 80	0.06	0.03	0.03	-2.03	1.66	0.22	0.20	0.04	0.00
	80 - 90	0.21	0.04	0.00	-1.06	2.07	0.61	0.44	0.05	0.00
	90 - 100	0.47	0.05	0.00	0.05	3.77	0.99	0.67	0.07	0.00
	101+	0.25	0.08	0.00	-2.22	7.78	0.78	0.93	0.08	0.00
DTI Ratio	0.21	-0.11	0.02	0.00	0.16	0.06	0.01	-0.05	0.03	0.10
	0.29	0.04	0.02	0.02	0.16	0.06	0.01	-0.02	0.02	0.30
	0.41	0.06	0.02	0.00	0.22	0.06	0.00	0.03	0.02	0.18
	0,41+	0.17	0.03	0.00	0.06	0.12	0.61	0.18	0.04	0.00
	missing	0.01	0.02	0.50	-0.32	0.06	0.00	0.05	0.02	0.04
Loan Type	FHA	0.35	0.03	0.00	-0.95	0.12	0.00	0.31	0.04	0.00
	Other	-0.37	0.05	0.00	-0.08	0.18	0.65	-0.53	0.06	0.00
	Conv'l PMI	-0.26	0.03	0.00	1.02	0.13	0.00	-0.56	0.04	0.00
	VA	0.46	0.05	0.00	-0.43	0.17	0.01	1.08	0.06	0.00
Property Type	Condo	-0.07	0.03	0.04	-0.27	0.10	0.00	-0.06	0.04	0.18
	Manufactrd	0.25	0.09	0.01	-0.41	0.25	0.10	0.48	0.12	0.00
	Multi-unit	0.02	0.04	0.56	0.24	0.13	0.07	0.03	0.05	0.49
	Other	-0.16	0.06	0.01	-0.83	0.16	0.00	-0.36	0.08	0.00
	PUD	0.06	0.04	0.18	0.92	0.16	0.00	-0.02	0.05	0.66
	Townhouse	-0.07	0.04	0.05	0.26	0.11	0.02	-0.02	0.05	0.64
Occupancy	2nd	0.07	0.06	0.27	0.67	0.17	0.00	0.03	0.07	0.73
	Investment	0.05	0.06	0.38	0.13	0.15	0.41	-0.10	0.06	0.12
	missina	-0.05	0.10	0.58	-0.37	0.22	0.08	0.30	0.10	0.00
	Other	-0.12	0.17	0.48	-1.05	0.51	0.04	-0.03	0.18	0.86
Loan Source	Broker	0.16	0.04	0.00	0.38	0.15	0.01	0.17	0.05	0.00
	Correspondent	0.03	0.04	0.39	0.53	0.14	0.00	0.07	0.04	0.11
	Missing	-0.15	0.017	0.38	-1.38	0.63	0.03	-0.33	0.17	0.05
	Other	-0.13	0.05	0.01	0.27	0.20	0.00	-0.04	0.06	0.45
	Syca right nuchsd	0.08	0.04	0.06	0.34	0.15	0.02	0.18	0.05	0.00
Loan Product	ARM	-0.02	0.03	0.50	0.50	0.10	0.00	0.07	0.04	0.06
Loannioddol	FRM15	-0.04	0.00	0.00	-173	0.08	0.00	0.07	0.04	0.00
	FRM40	0.28	0.00	0.00	1.56	0.00	0.00	0.11	0.04	0.00
	Other	-0.11	0.00	0.00	-1.69	0.10	0.00	-0.19	0.04	0.00
Documentation		0.11	0.04	0.02	-0.05	0.10	0.00	0.13	0.06	0.00
Documentation	No	0.10	0.04	0.00	-0.00	0.13	0.72	0.13	0.00	0.03
Interact Only	Voc	0.01	0.05	0.02	2.15	0.00	0.01	0.00	0.05	0.01
Rolloon	Voc	0.10	0.00	0.00	1.07	0.23	0.00	0.13	0.00	0.00
	165	0.40	0.13	0.00	0.77	0.34	0.03	-0.07	0.15	0.00
		0.29	0.14	0.04	0.77	0.34	0.03	0.45	0.10	0.00
Drement memorial		-0.20	0.14	0.05	-0.03	0.32	0.92	-0.25	0.15	0.09
Prepay penalty	0	-0.05	0.00	0.44	-0.32	0.18	0.07	0.10	0.07	0.14
ivionin in iorbearance	2	-0.20	0.03	0.00	-0.09	0.08	0.30	-0.16	0.04	0.00
	3	-0.12	0.03	0.00	0.09	0.08	0.28	-0.32	0.04	0.00
	4	-0.15	0.03	0.00	-0.08	0.09	0.39	-0.33	0.04	0.00
	5	0.32	0.03	0.00	-0.14	0.10	0.15	0.48	0.04	0.00
	6	-0.12	0.04	0.00	-0.13	0.12	0.24	0.14	0.04	0.00
	7	-0.98	0.06	0.00	0.33	0.17	0.05	-1.02	0.08	0.00
	8	-0.85	0.18	0.00	0.84	0.50	0.09	-0.61	0.22	0.01
Unemployment Rate		0.00	0.00	0.79	0.00	0.01	0.78	-0.04	0.00	0.00
Servicer & State FE			Yes			Yes			Yes	
AUC			0.78			1.00			0.87	

		All invos	store			stors		Investor			FHA/VA			Portfolio	<i>j</i> e ai	202	PISor	Othors	
	ClassValue	Estimate	StdErr	ProbChiSo	Estimate	StdErr	P value	Estimate	StdErr	P value	Estimate	StdErr	P value	Estimate	StdErr	robChi	Estimate	StdErr	P value
Intercept	Chaob Falab	-0.46	0.15	0.00	-1.02	0.15	0.00	-8.53	28.22	0.76	0.18	24.16	0.99	-7.63	10.07	0.45	-2.55	16.14	0.87
Ever In Forbearan	ce	1.83	0.01	0.00	1.48	0.02	0.00	2.12	0.03	0.00	1.23	0.02	0.00	1.57	0.04	0.00	0.79	0.04	0.00
Dlg Before Enter I	-B				0.79	0.02	0.00	1.00	0.03	0.00	0.70	0.03	0.00	0.76	0.05	0.00	1.14	0.05	0.00
FICO Current Lag	<=579	1.75	0.01	0.00	1.68	0.01	0.00	1.63	0.02	0.00	1.73	0.02	0.00	1.59	0.03	0.00	1.46	0.03	0.00
(Omitted: 720-759	580-619	0.85	0.01	0.00	0.83	0.01	0.00	0.83	0.03	0.00	0.77	0.02	0.00	0.86	0.04	0.00	0.72	0.03	0.00
	620-679	0.03	0.01	0.06	0.05	0.01	0.00	0.00	0.03	0.85	-0.04	0.02	0.06	0.18	0.03	0.00	-0.04	0.03	0.20
	680-719	-0.74	0.02	0.00	-0.69	0.02	0.00	-0.68	0.03	0.00	-0.80	0.03	0.00	-0.57	0.04	0.00	-0.78	0.05	0.00
	760+	-2.21	0.02	0.00	-2.20	0.02	0.00	-2.10	0.03	0.00	-2.05	0.04	0.00	-2.08	0.04	0.00	-2.00	0.06	0.00
	Missing	1.57	0.02	0.00	1.55	0.02	0.00	1.43	0.03	0.00	1.72	0.03	0.00	1.10	0.04	0.00	2.05	0.05	0.00
Refreshed LTV	<=30%	-0.67	0.02	0.00	-0.66	0.02	0.00	-0.70	0.04	0.00	-0.75	0.04	0.00	-0.60	0.04	0.00	-0.61	0.05	0.00
(Omitted: 70-80%)	30-40	-0.53	0.02	0.00	-0.52	0.02	0.00	-0.50	0.04	0.00	-0.63	0.03	0.00	-0.40	0.04	0.00	-0.50	0.05	0.00
	40-50	-0.37	0.02	0.00	-0.37	0.02	0.00	-0.36	0.03	0.00	-0.46	0.03	0.00	-0.29	0.04	0.00	-0.33	0.04	0.00
	50-60	-0.21	0.02	0.00	-0.21	0.02	0.00	-0.27	0.03	0.00	-0.24	0.03	0.00	-0.15	0.04	0.00	-0.20	0.04	0.00
	60-70	0.05	0.02	0.00	0.05	0.02	0.00	0.05	0.04	0.17	0.00	0.03	0.86	0.12	0.04	0.00	0.03	0.04	0.50
	80-90	0.59	0.02	0.00	0.58	0.02	0.00	0.54	0.05	0.00	0.62	0.04	0.00	0.48	0.07	0.00	0.55	0.05	0.00
	90-100	0.79	0.03	0.00	0.78	0.03	0.00	0.80	0.08	0.00	0.93	0.06	0.00	0.64	0.10	0.00	0.60	0.06	0.00
	>100	0.84	0.04	0.00	0.83	0.04	0.00	0.54	0.11	0.00	0.95	0.07	0.00	0.76	0.10	0.00	0.68	0.06	0.00
Investor	GSE	-0.45	0.01	0.00	-0.45	0.01	0.00												
(Omitted: Portfolio)	FHA/VA	0.10	0.01	0.00	0.10	0.01	0.00												
	PLS	0.30	0.02	0.00	0.30	0.02	0.00		-										
DTI Datia	Other	0.09	0.02	0.00	0.08	0.02	0.00	0.04	0.05	0.00	0.05	0.00	0.44	0.04	0.05	0.07	0.04	0.07	0.00
DTIRAtio	014	-0.21	0.03	0.00	-0.20	0.03	0.00	-0.01	0.05	0.88	-0.05	0.06	0.41	0.01	0.05	0.87	-0.31	0.07	0.00
	020	-0.06	0.02	0.00	-0.07	0.02	0.00	-0.15	0.03	0.00	-0.01	0.03	0.71	-0.06	0.04	0.10	-0.02	0.05	0.73
	042 051	0.03	0.01	0.04	0.03	0.01	0.01	0.02	0.03	0.53	-0.01	0.02	0.50	-0.02	0.03	0.02	0.06	0.03	0.05
	001 51+	0.07	0.01	0.00	0.00	0.01	0.00	0.04	0.03	0.10	0.02	0.02	0.34	0.07	0.03	0.03	-0.01	0.03	0.74
	DI+	0.06	0.02	0.00	0.07	0.02	0.00	0.08	0.04	0.04	0.00	0.03	0.00	0.01	0.05	0.09	0.08	0.05	0.11
Purnose	Refi: rate/tm	0.10	0.01	0.00	0.10	0.01	0.00	0.12	0.03	0.00	0.07	0.02	0.00	-0.05	0.04	0.17	0.00	0.03	0.01
(Omitted: Purchas	Refi: cashout	0.11	0.03	0.00	0.12	0.03	0.00	0.01	0.07	0.95	0.40	0.00	0.00	0.05	0.00	0.54	0.33	0.13	0.01
(Onlined. Fulcillas	Home Impny	0.10	0.05	0.00	0.10	0.00	0.00	-0.01	0.07	0.00	-0.83	0.00	0.00	0.05	0.00	0.01	0.32	0.15	0.01
Occupancy	2nd home	0.03	0.00	0.03	0.10	0.00	0.07	0.03	0.10	0.54	1 00	0.10	0.00	-0.22	0.11	0.01	0.42	0.10	0.01
(Omitted: Primary)	Investment	0.29	0.03	0.00	0.29	0.03	0.00	0.00	0.00	0.00	0.29	0.12	0.02	0.00	0.06	0.99	0.10	0.07	0.19
(Officious Phillip)	Other	0.12	0.08	0.00	0.10	0.08	0.00	-0.30	0.01	0.00	-0.12	0.12	0.52	0.00	0.00	0.00	-0.18	0.01	0.39
Product	FRM15	0.02	0.02	0.31	0.02	0.02	0.36	-0.23	0.04	0.00	-0.11	0.07	0.09	-0.23	0.04	0.00	0.28	0.07	0.00
(Omitted: FRM30)	FRM40	0.30	0.02	0.00	0.29	0.02	0.00	0.44	0.04	0.00	0.65	0.05	0.00	0.06	0.03	0.08	0.01	0.04	0.78
	ARM	0.25	0.02	0.00	0.25	0.02	0.00	-0.01	0.07	0.85	-0.10	0.07	0.18	-0.04	0.04	0.42	0.51	0.04	0.00
	Other	-0.54	0.03	0.00	-0.53	0.03	0.00	-0.03	0.09	0.76	-0.38	0.14	0.01	0.07	0.05	0.16	-0.83	0.05	0.00
Loan Source	Broker	0.05	0.02	0.02	0.06	0.02	0.01	0.12	0.18	0.48	0.17	0.04	0.00	0.28	0.06	0.00	0.04	0.17	0.83
	Correspondent	0.05	0.02	0.01	0.06	0.02	0.00	0.11	0.17	0.55	0.10	0.03	0.00	-0.05	0.07	0.51	-0.05	0.17	0.78
	Svcg right pch	-0.08	0.02	0.00	-0.08	0.02	0.00	0.14	0.17	0.43	-0.35	0.04	0.00	-0.04	0.06	0.48	-0.07	0.17	0.71
	Other	-0.01	0.03	0.80	-0.01	0.03	0.80	0.18	0.18	0.33	0.16	0.05	0.00	-0.19	0.20	0.33	-0.12	0.18	0.51
	Miss	0.05	0.07	0.48	0.03	0.08	0.64	-0.55	0.86	0.52	-0.19	0.09	0.03	0.74	10.07	0.94	0.33	0.85	0.69
Property Type	Condo	0.04	0.02	0.12	0.04	0.02	0.06	0.08	0.04	0.03	0.15	0.05	0.01	-0.06	0.05	0.24	0.15	0.06	0.01
(Omitted: SF)	Townhouse	0.01	0.03	0.71	0.01	0.03	0.84	0.16	0.05	0.00	-0.08	0.04	0.08	-0.24	0.10	0.01	0.15	0.08	0.07
	Manufactured	0.14	0.04	0.00	0.12	0.04	0.01	0.34	0.09	0.00	0.01	0.07	0.86	0.29	0.10	0.00	0.10	0.16	0.55
	PUD	-0.01	0.03	0.77	-0.01	0.03	0.65	-0.09	0.05	0.07	0.06	0.05	0.24	-0.11	0.08	0.17	0.14	0.07	0.05
	Multi-unit	-0.13	0.03	0.00	-0.12	0.03	0.00	-0.18	0.06	0.00	0.12	0.05	0.02	-0.09	0.06	0.13	-0.33	0.06	0.00
	Other	-0.11	0.03	0.00	-0.10	0.03	0.00	-0.28	0.07	0.00	-0.43	0.07	0.00	0.21	0.06	0.00	-0.30	0.09	0.00
Documention	Low doc	-0.35	0.03	0.00	-0.36	0.03	0.00	0.04	0.19	0.84	-0.77	0.06	0.00	0.12	0.08	0.11	-0.22	0.11	0.05
(Omitted: full doc)	No doc	0.24	0.03	0.00	0.24	0.03	0.00	0.14	0.18	0.46	0.76	0.06	0.00	0.09	0.06	0.13	-0.13	0.07	0.07
Balloon Payment	Yes	0.23	0.04	0.00	0.24	0.04	0.00	0.87	0.26	0.00	0.28	0.31	0.35	0.48	0.05	0.00	0.08	0.05	0.14
	Yes	-0.01	0.05	0.91	-0.01	0.05	0.88	0.27	0.21	0.21	0.10	0.51	0.85	0.02	0.07	0.77	0.21	0.34	0.53
Option Payment	Yes	0.36	0.09	0.00	0.37	0.09	0.00	0.54	0.28	0.05	0.95	16.00	0.95	0.15	0.12	0.23	0.08	0.07	0.26
Negative amortize	res	-0.20	0.09	0.04	-0.17	0.09	0.07	1.25	28.22	0.96	-4.04	9.77	0.68	-0.20	0.22	0.34	1.61	9.11	0.86
Prepay Penalty	res	-0.09	0.06	0.14	-0.09	0.06	0.14	-0.04	0.10	0.71	-0.55	0.42	0.19	-0.13	0.08	0.11	-0.07	0.13	0.57
Unemployment Rate	e(%)	0.19	0.00	0.00	0.18	0.00	0.00	0.15	0.00	0.00	0.19	0.00	0.00	0.19	0.00	0.00	0.22	0.00	0.00
		20.60M			20.60M			13.50M			3.02M			3.26M			.82M		
AUC		0.92			0.92			0.877			0.93			0.95			0.93		

Panel B: Performance of Never-Forborne Borrowers vs Forbearance Exits (Data by Jul 2021)

Table 5: Impact of Forbearance (and Payment) on Prepay

This table reports regression results examining prepay using data February-December 2020. Columns 1-3 use the borrower's forbearance (FB) status and payment status, lagged by 1 month. Columns 4-5 use the borrower's forbearance and payment status, lagged by 3 months.

		(1)			(2)			(3)			(4)			(5)		
		Lag 1 Mon	ith		Lag 1 Month			Lag 1 Mon	ith		Lag 3 Months	6		Lag 3 Mon	ths	
		All			Federally Bac	ked		Private			Federally Bac	cked		Private		
Variable	ClassVal0	Estimate	StdErr	p-value	Estimate	StdErr	p-value	Estimate	StdErr	p-value	Estimate	StdErr	p-value	Estimate	StdErr	p-value
Intercept		-4.58	0.17	0.00	-5.39	4.01	0.18	-4.71	0.20	0.00	-5.65	5.16	0.27	-4.94	0.20	0.00
FICO_Current (lag)	580-619	-0.49	0.01	0.00	-0.52	0.02	0.00	-0.41	0.03	0.00	-0.55	0.02	0.00	-0.38	0.03	0.00
(omitted: <580)	620-679	-0.09	0.01	0.00	-0.09	0.01	0.00	-0.10	0.02	0.00	-0.14	0.01	0.00	-0.13	0.02	0.00
	680-719	0.24	0.01	0.00	0.26	0.01	0.00	0.17	0.02	0.00	0.21	0.01	0.00	0.11	0.02	0.00
	720-759	0.42	0.01	0.00	0.44	0.01	0.00	0.35	0.01	0.00	0.40	0.01	0.00	0.31	0.01	0.00
	760+	0.57	0.01	0.00	0.60	0.01	0.00	0.52	0.01	0.00	0.56	0.01	0.00	0.47	0.01	0.00
	missing	0.05	0.01	0.00	0.03	0.02	0.04	0.10	0.03	0.00	0.20	0.02	0.00	0.18	0.03	0.00
Forbearance, lag		-0.85	0.02	0.00	-0.92	0.02	0.00	-0.66	0.04	0.00	-0.25	0.03	0.00	-0.08	0.05	0.11
FB_lag*Current_lag	3	0.49	0.02	0.00	0.58	0.03	0.00	0.24	0.05	0.00	0.14	0.03	0.00	-0.19	0.06	0.00
Current_lag		-0.25	0.02	0.00	-0.31	0.02	0.00	-0.11	0.03	0.00	0.30	0.03	0.00	0.41	0.04	0.00
Unemployment		-0.02	0.00	0.00	-0.02	0.00	0.00	-0.02	0.00	0.00	-0.04	0.00	0.00	-0.03	0.00	0.00
LTV	Missing	0.16	0.03	0.00	0.24	0.03	0.00	-0.02	0.07	0.83	0.23	0.03	0.00	-0.06	0.08	0.43
(omitted: <=30%)	30 - 40	-0.18	0.01	0.00	-0.22	0.01	0.00	-0.05	0.02	0.02	-0.22	0.01	0.00	-0.04	0.02	0.05
(40 - 50	-0.12	0.01	0.00	-0.15	0.01	0.00	-0.05	0.02	0.00	-0.15	0.01	0.00	-0.04	0.02	0.02
	50 - 60	-0.05	0.01	0.00	-0.09	0.01	0.00	0.05	0.02	0.00	-0.09	0.01	0.00	0.06	0.02	0.00
	60 - 70	0.03	0.01	0.00	-0.01	0.01	0.21	0.13	0.01	0.00	0.00	0.01	0.63	0.13	0.01	0.00
	70 - 80	0.00	0.01	0.00	0.10	0.01	0.00	0.20	0.01	0.00	0.11	0.01	0.00	0.21	0.01	0.00
	80 - 90	0.10	0.01	0.00	0.10	0.01	0.00	0.20	0.02	0.00	0.12	0.01	0.00	0.17	0.02	0.00
	90 - 100	0.11	0.01	0.00	0.08	0.01	0.00	-0.16	0.02	0.00	0.08	0.01	0.00	-0.15	0.02	0.00
	>100	0.06	0.01	0.00	0.00	0.01	0.00	-0.18	0.04	0.00	0.18	0.01	0.00	-0.17	0.04	0.00
Lean Durness	Cashout	0.00	0.02	0.00	0.10	0.02	0.00	0.00	0.04	0.02	0.10	0.02	0.00	0.00	0.04	0.02
Loan Purpose	Cashout	-0.10	0.02	0.00	-0.10	0.02	0.00	-0.09	0.04	0.02	-0.10	0.02	0.00	-0.09	0.04	0.02
(omitted: Purchas	Home Improv	-0.06	0.02	0.00	-0.10	0.02	0.00	0.01	0.05	0.89	-0.10	0.02	0.00	-0.02	0.05	0.74
	Missing	0.14	0.08	0.09	0.20	0.09	0.02	0.03	0.20	0.89	0.18	0.10	0.07	0.07	0.20	0.73
	Other	0.15	0.02	0.00	0.14	0.02	0.00	0.08	0.05	0.07	0.15	0.02	0.00	0.06	0.05	0.22
	Rate/term	-0.05	0.02	0.00	-0.07	0.02	0.00	-0.01	0.04	0.88	-0.05	0.02	0.01	0.00	0.04	0.93
Property Type	Condo	0.02	0.01	0.00	0.04	0.01	0.00	-0.01	0.02	0.60	0.04	0.01	0.00	-0.01	0.02	0.47
(omitted: Single Fa	a Manufactured	-0.40	0.02	0.00	-0.47	0.03	0.00	-0.16	0.05	0.00	-0.50	0.03	0.00	-0.16	0.06	0.00
	Multi-unit	-0.17	0.01	0.00	-0.14	0.01	0.00	-0.30	0.03	0.00	-0.12	0.02	0.00	-0.30	0.03	0.00
	Other	-0.09	0.01	0.00	-0.12	0.02	0.00	-0.04	0.03	0.22	-0.11	0.02	0.00	0.00	0.03	0.93
	PUD	0.31	0.01	0.00	0.33	0.01	0.00	0.29	0.02	0.00	0.34	0.01	0.00	0.28	0.02	0.00
	Townhouse	0.20	0.01	0.00	0.21	0.01	0.00	0.12	0.02	0.00	0.21	0.01	0.00	0.11	0.02	0.00
Occupancy (Omitte	Secondary ho	-0.01	0.01	0.62	0.02	0.02	0.18	0.00	0.03	0.87	0.03	0.02	0.11	-0.01	0.03	0.84
Primary Residen	(Investment pr	-0.16	0.01	0.00	-0.15	0.02	0.00	-0.07	0.03	0.02	-0.16	0.02	0.00	-0.07	0.03	0.02
	Missing	-0.13	0.02	0.00	-0.08	0.03	0.00	-0.36	0.08	0.00	-0.09	0.03	0.00	-0.34	0.08	0.00
	Other	0.18	0.04	0.00	0.05	0.06	0.41	0.33	0.07	0.00	0.06	0.06	0.32	0.32	0.07	0.00
Loan Source	Broker	0.01	0.02	0.73	0.02	0.03	0.48	0.00	0.03	0.94	0.04	0.03	0.15	0.03	0.03	0.42
(omitted group: R	Corresponder	0.19	0.02	0.00	0.13	0.02	0.00	0.25	0.03	0.00	0.13	0.03	0.00	0.26	0.03	0.00
(missing	-0.21	0.09	0.02	-0.16	0.12	0.17	-0.32	0.14	0.02	-0.18	0.12	0.13	-0.43	0.14	0.00
	Other	-0.07	0.02	0.00	0.02	0.03	0.51	-0.07	0.03	0.03	0.00	0.03	0.95	-0.03	0.03	0.27
	Syca right pur	0.14	0.02	0.00	0.12	0.02	0.00	0.12	0.03	0.00	0,13	0.03	0.00	0.13	0.03	0.00
Loan Product	ARM	0.22	0.01	0.00	0.30	0.01	0.00	0.21	0.01	0.00	0.28	0.02	0.00	0.19	0.01	0.00
(omitted: FRM 30)	FRM15	-0.14	0.01	0.00	-0.17	0.01	0.00	-0.03	0.01	0.03	-0.17	0.01	0.00	-0.02	0.01	0.14
(5	FRM40	-0.25	0.01	0.00	-0.21	0.02	0.00	-0.25	0.02	0.00	-0.15	0.02	0.00	-0.24	0.02	0.00
	Other	0.06	0.02	0.00	-0.03	0.04	0.46	-0.04	0.02	0.00	-0.08	0.02	0.05	-0.05	0.02	0.00
Documentation	Low	-0.04	0.01	0.00	-0.01	0.01	0.32	-0.09	0.03	0.00	-0.02	0.01	0.00	-0.08	0.03	0.02
Dooumontation	No	-0.09	0.01	0.00	-0.12	0.01	0.00	0.02	0.02	0.00	-0.12	0.01	0.00	0.02	0.02	0.31
Interest Only	Ves	-0.05	0.01	0.00	0.12	0.01	0.00	-0.13	0.02	0.10	-0.12	0.06	0.85	-0.12	0.02	0.01
Interest Only	Other	-0.13	0.02	0.00	-0.24	0.00	0.35	-0.03	0.02	0.00	-0.57	0.00	0.00	0.12	0.02	0.00
Balloon	Ves	-0.10	0.05	0.66	-0.24	0.23	0.00	-0.10	0.15	0.05	-0.32	0.02	0.34	-0.06	0.06	0.00
Balloon	Linknown	-0.02	0.05	0.00	-0.20	0.23	0.07	-0.10	0.00	0.05	-0.23	0.24	0.04	-0.00	0.00	0.30
Optional ARM	Ves	-0.20	0.01	0.00	0.05	0.01	0.00	-0.40	0.02	0.00	0.05	0.01	0.00	0.02	0.06	0.00
	Missing	0.02	0.00	0.70	-0.03	0.10	0.05	-0.01	0.00	0.03	0.00	0.21	0.03	-0.48	0.00	0.11
Negative A morta	Vec	-0.51	0.19	0.01	-0.02	0.20	0.90	-0.71	0.20	0.01	0.12	0.20	0.07	-0.40	0.00	0.11
Negauve Amonz	Missing	-0.27	0.05	0.00	-0.49	0.17	0.00	-0.23	0.00	0.00	-0.31	0.20	0.01	-0.24	0.00	0.00
Drange mant D	wissing	0.31	0.30	0.30	0.40	0.35	0.25	0.12	0.00	0.00	0.39	0.35	0.27	0.17	0.02	0.78
Prepayment Penalty	y tes Other	0.05	0.02	0.00	-0.23	0.10	0.02	-0.13	0.02	0.00	-0.24	0.11	0.03	-0.15	0.02	0.00
	Uther	0.49	0.09	0.00	0.27	1.02	0.79	0.30	0.10	0.00	0.91	1.02	0.37	0.30	0.11	0.01
AUC		0.65			0.64			0.67		-	0.65	-		0.67		
IN ODS		16.5M			13.6M			3.3M			10.6M			∠.bIVI		

Appendix

 Table A1: Summary Stats for the Exit Analysis Sample

Variable	Total	GSE	GNM	PLS	Portfolio	GNM Buyout
Investor	100%	52.4%	15.6%	5.4%	14.4%	10.7%
Under forbearance	75.3%	69.6%	78.7%	86.2%	77.9%	88.9%
FICO Current Less than 579	2.7%	1.7%	3.5%	3.0%	3.2%	5.4%
580-619	12.9%	6.9%	16.7%	23.4%	11.8%	31.9%
620-679	7.3%	4.5%	10.8%	11.8%	6.5%	13.7%
680-719	15.8%	13.1%	22.2%	20.8%	13.3%	20.2%
720-759	14.4%	15.1%	15.8%	14.6%	12.4%	11.3%
760+	15.3%	17.9%	13.0%	11.9%	15.3%	8.4%
Missing	31.7%	40.8%	18.1%	14.5%	37.6%	9.0%
Refreshed LTV less than 30%	13.2%	16.6%	4.8%	12.8%	15.4%	4.3%
30% - 40%	11.1%	12.6%	7.4%	13.0%	11.9%	7.2%
40% - 50%	15.1%	15.1%	14.0%	18.3%	15.7%	14.0%
50% - 60%	17.4%	16.1%	19.2%	19.2%	17.5%	20.5%
60% - 70%	17.4%	15.4%	21.7%	14.5%	17.3%	22.9%
70% - 80%	13.8%	13.1%	16.1%	10.0%	14.2%	16.1%
80% - 90%	7.8%	7.8%	10.2%	5.8%	4.8%	9.6%
90% - 100%	3.3%	2.8%	5.5%	2.5%	2.2%	4.3%
>100%	0.5%	0.3%	0.3%	3.4%	0.6%	0.5%
Missing	0.4%	0.2%	0.6%	0.5%	0.4%	0.5%
Debt to income less than 0.15	14.2%	15.0%	9.1%	33.8%	16.2%	5.8%
0.15 - 0.21	15.0%	17.2%	13.5%	6.5%	14.5%	11.7%
0.21 - 0.29	21.7%	23.7%	20.9%	11.8%	20.8%	20.0%
0.29 - 0.41	20.4%	21.5%	19.5%	15.7%	20.5%	19.2%
> 0.41	5.4%	6.6%	4.4%	4.8%	3.7%	4.3%
Missing	23.3%	15.9%	32.6%	27.4%	24.4%	39.0%
Loan type: Conventional w/o PMI	54.7%	72.7%	0.0%	78.6%	81.3%	0.0%
FHA	23.2%	0.1%	80.4%	7.7%	6.2%	81.7%
VA	4.0%	0.0%	14.3%	0.8%	1.6%	14.0%
Conventional w/ PMI	15.2%	26.9%	0.0%	5.3%	3.9%	0.2%
Other	2.9%	0.2%	5.3%	7.7%	7.1%	4.2%
Loan Purpose: Purchase	48.4%	39.2%	66.7%	42.4%	44.0%	74.4%
Refi: rate	29.1%	36.0%	20.5%	16.9%	25.8%	20.3%
Refi: cash-out	17.5%	18.7%	5.6%	38.5%	27.5%	4.7%
Refi: home improvement	1.6%	2.3%	0.8%	1.0%	1.1%	0.0%
Other	3.3%	3.8%	6.3%	1.0%	1.6%	0.5%
Loan Product: FRM 30 year	75.0%	76.4%	94.4%	53.1%	42.9%	94.0%
FRM 40 year	5.9%	3.3%	1.6%	10.1%	20.7%	2.2%
FRM 15 year	11.1%	17.2%	2.6%	1.7%	9.2%	2.0%
ARM	5.5%	2.0%	1.3%	16.1%	21.4%	1.5%
Other	2.5%	1.1%	0.1%	18.9%	5.9%	0.3%
Property Type: Single Family	76.7%	74.2%	81.6%	/3.1%	72.9%	88.9%
Condo	7.0%	8.6%	2.8%	7.1%	9.2%	2.4%
Townhouse	5.8%	7.0%	7.5%	2.4%	2.9%	3.1%
PUD	4.1%	3.7%	2.5%	6.8%	8.0%	2.2%
Manufactured	0.7%	0.5%	1.5%	0.4%	0.6%	0.4%

Multi-unit	4.2%	4.3%	3.1%	7.2%	4.5%	2.9%
Other	1.5%	1.6%	1.0%	3.1%	1.8%	0.2%
Occupancy: Primary	89.9%	86.3%	97.5%	84.9%	89.3%	99.2%
residence						
Second home	2.9%	3.8%	0.1%	2.5%	4.7%	0.1%
Investment property	6.2%	9.1%	0.7%	7.3%	5.8%	0.5%
Other	1.0%	0.7%	1.7%	5.3%	0.2%	0.2%
Loan Source: Retail	42.3%	47.6%	27.1%	23.5%	61.0%	24.8%
Broker	6.4%	3.4%	4.1%	26.4%	14.1%	3.9%
Correspondent	39.2%	37.3%	61.1%	17.6%	11.1%	65.7%
Servicing right purchased	8.9%	10.2%	7.1%	26.5%	3.1%	2.3%
Other	3.2%	1.6%	0.5%	5.9%	10.7%	3.3%
Loan Age <=1 year	6.1%	7.5%	3.5%	0.2%	9.7%	1.3%
1-2 year	7.6%	9.9%	4.5%	1.2%	8.4%	3.4%
2-3 year	8.4%	11.1%	6.0%	1.0%	7.6%	4.2%
3-4 year	9.0%	11.2%	7.1%	0.6%	8.5%	5.8%
4-5 year	7.3%	8.4%	7.4%	0.4%	7.1%	6.3%
5-6 year	6.0%	6.2%	7.5%	0.5%	4.7%	7.6%
6-7 year	5.1%	5.3%	7.2%	0.2%	3.4%	6.4%
7-8 year	10.1%	11.0%	14.5%	0.3%	4.8%	12.7%
8-9 year	7.4%	7.5%	11.1%	0.1%	2.7%	12.4%
9-10 year	4.9%	4.7%	7.9%	0.4%	1.9%	8.0%
>=10 years	28.1%	17.2%	23.2%	94.9%	41.1%	31.8%
missing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unpaid principal	5.1%	5.1%	3.7%	6.5%	6.3%	3.3%
balance<=\$37k						
\$37k - \$73k	10.9%	9.8%	13.9%	11.8%	9.2%	13.2%
\$73k - \$134k	24.6%	22.0%	35.8%	19.9%	15.4%	35.8%
\$134k - \$231k	28.4%	30.8%	31.8%	20.7%	16.2%	32.9%
\$231k - \$379k	19.1%	24.4%	12.2%	18.9%	13.3%	12.1%
\$379k - \$538k	6.6%	6.7%	2.2%	12.1%	12.2%	2.2%
>=\$538k	5.3%	1.3%	0.6%	10.1%	27.3%	0.5%
Documentation: Full doc	75.8%	76.0%	83.2%	32.6%	78.0%	84.6%
Low doc	4.8%	3.7%	12.6%	2.4%	3.3%	1.8%
No doc	19.4%	20.3%	4.2%	65.0%	18.6%	13.6%
Interest only: No	97.7%	99.5%	100.0%	82.6%	92.7%	100.0%
Yes	2.3%	0.5%	0.0%	17.4%	7.2%	0.0%
Balloon Payment: No	93.7%	95.9%	98.8%	59.5%	89.1%	99.4%
Yes	0.4%	0.1%	0.0%	3.7%	0.6%	0.0%
Unknown	6.0%	4.0%	1.2%	36.8%	10.3%	0.6%
Negative Amortization: NO	98.3%	99.9%	100.0%	89.1%	92.6%	100.0%
Yes	1.7%	0.1%	0.0%	10.9%	7.4%	0.0%
Optional payment ARM: Yes	97.8%	99.9%	100.0%	88.1%	90.1%	99.5%
Yes	2.1%	0.1%	0.0%	11.9%	9.9%	0.0%
Prepayment Penalty: No	97.9%	99.9%	99.9%	85.9%	92.1%	99.9%
Yes	2.1%	0.1%	0.1%	14.1%	7.8%	0.1%
Unemployment rate (%)	9.7	9.8	10.0	10.3	10.1	8.0
Pct_HHInc_abv_75k_zip	63.7%	65.4%	58.3%	62.6%	68.3%	58.3%

The number of observation for the exit analysis sample is 1,532,116.

Dependent Variable		Forbearand	ce exit by r	on-prepav	Forbearan	ce exit by r	ion-prepav	Forbearance	e Exit by	Prepaving
Variable		Estimate	StdErr	ProbChiSq	Estimate	StdErr	ProbChiSq	Estimate	StdErr	ProbChiSq
Intercept		-1.44	2.82	0.61	-26.44	14.96	0.08	-39.29	65.67	0.55
FICO Current, lag	580-619	-0.16	0.01	0.00	-0.20	0.01	0.00	-0.37	0.06	0.00
	620-679	-0.01	0.01	0.25	-0.05	0.01	0.00	-0.04	0.04	0.31
	680-719	0.13	0.01	0.00	0.10	0.01	0.00	0.30	0.04	0.00
	720-759	0.24	0.01	0.00	0.20	0.01	0.00	0.46	0.04	0.00
	760+	0.39	0.01	0.00	0.39	0.01	0.00	0.43	0.03	0.00
	missing	-0.23	0.02	0.00	-0.07	0.02	0.00	-0.21	0.07	0.00
Refreshed LTV	missing	-0.13	0.06	0.02	0.06	0.06	0.26	4.23	0.45	0.00
	30 - 40	0.01	0.01	0.45	0.07	0.01	0.00	-1.38	0.79	0.08
	40 - 50	-0.01	0.01	0.90	0.05	0.01	0.00	-1.34	0.71	0.06
	50 - 60	0.01	0.01	0.97	0.05	0.01	0.00	-1.19	0.68	0.08
	60 - 70	0.00	0.01	0.40	0.01	0.01	0.51	-1.39	0.69	0.04
	70 - 80	0.00	0.01	0.92	-0.04	0.01	0.00	-1.23	0.77	0.11
	80 - 90	-0.01	0.02	0.03	-0.16	0.02	0.00	-1.18	0.99	0.23
	90 - 100	0.00	0.02	0.00	-0.25	0.02	0.00	-0.83	1.51	0.58
	101+	0.12	0.05	0.31	0.08	0.05	0.16	-1.03	2.96	0.73
DTI Ratio	0.21	0.05	0.01	0.00	0.05	0.01	0.00	0.04	0.04	0.31
	0.29	0.01	0.01	0.00	0.01	0.01	0.18	0.19	0.04	0.00
	0.41	-0.04	0.01	0.00	-0.04	0.01	0.00	0.29	0.04	0.00
	0,41+	-0.13	0.01	0.00	-0.16	0.01	0.00	0.23	0.07	0.00
	missing	0.08	0.01	0.00	0.10	0.01	0.00	-0.38	0.04	0.00
Investor Type	EBO	-1.75	0.15	0.00	22.63	0.03	0.00	26.06	0.12	0.00
(Omitted: portfolio)	GNM	-1.48	0.15	0.00	22.91	0.03	0.00	26.17	0.12	0.00
	GSE	-0.45	0.15	0.00	23.97	0.02	0.00	24.37	0.08	0.00
	Missing	6.00	0.89	0.00	-140.03	0.12	0.00	-149.47	0.40	0.00
	Other	-0.63	0.15	0.00	23.61	0.04	0.00	23.37	0.13	0.00
Loan Type	FHA	0.40	0.01	0.00	0.41	0.02	0.00	-1.04	0.07	0.00
	Other	0.12	0.02	0.00	0.03	0.02	0.17	0.28	0.10	0.01
	Conv't PM	-0.34	0.02	0.03	-0.34	0.02	0.00	1.17	0.07	0.00
	VA	0.19	0.02	0.02	0.31	0.02	0.00	-0.80	0.09	0.00
Occupancy	Secondary	-0.04	0.03	0.01	-0.06	0.03	0.02	0.50	0.09	0.00
	Investmen	-0.04	0.03	0.95	-0.04	0.03	0.11	0.10	0.08	0.19
	Missing	0.10	0.04	0.63	0.33	0.04	0.00	-0.27	0.12	0.03
	Other	-0.01	0.09	0.00	-0.18	0.08	0.03	-0.65	0.22	0.00
Loan Source	Broker	-0.01	0.02	0.06	0.01	0.02	0.54	0.27	0.07	0.00
	Correspon	0.08	0.02	0.00	0.11	0.01	0.00	0.46	0.05	0.00
	Missing	0.12	0.06	0.01	0.16	0.06	0.01	-0.91	0.19	0.00
	Other	-0.15	0.02	0.18	-0.06	0.02	0.01	0.11	0.09	0.21
	Svcg right	-0.05	0.02	0.00	-0.20	0.02	0.00	0.21	0.06	0.00
Product Group	ARM	-0.02	0.02	0.00	0.14	0.02	0.00	0.53	0.06	0.00
-	FRM15	0.15	0.01	0.05	0.23	0.01	0.00	-1.58	0.04	0.00
	FRM40	-0.15	0.02	0.06	-0.25	0.02	0.00	1.02	0.06	0.00
	Other	-0.05	0.03	0.00	-0.39	0.03	0.00	-0.94	0.08	0.00
Status current(Lag)		0.97	0.01	0.46	0.84	0.01	0.00	-0.08	0.03	0.03
Unemployment Rate		-0.09	0.00	0.44	-0.06	0.00	0.00	-0.03	0.00	0.00
Estimation Method		Logistic			Multinoial L	_ogit		Multinoial L	ogit	
AUC		0.73								

Table A2: Robustness Checks on Forbearance Exit Regressions

The number of loan-month observations for forbearance exit analysis is 1.53 million. All specifications include servicer and state fixed effects.