

# MORTGAGE FORECLOSURE, FORBEARANCE, AND REFINANCING

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## EXECUTIVE SUMMARY:

### 1. CONTEXT AND SUMMARY OF MAIN FINDINGS

This project investigated the effect of foreclosure prevention policies on refinancing activities. The Principal Investigator (PI), Agostino Capponi, jointly with the graduate student Ruizhe Jia and David Rios, a colleague from the Statistics Department, developed a counterfactual analysis to assess the impact of the foreclosure moratorium imposed right after the COVID-19 pandemic started. His research shows that this moratorium has significantly decreased households' refinancing costs of households, and relaxed their refinancing eligibility constraints. His results imply that the economic effects are even broader and have far-reaching consequences. By granting forbearance to households facing foreclosures, other households which intend to refinance also benefit from better refinancing opportunities. Mortgage forbearance thus amplifies the stimulative effect of monetary policies.

### 2. INSTITUTIONAL STRUCTURE OF THE MORTGAGE MARKET

Mortgages are the second largest sector of the U.S. fixed-income security market behind U.S. Treasury debt. The total outstanding unpaid balance of American mortgages on one-to-four family homes is currently roughly \$11.2 trillions, according to the Federal Reserve Z1 table released in June 2020. Mortgages can be made on any property. Homes built for a single family, or with one, two or three extra apartments are referred to as one-to-four family homes. Above four, the home becomes a “multifamily”

residence. The total outstanding U.S. residential mortgage debt on one-to-four family homes can be found in L.217. Most of these mortgages are fixed rate, that is, the monthly coupon and payment are constant, and some are adjustable-rate mortgages (ARMS), which retain monthly payments but with interest payment is reset periodically.

Ginnie Mae provides US Government backing to roughly 18% of the outstanding balance. In addition, the two government sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, provide credit backing to another 44% of the outstanding balance.

If the mortgagor is 30-day delinquent and then misses a second payment, he is counted as 60-day delinquent, and so forth. Mortgagors who have missed three or more consecutive payments are counted as 90+ delinquent. At any time, the mortgagor may make up for all or a few of the missing payments to bring the loan out of delinquency or to reduce the severity of its status. Under normal market conditions, a loan will go from 30-day to 60-day, to 90-day delinquent and then into the foreclosure process.

When the interest rate decreases significantly, households holding fixed-rated mortgages can refinance them, that is, paying off their existing mortgages with a new loans at a lower interest rates. Failing to refinance leads to a large amounts of foregone savings, which, on average, costs households \$160 per month, or \$45,000 (unadjusted) over the remaining life of the loans (see [Keys, Pope, and Pope \(2016\)](#) for details).

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There are two different types of refinancing: non cashout refinance and cash-out refinance. A cash-out refinance replaces the homeowner’s existing mortgage with a new mortgage wherein loan amount is larger than the unpaid balance of the existing mortgage. The difference is cashed out by the homeowner, and used at his discretion. In contrast, with a non-cashout refinance, the homeowner borrows an amount which does not exceed the current remaining balance plus any additional closing cost.

### 2.1 CARES Act

The CARES Act provides federal relief for the United States in response to the economic impact of the COVID-19 pandemic. Section 4022 of the Act focuses on providing financial assistance to homeowners who have lost income because of the pandemic. Ever since the start of the pandemic, mortgage delinquencies have surged. Figure 1 provides a historical perspective and shows the national serious delinquency rate and foreclosure rate in United States since 1990.

### 3. METHODOLOGY AND EMPIRICAL RESULTS

The recent pandemic imposed financial challenges on millions of homeowners in the United States, who struggled to pay their mortgages. To mitigate the risk of foreclosures and prevent large economic losses, the Congress passed the CARES Act and signed it into law on March 27, 2020. The Act offers mortgage forbearance to all mortgages backed by Ginnie Mae as well as the two

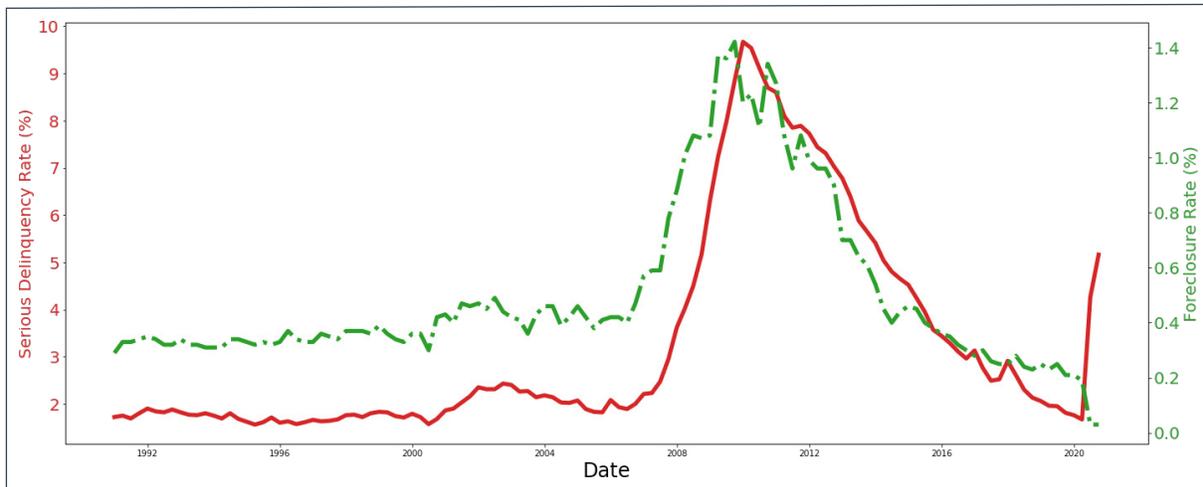
government sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, until June 30, 2021. In essence, the moratorium grants American homeowners the option to defer mortgage payments without penalty.

This project consisted of two parts:

- Quantified the amount of foreclosures prevented by mortgage forbearance, and evaluated its impact on house prices.
- Developed a counterfactual analysis to examine how the refinancing cost of households and their refinancing eligibility constraints are affected by the mortgage forbearance.

**Data and Empirical Results:** The PI used monthly, loan-level delinquency data to identify the mortgagors who are experiencing financial difficulty, and are thus unable to pay their monthly mortgages. The PI estimated a Markov transition model for delinquent mortgages. Using the estimated transition rate from delinquencies to foreclosures along with the delinquent loans identified as non strategically delinquent in the first step, the PI found that the foreclosure moratorium has prevented approximately 900,000 foreclosures filings in the months from April through October 2020.

Using GSE loan-level data as well as GSE eligibility requirements and the loan-level pricing adjustment (LLPA) table, the PI documented that a decline in house prices, which reduces the value of home equity and increases



**Figure 1:** This plot shows the quarterly series of serious delinquency rates (solid) and foreclosure rates (dashed) in U.S. Source: Mortgage Bankers Association

households leverage, can negatively impact refinancing activities in three different ways: tightening the refinancing eligibility constraint, lowering equity extraction, and increasing refinancing cost of households.

Using loan-level data on GSE-backed, 30-year fixed-rate refinance loans originated since the start of the pandemic, the PI estimated that 3.3% of total non-cashout refinance loans (about 60,000) would have been ineligible to refinance through standard GSE programs in the absence of forbearance. The PI has shown that the foreclosure moratorium allowed about 145,000 households to extract around \$15,000 more, on average, from their home equity. The third negative effect of a house price decline is a much higher refinancing cost for households.

The PI’s counterfactual analysis shows that, in the absence of forbearance, the house price decline would have greatly increased the refinancing cost of households through changes in their loan-to-value ratios. The PI estimated that 37% of total mortgagors who refinanced from April to October 2020 (about 900,000) would have been charged higher fees, or an extra \$5,600 in interest payment over the life of the loan.

The PI found that the group of mortgagors with low credit scores would have been more severely impacted in the absence of forbearance, and roughly 50% of them would have incurred an extra refinancing cost, resulting in either an additional up-front fee higher than \$3,700, or an average extra interest payment of \$15,500 over the life of the loan.

The PI has calculated that the additional home equity extracted and the refinancing cost saved due to the

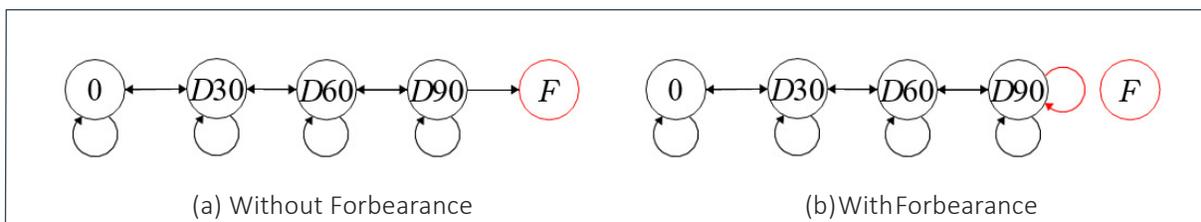
moratorium can increase households’ consumption by at least 6.4 billion.

#### 4. COUNTERFACTUAL ANALYSIS

We conduct a counterfactual analysis to assess what the amount of foreclosures would have been in the absence of forbearance.

We use a finite-state Markov transition model to estimate how many foreclosures would have occurred without forbearance. We first collect the monthly delinquency state transition data for all Ginnie Mae backed mortgages in the period from November 2013 till October 2020. In every month, each loan then belongs to one the following states of the Markov chain: performing, 30-day, 60-day, 90-day delinquent, foreclosed, repurchased, paid-off, and loss mitigation. In particular, the states of foreclosures, repurchased, paid-off, and loss mitigation result in the removal of the loan from the pool, i.e., those states are absorbing states in the Markov chain.

Figure 2 illustrates transition from delinquency to foreclosure in the Markov transition model. Panel 2a illustrates that without forbearance, loans that are 90-day delinquent can transit to foreclosures with a certain transition probability. In contrast, panel 2b shows that, with forbearance, loans that are 90-day delinquent will no longer be foreclosed. Therefore, to construct the counterfactual estimation of foreclosures in the absence of forbearance using the Markov transition model, we need to (1) identify 90-day delinquent loans that are not strategically delinquent and would remain delinquent without forbearance and (2) estimate the transition rate from 90-day delinquency to foreclosure.



**Figure 2:** Panel 2a illustrates that without forbearance, loans that are 90-day delinquent (D90) can transit to foreclosures (F) with certain transition probability. Panel 2b illustrates that, with forbearance, loans that are 90-day delinquent will no longer be able to be foreclosed. Therefore, to construct the counterfactual estimation of foreclosures in the absence of forbearance, we need to identify 90-day delinquent loans that are not strategically delinquent and estimate the transition rate from 90-day delinquency to foreclosure.

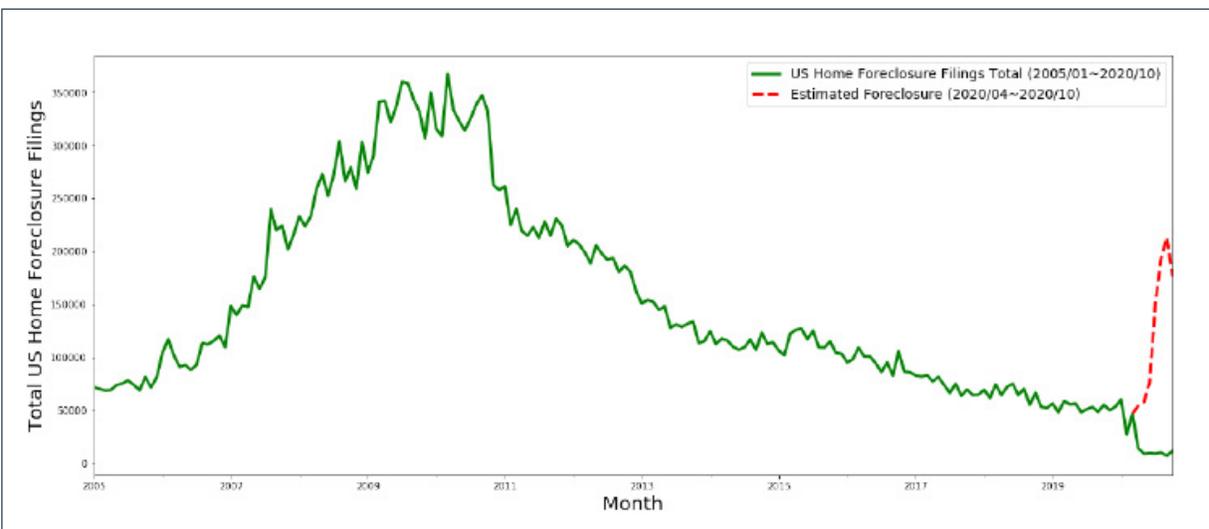
**Table 1:** This table reports the counterfactual estimates of foreclosures from April to October in the hypothetical scenario of no foreclosure moratorium. For comparison purposes, the actual foreclosures from April to October are also reported in the table.

	Foreclosures:							
	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Counterfactuals	55,037	58,957	79,759	157,406	201,880	222,665	183,555	959,259
Actual Foreclosures	14,148	8,767	9,247	8,892	9,889	6,872	11,673	69,488

We next estimate the transition rate from 90-day delinquency to foreclosure in the absence of forbearance. To control for loan-level characteristics, for each month we divide loans into different groups according to their current LTV ratios (30, 60, 80, 100, 120), credit scores (600, 660, 740), Ginnie Mae programs (FHA, VA, PIH, RD), and states (judicial/non-judicial).

We then estimate the expected foreclosures in the absence of forbearance using our estimated transition rate from

90-day delinquency to foreclosure and the number of delinquencies identified as non strategic. In the absence of intervention, foreclosures would have shot up since April whereas in the same period, the actual foreclosures have declined to the lowest level in the past 15 years. Table 1 compares our counterfactual estimation of foreclosures with the actual foreclosures. We find that in the period from April to October 2020, the foreclosure moratorium has prevented approximately 900,000 foreclosure filings that might have occurred without intervention.



**Figure 3:** Number of Estimated Total US Foreclosures Filings with the intervention of CARES Act (red dashed) and in the hypothetical scenario with no intervention of the foreclosure moratorium (green solid).

### 4.1 The Impact of Forbearance on House Prices

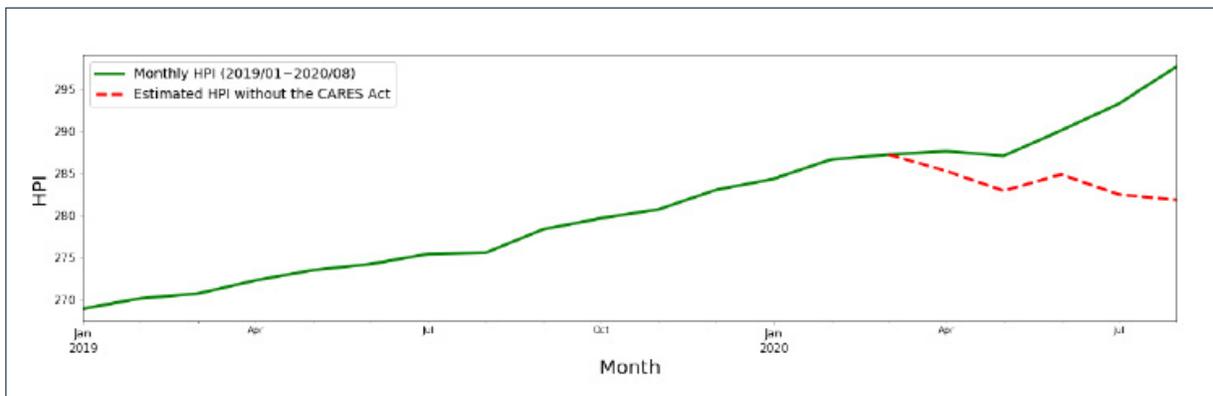
The moratorium prevents foreclosures, and as a result, temporarily shuts down the negative spillovers to house prices. In order to estimate how much house prices would have dropped after foreclosure shocks and without intervention, we construct an econometric model to measure house price fluctuations associated only with exogenous shocks to foreclosures. We consider a five-variable VAR model, similar to the one in [Calomiris, Longhofer, and Miles \(2013\)](#). We use a standard VAR based on monthly data from February 2005 to March 2020/

We use the SVAR model to estimate how much house prices would have declined without the foreclosure moratorium. We find that without the foreclosure moratorium, house prices would have dropped by 0.7%, 1.3%, 1.7%, 3.5%, 5.4%, 7.2%, 9.4% relative to the realized values from April through October 2020. Figure 4 compares the actual house prices with their counterfactual estimates. In the hypothetical scenario of no foreclosure moratorium, the counterfactual House Price Index exhibits a large, persistent drop since April. In contrast, the actual House Price Index shows a persistent increase during the same period. This comparison is consistent with our claim that the foreclosure moratorium prevents a tidal wave of foreclosures and stabilizes house prices.

### 4.2 The Impact of Forbearance on Refinancing

What is the mechanism through which forbearance, whose mandate is to prevent foreclosure shocks, supports refinancing activities? By stabilizing house prices, forbearance prevents a wide range of homeowners' LTV ratios from increasing. This in turn increases the number of homeowners eligible for refinancing, leads to more equity extraction through cash-out refinancing, reduces the up-front fee for refinancing, and lowers interest payments.

Without the moratorium, among all 30-year, fixed-rate, GSE-backed refinance loans originated from April 2020 to October 2020, we find that 3.3% of non-cashout refinance loans (about 60,000) would have not satisfied the GSE Standard Eligibility Requirements due to high LTV ratios. Among all 30-year, fixed-rate, GSE-backed cash-out refinance loans originated since April, we find that around 145,000 of them would have been forced to decrease the amount of their cashed-out home equity, and on average, they would have decreased the amount of equity cashed out by around \$15,000. Without forbearance, we find that the refinancing cost for homeowners would increase drastically, especially for those with low credit score.



**Figure 4:** The actual House Price Index with the intervention of CARES Act (green solid line), and the counterfactual estimate of the House Price Index without foreclosure moratorium (red dashed line).

We find that without intervention, 14.7% of all GSE-backed non-cashout refinance loans originated since April (about 260,000) would have needed to purchase private mortgage insurance (PMI). A PMI is required for mortgages with LTV ratios larger than 80%, and its annual cost is approximately between 0.4% and 0.8% of the borrowed amount according to Freddie Mac.

## 5. CONCLUSION

This research investigated the impact of mortgage forbearance on the real economy through the housing market and the refinancing channel. The empirical analysis shows that the foreclosure moratorium has prevented approximately 900,000 foreclosures in the first seven months of its enactment and a house price decline up to 8% in the period from April to October 2020.

We have quantified how forbearance supports household borrowing through the refinancing channel along three dimensions: relaxing eligibility constraints of mortgagors,

increasing their equity extraction, and lowering their refinancing cost.

These results have important implications for the design of effective policy interventions. In crisis times where a large number of households are simultaneously hit by income shocks, decisive and comprehensive foreclosure-prevention interventions are necessary from the very beginning. Lessons from the 2008 financial crisis indicate that the occurrence of a large wave of foreclosure has a negative long-term impact on economy, which is extremely difficult to counteract even with the aid of massive stimulus and debt relief. Our analysis demonstrates that, by preventing a foreclosure shock from occurring, early intervention through mortgage forbearance avoids its potential amplification through the refinancing channel. This highlights the importance of implementing foreclosure prevention policies early during a crisis instead of trying to limit the negative consequences afterward, especially given that ex-post relief policies often come with severe frictions.

**Table 2:** This table reports estimates of the fraction of mortgage borrowers who could have been subject to a higher LLPA fee without intervention, and the average increase in refinancing cost either in the form of up-front fee or interest payment, across a range of borrower credit core characteristics. The sample consists of 30-year, fixed-rate, refinancing mortgage originated from April 2020 to October 2020. Our calculation follows the assumption that a 25 basis point upfront charge is approximately equivalent to 5 basis points raise in current mortgage rate, which is in the report of Fannie Mae and Freddie Mac Guarantee Fee Review in 2015.

FICO Score	Item Count	Share with increase in LLPA fees	Average LLPA cost in the form of up-front fee	Average LLPA cost in the form of interest payment
$x \geq 740$	2,030,037	35.1%	\$1,264	\$4,987
$740 > x \geq 720$	198,047	44.3%	\$1,452	\$5,773
$720 > x \geq 700$	128,834	46.3%	\$1,827	\$7,289
$700 > x \geq 680$	58,824	47.0%	\$2,529	\$10,194
$680 > x \geq 660$	28804	50.8%	\$3,610	\$14,663
$660 > x \geq 640$	14085	49.0%	\$4,214	\$17,241
$640 > x \geq 620$	845	45.0%	\$4,501	\$18,443
$620 > x$	91	35.2%	\$4,124	\$16,517
<b>Total</b>	<b>2,459,567</b>	<b>37.0%</b>	<b>\$1,419</b>	<b>\$5,626</b>

## REFERENCES

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- Keys, B. J., D. G. Pope, and J. C. Pope. 2016. Failure to refinance. *Journal of Financial Economics* 122:482–499.

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