Chicago Fed Letter

Helping homeowners during the Covid-19 pandemic: Lessons from the Great Recession

by Gene Amromin, vice president and director of financial research, Jane Dokko, assistant vice president, community affairs and policy studies, and Karen Dynan, professor of economics, Harvard University, and nonresident senior fellow, Peterson Institute for International Economics

The Covid-19 public health crisis has sharply reduced the earnings of millions of U.S. households, following the severe curtailment of economic activity needed to contain the spread of the virus. Meanwhile, households continue to confront their ongoing financial obligations. The ability of households to manage these obligations has important consequences for the speed at which the U.S. economy can recover from the current crisis. Households that are wiped out financially in the coming months will not be in a position to strongly resume spending once the virus containment issues have passed. Moreover, a wave of missed payments on mortgages and other types of household debt could propagate through the financial system—weakening financial institutions, unnerving investors, and further prolonging the economic slump.

The risk that large numbers of households will lack the liquidity needed to meet their financial obligations is thus an important consideration for policymakers as they seek to mitigate the economic fallout from the Covid-19 pandemic.¹ Federal regulators and Congress have already enacted some policies to provide relief to households struggling to make payments on mortgages and student debt. These measures complement the substantial income support for households and subsidies for businesses in a series of fiscal packages that have already been passed. However, there is growing concern that these measures may not be large, timely, or targeted enough to avoid a substantial scarring of household balance sheets that would inhibit a strong recovery.

In this *Chicago Fed Letter*, we explore lessons from policymakers' efforts to provide assistance to homeowners during the Great Recession of 2007–09. Our goal is to provide insights into the potential role of policy in improving outcomes for mortgage borrowers during the Covid-19 crisis. We come to three broad conclusions:

1. The specific type of assistance to mortgage borrowers must correspond to the nature of the economic shock. In general, payment relief is a more effective way to help struggling mortgage borrowers than debt forgiveness. But the Great Recession era programs that provided modest long-term reductions in required payments are not likely to be the solution in current circumstances that call for quick and sizable liquidity support.

- 2. The design of payment relief should be simple for borrowers to understand and straightforward for financial institutions to implement.
- 3. Broader policy actions, such as monetary policy and enhancements to social safety net programs (e.g., the Supplemental Nutrition Assistance Program [SNAP], Medicaid, and unemployment insurance [UI]), can also be important for maintaining the financial resilience of households while the economy is weak.

Economic conditions going into the crisis

Prior to the pandemic, U.S. households were generally less financially vulnerable than they were in the period leading up to the Great Recession (Bhutta et al., 2019). A strong labor market had buoyed income growth in the years prior to the pandemic. A subdued pace of new household borrowing since the financial crisis, together with low interest rates, had reduced aggregate debt service burdens to their lowest level since data began to be recorded in the early 1980s.² In addition, more than half a decade of home price gains meant that the vast majority of homeowners could withstand a 20% drop in prices without going into negative equity.³

The mortgage finance system had also evolved. Today's mortgage market features a much larger government presence, with nearly two-thirds of mortgage debt backed by the government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, or insured by the Federal Housing Administration (FHA) (Goodman et al., 2020). Post-crisis changes in financial regulation had established better protections for borrowers, reduced exposure of the mortgage system to abrupt changes in short-term funding conditions, and increased the bank capital available to cushion against adverse shocks.

Notwithstanding these favorable trends, neither households nor the financial system were fully prepared for the abrupt and severe disruption in economic activity needed to manage a pandemic. For example, the recently released 2019 Federal Reserve Board's *Survey of Household Economics and Decisionmaking* (SHED) suggests that many households had limited liquidity even in last year's relatively strong economy, with only 63% of households saying they would cover an unexpected \$400 expenditure with cash. Moreover, a SHED supplement conducted in April 2020 found that the share was just 46% among those who had experienced an employment disruption in March and April 2020. A sufficiently large wave of mortgage payment problems, particularly if accompanied by a drop in home prices, could still impair the financial system and cause losses for taxpayers. New risks had also emerged in parts of the mortgage finance system—most notably, those related to the rise of thinly capitalized nonbank financial institutions as mortgage originators and servicers (Kim et al., 2018).

Tailoring assistance to the economic shock

Unemployed borrowers with equity in their homes require different types of assistance than underwater borrowers facing smaller liquidity crunches.

In the Great Recession, many mortgage defaults were associated with homeowners facing the dual challenges of having insufficient resources to make their scheduled mortgage payments and being in negative equity because of a decline in house values (Foote, Gerardi, and Willen, 2008). When hit with these two shocks, homeowners found themselves challenged in making scheduled payments—many had suffered income losses, some had experienced upward payment resets on "teaser" mortgages, and others had lost the housing capital gains they had been counting on.

The Great Recession era homeowner assistance programs, of which the Home Affordable Modification Program (HAMP) and Home Affordable Refinance Program (HARP) are the two most prominent examples, were principally aimed at lowering required mortgage payments to meet a target

payment-to-income ratio.⁵ This approach can save the mortgages of negative equity borrowers who face a limited (or no) loss of income. The approach works for lenders because the reduced likelihood of default associated with the modified payment stream can make the loan modification profitable with only a modest subsidy from the government. However, for borrowers who have experienced large income reductions, meeting the target payment-to-income ratio would require a massive reduction in the payment and hence make the modification prohibitively costly for the lender (or require very large taxpayer subsidies). Indeed, this logic explains why unemployed borrowers were initially simply barred from the government loan modification programs (Agarwal et al., 2017).

With unemployment now at extremely high levels, many borrowers are experiencing large reductions in earnings—so large that the sorts of programs used during the Great Recession are likely to be unsuitable to meet their needs. Some unemployed borrowers will be able to secure employment again as the economy recovers, but others are likely to experience longer-term unemployment associated with sectoral reallocation of jobs (Barrero, Bloom, and Davis, 2020). However, in the near term, both types of borrowers need substantial assistance to tide them over (Eberly and Krishnamurthy, 2014). Without this support, they would need to draw down savings to meet their mortgage obligations, leaving them more vulnerable and less able to resume spending once they regain employment. Because most homeowners had positive equity going into the current crisis, having insufficient means to make payments puts them more at risk of being forced to sell their home than having to default. Although the former outcome might be better than the latter, it is a very costly way to address a liquidity crisis—it would be highly disruptive to the displaced families, and many homeowners being forced to move at once could have spillovers to the broader market by reducing home prices (perhaps below levels warranted by fundamentals if a large number of houses are dumped on the market at once).

One way to provide significant mortgage payment relief is through forbearance, where payments are reduced or canceled for a limited period. With forbearance, borrowers are generally responsible for making up the missed payments. The specifics depend on the design of the forbearance plan. Currently, under the Coronavirus Aid, Relief, and Economic Security (CARES) Act, GSE and FHA mortgages are automatically permitted six months of forbearance with an option to extend to 12 months. At the end of the forbearance period, missed payments by an FHA borrower will be converted to a second lien that is payable when borrowers refinance, sell the house, or pay off the loan. The GSEs' regulator, the Federal Home Finance Agency (FHFA), has released guidelines mandating servicers to offer a similar treatment of forborne payments to borrowers, even if such borrowers are financially able to make up these payments more quickly.

Borrowers can also benefit from refinancing their mortgages, with current circumstances warranting some policy focus on potential frictions.

Mortgage interest rates have dropped since the pandemic took hold and are near their lowest level in decades. As a result, qualified borrowers can reduce their monthly mortgage payments by refinancing into a lower-rate loan. Qualified borrowers with significant positive home equity can also choose to do a cash-out refinancing as an alternative way to increase the funds available for mortgage payments.

These refinancing options would have benefits for mortgage borrowers facing temporary income disruptions and also, potentially, for mortgage lenders. Although lenders (and mortgage investors) tend to suffer losses when mortgages are prepaid sooner than expected, there is likely to be some offsetting benefit under current circumstances, because lower mortgage payments or liquefied home equity may help reduce the incidence of mortgage delinquencies.

However, income disruptions could obstruct many households' ability to refinance if the refinancing transactions require income verification (as they typically do). Forbearance can help these households

in the near term. However, should the economic downturn drag on beyond the currently available forbearance period, these households could miss out on a significant opportunity to improve their own circumstances and contribute to better economic outcomes more broadly.

The experience of the Great Recession highlighted this obstacle—borrowers who had lost their jobs faced difficulty documenting income for the Home Affordable Refinance Program (HARP) that facilitated refinancing for borrowers with GSE mortgages in negative equity. Eventually, the GSEs waived the income requirement. The key logic then was that the holder of the credit risk (the GSEs in this case) stood to gain from allowing the borrower to refinance if it reduced the probability of default.⁷ This logic applies in the current circumstances as well. Beyond the direct benefits to borrowers and lenders of easing income verification requirements, research has shown that reducing such frictions can create better aggregate outcomes by enhancing the transmission of monetary policy (Agarwal et al, 2020; DeFusco and Mondragon, 2020).

In the event home prices fall substantially, policymakers might also consider subsidizing refinancing for homeowners with income disruptions to lower their upfront costs. For instance, Ehrlich and Perry (2015) find that a reduction in FHA insurance premiums for borrowers eligible for a streamlined refinance program resulted in these borrowers having a lower default rate. Such subsidies may be more costly than easing income verification requirements, but in a situation of depressed home prices they might have significant social value if they limit the extent of foreclosures. A wave of foreclosures can lead to increases in crime and blight in neighborhoods and excess housing supply due to distressed sales.

Evidence on Great Recession homeowner assistance programs suggests that payment relief is a more effective way to help struggling mortgage borrowers than principal reduction.

The experience of the Great Recession suggests that mortgage principal reduction will be debated as yet another way to help struggling homeowners—particularly if home prices decline and large numbers of borrowers go into negative equity. Although debt forgiveness would have benefits for some borrowers, studies from that period have found that reducing payments was more effective than reducing principal from a cost-per-borrower-saved standpoint (Eberly and Krishnamurthy, 2014; Scharlemann and Shore, 2016). With federal debt projected to reach its highest level as a share of gross domestic product since World War II by fall 2020, policymakers will face pressure to limit relief and recovery spending. Under these circumstances, payment-reduction strategies may benefit a larger number of borrowers, and therefore provide better value, than principal-reduction strategies.

Policy design and implementation

Programs should be straightforward for borrowers and financial institutions to use.

During the Great Recession, homeowner assistance programs were initially complicated in ways that greatly reduced take-up—even by those the government was aiming to help. Fairness and moral hazard concerns led policymakers to impose complex screening mechanisms in an effort to target truly struggling borrowers, as opposed to those looking for aid even though they had the means to make their mortgage payments (Barr et al., 2020). In turn, many struggling borrowers had a difficult time demonstrating they qualified for assistance and sometimes even understanding whether they did. The complexity also hampered lenders' willingness to process paperwork efficiently and comply with the parameters of the loan modification programs. These problems were only exacerbated by the high volume of modification applications and servicers' lack of staffing and systems for handling them.

The complex design of the homeowner assistance programs limited their effectiveness. Over the first 12 months of HAMP, lenders were allowed to start a loan modification on a trial basis even without obtaining all required documents. This practice produced a surge in trial modifications,

but rates of successfully converting them into permanent modifications—which required full documentation—were low. Once full documentation was required to start the modification process, conversion rates improved but the volumes increased only slowly. The initial stringency and the back-and-forth on implementation details did not even assuage the worries about fairness that the policymakers had hoped to address, as the programs received extensive criticism for being both too generous and too restrictive.

The experience during the Great Recession period generally demonstrates that over-engineering an assistance program can materially obstruct the ability to deliver aid to the group of interest. The argument for avoiding overly stringent restrictions in the current crisis is even stronger given the nature of the Covid-19 shock—it is hard to argue that most borrowers now needing assistance are in that position because of previously irresponsible behavior.

Resolving the institutional complications related to the incentives and constraints of credit market intermediaries will be critical to transmitting relief.

Credit market intermediaries play an important role in delivering mortgage relief to borrowers, and the Great Recession revealed institutional complications related to their incentives and constraints. In turn, these complications created problems in how borrowers received aid. For example, lenders were reluctant to modify loans because of uncertainties over how "troubled debt restructuring" would be treated under accounting rules and lenders' fear of GSE "put backs," where the FHFA required lenders to buy back newly refinanced loans for seemingly minor flaws in underwriting. (This latter problem dissipated after the GSEs agreed in late 2011 not to enforce the provisions of their contracts with lenders that would have allowed them to force the lenders to take back troubled loans.) And the GSEs applied loan-level pricing adjustments to higher-risk borrowers (that is, those with higher loan-to-value ratios or low credit scores), which left many borrowers with small (if any) reductions in their mortgage rates when they refinanced.

Beyond the GSEs and lenders, mortgage relief programs also had to consider the incentives and constraints of investors in mortgage-backed securities (MBS) and mortgage servicers. While government refinancing programs benefited borrowers and taxpayers (by lowering credit losses for the taxpayer-backed GSEs), they imposed costs on MBS investors by accelerating prepayments (Abel and Fuster, 2019). Policymakers went forward with such programs on the (ultimately correct) assumption that, because MBS holdings were widely distributed among domestic and foreign investors, accelerated prepayments would not imperil financial stability. In contrast, policies to extinguish second liens faced insurmountable frictions. In many cases, servicers' incentives were conflicted by servicer ownership of the second liens (Agarwal et al., 2019). More generally, some have argued that mortgage servicers were slow to modify and refinance mortgages because of capacity constraints or problematic incentives in their servicing contracts (Agarwal et al., 2017).

The general lesson for the future is that policymakers need to monitor potential institutional complications, including through ongoing communication with credit market intermediaries, as they design mitigating polices. Many institutional details are opaque to nonexperts but highly consequential in determining the effectiveness of policy.

A specific complication that has already arisen for credit market intermediaries during the Covid-19 crisis is that the temporary forbearance allowed by the CARES Act will potentially threaten the viability of some nonbank mortgage servicers. Covering the missed payments falls on the servicing industry in the short to medium run, which requires servicers to have ample liquid funds. Yet the rise of nonbank mortgage servicers noted earlier means that the majority of mortgages are now serviced by nonbanks with relatively thin capital cushions (Kim et al., 2018). Policy actions have been taken to shore up servicer liquidity, given the high take-up of forbearance plans to date. It is too soon to know whether these actions will prove sufficient for borrowers to receive timely assistance and for the financial system to remain stable, particularly as the public health crisis evolves.

Mortgage assistance as one element of broader policy actions

Monetary policy transmission has the potential to lower rates for many mortgage borrowers.

For the easing of monetary policy to provide assistance to struggling homeowners, it needs to result in lower mortgage rates for borrowers. Yet the experience of the Great Recession demonstrated that lowering mortgage rates through monetary policy is more complicated than stylized textbook examples would suggest.

In particular, the ability to lower mortgage rates once the Fed has reached the zero lower bound (meaning the fed funds rate is already close to or at zero) may be influenced by the central bank's portfolio choices. During the Great Recession, monetary policymakers aimed to reduce yields on "agency" MBS (those issued by the GSEs and by Ginnie Mae, which securitizes FHA-backed mortgages), with the idea that lower yields would lead to lower rates to mortgage borrowers. The Fed embarked on large-scale purchases of agency MBS, soaking up nearly two-thirds of gross MBS issuance (and a much higher fraction of net issuance) in 2009. These actions have been found to lower MBS yields by about 100 basis points (Krishnamurthy and Vissing-Jorgensen, 2011).

However, what matters for individual borrowers are rates quoted by their lender, not MBS yields. At times of market stress, there can be a substantial gap between the two, owing to limited lender capacity to originate loans and higher costs of origination in volatile market conditions. Fortunately, Federal Reserve purchases of MBS were shown to help with this margin as well during the Great Recession (Di Maggio, Kermani, and Palmer, 2020). During recent weeks, large-scale Fed actions have also succeeded in reducing volatility in MBS markets and in moving quoted mortgage rates closer to MBS yields.⁹

The broader social safety net is an important complement to homeowner assistance policies.

Forbearance is one way to help mortgage borrowers facing substantial earning reductions because of job loss; replacing (or partly replacing) the lost income through the government's social insurance and safety net programs is another way. Programs like SNAP, Medicaid, and unemployment insurance helped homeowners continue to make their mortgage payments in the face of income losses in the Great Recession. For example, Hsu, Matsa, and Melzer (2018) estimate that the expansion of unemployment insurance during the Great Recession prevented more than 1.3 million foreclosures, which in turn helped stabilize the mortgage market. Similarly, Medicaid expansions under the Affordable Care Act helped reduce household financial distress (Gross and Notowidigdo, 2011; Hu et al., 2018).

Safety net programs are especially important when countercyclical monetary policy is more likely to be limited by the zero lower bound on the federal funds rate (Peek, Rosengren, and Tootell, 2018). Along these lines, the CARES Act expanded UI benefits so that all beneficiaries received an additional \$600 per week and extended benefits to many workers not traditionally covered (like the self-employed). This expansion substantially (but temporarily) increased the capacity of millions of homeowners to manage their mortgage payments. Congress has also passed measures that will increase funding for states and cities, easing budget pressures related to fighting the crisis and thereby reducing the need to cut jobs and other types of social services that support homeowners.

These initial fiscal steps should help homeowners avoid liquidity crunches that would otherwise impair their ability to make mortgage payments. However, more may be needed. The unemployment rate may still be quite high when the expansion of unemployment insurance benefits ends in July 2020. Moreover, analysts estimate that the federal support passed to date will only fill a limited portion of the state and local budget holes created by the Covid-19 crisis (Gordon and Auxier, 2020).

Conclusion

The sharp decline in economic activity that occurred in the United States following the onset of the Covid-19 pandemic is unprecedented. A high degree of uncertainty surrounds the timing, speed, and magnitude of the economic recovery. Yet, there is a growing consensus that structural damage to the economy, including the scarring of household balance sheets, could substantially prolong the downturn and hinder the economy's return to more normal conditions. Policies to assist homeowners that are struggling to make their mortgage payments might help cushion the impact of the downturn on U.S. households and reduce spillovers to the financial system and the broader economy.

Notes

- ¹ Other recent Federal Reserve Bank of Chicago research analyzing household liquidity needs includes Fishback, Rose, and Snowden (2020) and Lanning and Rose (2020).
- ² Data available online, https://www.federalreserve.gov/consumerscommunities/shed.htm.
- ³ Based on 2019 data from CoreLogic. Quarterly updates are available online, https://www.corelogic.com/insights-download/homeowner-equity-report.aspx.
- ⁴ Details available online, https://www.federalreserve.gov/consumerscommunities/shed.htm.
- ⁵ HAMP codified a multi-step process for modification of mortgages likely to enter delinquency and provided monetary incentives for participating lenders and servicers to offer such modifications. HARP facilitated refinancing for borrowers with GSE-backed mortgages that had low or insufficient equity in their houses.
- ⁶ The 2019 SHED also found that only 64% of households who experienced employment disruption by April 2020 expected to be able to pay all of their April bills, as compared with 85% of households whose employment remained stable.
- ⁷ The FHA offered a streamlined refinancing program early on in the Great Recession that allowed underwater FHA borrowers with impaired credit histories to refinance with no new underwriting. The FHA scaled back the program when general mortgage market deterioration stressed the FHA's finances in 2009. However, some estimates suggest that more refinancing among unemployed borrowers would have saved the FHA about \$7 billion in 2009, an amount equivalent to 10% of unemployment insurance spending in that year (DeFusco and Mondragon, 2020).
- ⁸ In late March, Ginnie Mae announced a Pass-Through Assistance Program (PTAP) that allows servicers of FHA loans to ask Ginnie Mae to advance any forborne payments that they are unable to make. On April 21, the FHFA explicitly limited servicer obligations to advance forborne payments to four months.
- ⁹ In March 2020 alone, the Fed purchased \$292.2 billion in agency MBS, absorbing 178% of gross issuance (Goodman et al., 2020).

References

Abel, Joshua, and Andreas Fuster, 2019, "How do mortgage refinances affect debt, default, and spending? Evidence from HARP," Federal Reserve Bank of New York, staff report, No. 841, revised August 5, 2019 (originally issued February 2018). Crossref, https://doi.org/10.2139/ssrn.3132012

Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, Tomasz Piskorski, and Amit Seru, 2017, "Policy intervention in debt renegotiation: Evidence from the Home Affordable Modification Program," *Journal of Political Economy*, Vol. 125, No. 3, June, pp. 654–712. Crossref, https://doi.org/10.1086/691701

Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, and Yan Zhang, 2019, "Holdup by junior claimholders: Evidence from the mortgage market," *Journal of Financial and Quantitative Analysis*, Vol. 54, No. 1, February, pp. 247–274. Crossref, https://doi.org/10.1017/S0022109018000662

Agarwal, Sumit, Gene Amromin, Souphala Chomsisengphet, Tim Landvoigt, Tomasz Piskorski, Amit Seru, and Vincent Yao, 2020, "Mortgage refinancing, consumer spending, and competition: Evidence from the Home Affordable Refinancing Program," National Bureau of Economic Research, working paper, No. 21512, revised April 2020 (originally issued August 2015). Crossref, https://doi.org/10.3386/w21512

Barr, Michael, Neel T. Kashkari, Andreas Lehnert, and Phillip Swagel, 2020, "Crisis-era housing programs," in *First Responders: Inside the U.S. Strategy for Fighting the 2007–2009 Global Financial Crisis*, Ben S. Bernanke, Timothy F. Geithner, Henry M. Paulson, Jr., and J. Nellie Liang (eds.), New Haven, CT: Yale University Press, pp. 320–358.

Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis, 2020, "COVID-19 is also a reallocation shock," National Bureau of Economic Research, working paper, No. 27137, May. Crossref, https://doi.org/10.3386/w27137

Bhutta, Neil, Jesse Bricker, Lisa Dettling, Jimmy Kelliher, and Steven Laufer, 2019, "Stress testing household debt," Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System, No. 2019-008, January 11. Crossref, https://doi.org/10.17016/FEDS.2019.008

DeFusco, Anthony A., and John Mondragon, 2020, "No job, no money, no refi: Frictions to refinancing in a recession," *Journal of Finance*, forthcoming. Crossref, https://doi.org/10.2139/ssrn.3231596

Di Maggio, Marco, Amir Kermani, and Christopher J. Palmer, 2020, "How quantitative easing works: Evidence on the refinancing channel," *Review of Economic Studies*, Vol. 87, No. 3, May, pp. 1498–1528. Crossref, https://doi.org/10.1093/restud/rdz060

Eberly, Janice, and Arvind Krishnamurthy, 2014, "Efficient credit policies in a housing debt crisis," *Brookings Papers on Economic Activity*, Fall, pp. 73–136. Crossref, https://doi.org/10.1353/eca.2014.0013

Ehrlich, Gabriel, and Jeffrey Perry, 2015, "Do large-scale refinancing programs reduce mortgage defaults? Evidence from a regression discontinuity design," Congressional Budget Office, working paper, No. 2015-06, October. Crossref, https://doi.org/10.2139/ssrn.2678425

Fishback, Price, Jonathan Rose, and Ken Snowden, 2020, "Housing markets in a time of crisis: A historical perspective," *Chicago Fed Letter*, Federal Reserve Bank of Chicago, No. 433. Crossref, https://doi.org/10.21033/cfl-2020-433

Foote, Christopher L., Kristopher Gerardi, and Paul S. Willen, 2008, "Negative equity and foreclosure: Theory and evidence," *Journal of Urban Economics*, Vol. 64, No. 2, September, pp. 234–245. Crossref, https://doi.org/10.1016/j.jue.2008.07.006

Goodman, Laurie, Alanna McCargo, Edward Golding, Jim Parrott, Sheryl Pardo, Todd M. Hill-Jones, Karan Kaul, Sarah Strochak, John Walsh, Alison Rincon, and Caitlin Young, 2020, "Housing finance at a glance: A monthly chartbook, April 2020," Urban Institute, Housing Finance Policy Center, report, April 21, available online, https://www.urban.org/research/publication/housing-finance-glance-monthly-chartbook-april-2020/view/full_report.

Gordon, Tracy, and Richard C. Auxier, 2020, "Congress must do more to help states and localities respond to COVID-19," *TaxVox*, Urban Institute and Brookings Institution, Tax Policy Center, March 30, available online, https://www.taxpolicycenter.org/taxvox/congress-must-do-more-help-states-and-localities-respond-covid-19.

Gross, Tal, and Matthew J. Notowidigdo, 2011, "Health insurance and the consumer bankruptcy decision: Evidence from expansions of Medicaid," *Journal of Public Economics*, Vol. 95, Nos. 7–8, August, pp. 767–778. Crossref, https://doi.org/10.1016/j.jpubeco.2011.01.012

Hsu, Joanne W., David A. Matsa, and Brian T. Melzer, 2018, "Unemployment insurance as a housing market stabilizer," *American Economic Review*, Vol. 108, No. 1, January, pp. 49–81. Crossref, https://doi.org/10.1257/aer.20140989

Hu, Luojia, Robert Kaestner, Bhashkar Mazumder, Sarah Miller, and Ashley Wong, 2018, "The effect of the Affordable Care Act Medicaid expansions on financial wellbeing," *Journal of Public Economics*, Vol. 163, July, pp. 99–112. Crossref, https://doi.org/10.1016/j.jpubeco.2018.04.009

Kim, You Suk, Steven M. Laufer, Karen Pence, Richard Stanton, and Nancy Wallace, 2018, "Liquidity crises in the mortgage market," *Brookings Papers on Economic Activity*, Spring, pp. 347–428. Crossref, https://doi.org/10.1353/eca.2018.0004

Krishnamurthy, Arvind, and Annette Vissing-Jorgensen, 2011, "The effects of quantitative easing on interest rates: Channels and implications for policy," *Brookings Papers on Economic Activity*, Fall, pp. 215–287. Crossref, https://doi.org/10.1353/eca.2011.0019

Lanning, Jonathan, and Jonathan Rose, 2020, "What are the consequences of missed payments on consumer debts?," *Chicago Fed Letter*, Federal Reserve Bank of Chicago, No. 437. Crossref, https://doi.org/10.21033/cfl-2020-437

Peek, Joe, Eric S. Rosengren, and Geoffrey M. B. Tootell, 2018, "Some unpleasant stabilization arithmetic," presentation at the 62nd Economic Conference, What Are the Consequences of Long Spells of Low Interest Rates?, Federal Reserve Bank of Boston, September 8, available online, https://ideas.repec.org/p/fip/fedbsp/136.html.

Scharlemann, Therese C., and Stephen H. Shore, 2016, "The effect of negative equity on mortgage default: Evidence from HAMP's principal reduction alternative," *Review of Financial Studies*, Vol. 29, No. 10, October, pp. 2850–2883. Crossref, https://doi.org/10.1093/rfs/hhw034

Charles L. Evans, President; Anna L. Paulson, Executive Vice President and Director of Research; Daniel G. Sullivan, Executive Vice President, outreach programs; Spencer Krane, Senior Vice President and Senior Research Advisor; Sam Schulhofer-Wohl, Senior Vice President, financial policy; Gene Amromin, Vice President, finance team; Alessandro Cocco, Vice President, markets team; Jonas D. M. Fisher, Vice President, macroeconomic policy research; Leslie McGranahan, Vice President, regional research; Daniel Aaronson, Vice President, microeconomic policy research, and Economics Editor; Helen Koshy and Han Y. Choi, Editors; Julia Baker, Production Editor, Sheila A. Mangler, Editorial Assistant.

Chicago Fed Letter is published by the Economic Research Department of the Federal Reserve Bank of Chicago. The views expressed are the authors' and do not necessarily reflect the views of the Federal Reserve Bank of Chicago or the Federal Reserve System.

© 2020 Federal Reserve Bank of Chicago *Chicago Fed Letter* articles may be reproduced in whole or in part, provided the articles are not reproduced or distributed for commercial gain and provided the source is appropriately credited. Prior written permission must be obtained for any other reproduction, distribution, republication, or creation of derivative works of *Chicago Fed Letter* articles. To request permission, please contact Helen Koshy, senior editor, at 312-322-5830 or email Helen.Koshy@chi.frb.org. *Chicago Fed Letter* and other Bank publications are available at https://www.chicagofed.org.

ISSN 0895-0164