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Liquidity in the Mortgage Market: How does the COVID-19 Crisis Compare with the Global Financial Crisis?

Karen M. Pence

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Liquidity in the Mortgage Market:

How does the COVID-19 Crisis Compare with the Global Financial Crisis?

Karen M. Pence¹

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Abstract

The liquidity strains that contributed to the meltdown of the mortgage market in the Global Financial Crisis (GFC) re-emerged in the Coronavirus 2019 (COVID-19) Crisis. Some of these strains were acute. For example, the dependence of mortgage real estate investment trusts (REITs) on short-term funding amplified market disruption in March 2020. However, other liquidity pressures had only minor repercussions for the overall mortgage market because of reforms since the GFC, a heavy government presence, and strong house prices. The lackluster performance of the private-label mortgage-backed securities market provides a glimpse of how the market might have performed in the absence of the heavy government presence.

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JEL Codes: G21, G23, G28

¹ Board of Governors of the Federal Reserve System, Washington, DC. Email: Karen.Pence@FRB.GOV. The views in this paper are mine and not necessarily those of the Board of Governors of the Federal Reserve System or its staff. This paper draws upon years of fruitful collaboration with my co-authors Brian Bucks, Sean Campbell, Daniel Covitz, You Suk Kim, Steven Laufer, Chris Mayer, Ralf Meisenzahl, Bill Nelson, Shane Sherlund, Richard Stanton, Johan Walden, and Nancy Wallace. I am grateful to Larry Cordell, Scott Frame, Mike Fratantoni, Laurie Goodman, and numerous Federal Reserve colleagues for thoughtful comments.

Introduction

The mortgage market came under enormous strain in both the Global Financial Crisis (GFC) and the COVID-19 crisis. Both periods were marked by extreme dislocations in financial markets and the broader economy. The Volatility Index (VIX), a gauge of uncertainty in financial markets, spiked at 82.7 on March 16, 2020, higher than its GFC peak of 80.1 on October 27, 2008, and well above its long-run median of 17.6.² The unemployment rate reached almost 15 percent in April 2020, relative to its GFC peak of 10 percent in October 2009.³ By August 2020, 5.8 percent of borrowers had not made a payment on their mortgages for at least three months, up sharply from 1.7 percent in February 2020 but still below the GFC peak of 8.6 percent in January 2010.⁴

However, the mortgage market imploded in the GFC, whereas it survived the COVID-19 crisis mostly intact. A major difference, of course, is that the GFC originated in part in the mortgage market. In the years before the GFC, the mortgage market was plagued with shoddy underwriting, faulty credit-rating models, unsustainable leverage throughout the financial system, plunging house prices, and fraud.

In addition to these factors, in earlier work (Kim et al., 2018) my co-authors and I highlighted the fact that the mortgage market is vulnerable to liquidity pressures at times of strain. In this paper, I update that work to explore whether liquidity strains emerged in the COVID-19 crisis as they did in the GFC. To preview my conclusions, I find that the mortgage market remains vulnerable to liquidity pressures, but these strains were mitigated in 2020 by reforms to the mortgage system since the GFC, the heavy government footprint in the mortgage market, and strong house prices.

In the next sections, I describe the shadow mortgage banking system and its liquidity vulnerabilities, summarize some of the tumult in the mortgage market in 2020 and the associated government interventions, and then trace out how this tumult affected the liquidity vulnerabilities of mortgage borrowers, mortgage finance companies, and MBS investors.

Liquidity and the Shadow Mortgage Banking System

I focus on the shadow mortgage banking system that delivers mortgage credit to borrowers through mortgage finance companies and securitization markets, rather than through banks. About 70 percent

² Long-run average measured from January 1, 1990 to December 31, 2021. Data are from Chicago Board Options Exchange, CBOE Volatility Index: VIX [VIXCLS], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/VIXCLS>, January 12, 2022.

³ U.S. Bureau of Labor Statistics, Unemployment Rate, seasonally adjusted.

⁴ Federal Reserve Bank of Philadelphia (2022).

of outstanding mortgages were funded through securitization as of September 30, 2021.⁵ Banks are also subject to liquidity pressures, but unlike nonbanks, banks can obtain liquidity from the Federal Home Loan Banks and the Federal Reserve System.

Figure 1 shows a stylized schematic of the shadow mortgage banking system. Mortgage borrowers borrow money to purchase or refinance homes from mortgage finance companies (referred to as “mortgage companies” herein for short). Mortgage companies obtain short-term financing to make these mortgages from commercial or investment banks and obtain longer-term financing by selling the mortgages to securitization trusts that issue MBS. Certain MBS investors finance their MBS purchases with short-term funding that is often obtained from the same banks that fund the mortgage finance companies.

All three of the key participants in this chain—borrowers, mortgage companies, and MBS investors—are vulnerable to funding liquidity pressures, meaning that the entity may not have the cash flow to finance a longer-term asset position. Borrowers can lose their jobs or suffer other cash flow disruptions that make it difficult to make their mortgage payments. Mortgage companies and MBS investors can lose the short-term funding that finances their originations and MBS purchases.

If unaddressed, these issues can lead to market liquidity pressures for homes, mortgages, and mortgage-backed securities, where liquidity pressures mean here that an asset cannot be quickly sold, except at a substantial discount compared with its intrinsic value. If borrowers default on their mortgages, or if mortgage companies or MBS investors lose their short-term funding, the resulting fire sales of homes, mortgages, and MBS can cause illiquid conditions in their markets and impose costs on other market participants.

The Mortgage Market and Government Intervention in 2020

In March 2020, the announcement of lockdown measures to fight the COVID-19 pandemic led to panic and a widespread “dash for cash” in financial markets as investors such as foreign central banks, hedge funds, and bond mutual funds sold massive amounts of U.S. Treasuries to raise cash.⁶ As one measure of the extraordinary strain in financial markets, the VIX was above the 99th percentile of its historical

⁵ Financial Accounts of the United States, Table L.218.

⁶ See “A Retrospective on the March 2020 Turmoil in Treasury and Mortgage-Backed Securities Markets,” in Board of Governors of the Federal Reserve System (2020g), Vissing-Jorgensen (2021), and Ma, Xiao, and Zeng (forthcoming).

distribution for almost the entire period from March 16 through April 23, 2020.⁷ The lockdown measures also resulted in an enormous surge in unemployment that left many mortgage borrowers unable to make their payments.

The liquidity strains in the Treasury market spilled over into the mortgage market. The prices of government-sponsored enterprise (GSE) and Ginnie Mae (“agency”) MBS trading in the to-be-announced (TBA) market were extremely volatile, including plunging from 102.13 on March 17 to 98.92 on March 19 (Figure 2).⁸ In the commercial mortgage-backed securities (CMBS) market, the spreads on agency and private-label (non-agency) AAA CMBS rose from around 55 and 75 basis points, respectively, in February 2020 to 135 and 275 basis points by March 19, 2020, while spreads on AAA private-label RMBS collateralized by non-qualified mortgages (QMs) rose from 80 to 450 basis points (Figure 3).^{9 10}

The Federal Reserve took multiple steps to restore normal functioning to the agency mortgage market, amid a large array of measures to support the flow of credit to households and businesses.¹¹ On Sunday, March 15, the Federal Reserve announced that it would start purchasing agency MBS the next day “to support the smooth functioning of markets... that are central to the flow of credit to households and businesses” (Board of Governors, 2020b). On March 19, in response to the acute need for cash among market participants (“highly unusual disruptions”), the Federal Reserve Bank of New York announced that it would start purchasing MBS to settle three days (“t+3”) later, instead of the standard monthly TBA schedule (Federal Reserve Bank of New York, 2020).¹² On March 23, the Federal Reserve lifted the cap on its MBS purchases, stating that it would purchase “in the amounts needed,” and that it would start purchasing agency CMBS (Board of Governors, 2020c).¹³ The steps of “t+3” settlement and

⁷ Author’s calculation from Chicago Board Options Exchange, CBOE Volatility Index: VIX [VIXCLS], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/VIXCLS>, January 19, 2022.

⁸ Price is for a uniform mortgage-backed security (UMBS) bearing a coupon of 3 percent.

⁹ The agency CMBS spread is Fannie Mae’s Delegated Underwriting and Servicing (DUS) 10/9.5/30-year, which means that the underlying commercial mortgages have a ten-year balloon period, a 9.5 year period in which a yield maintenance charge applies, and a 30-year amortization schedule. The private-label triple-A CMBS security spread is for a bond with a ten-year weighted average life and is measured relative to swaps. Both measures are courtesy of JPMorgan Chase & Co., Copyright 2021. The AAA non-QM spread is from Citigroup, Inc., Citi Velocity.

¹⁰ Non-qualified mortgages have certain riskier terms or features that do not conform with the Consumer Financial Protection Bureau’s qualified mortgage definition. Issuers of securitizations collateralized by non-QMs must retain 5 percent of the credit risk of the securitization under the risk retention rule; this requirement contributes to the segmentation of this part of the securitization market (U.S. Department of the Treasury et al., 2021).

¹¹ See Clarida, Duygan-Bump, and Scotti (2021) for a comprehensive list of Federal Reserve responses to the pandemic and Fleming, Liu, Podjasek, and Schurmeier (2021) for more information on Federal Reserve MBS purchases during the pandemic. See also Storms and Cooperstein (2021).

¹² See Chen, Liu, Rubio, Sarkar, and Song (2020) for more details on t+3 settlement.

¹³ See Park, Gouny, and Liu (2020) for more background on agency CMBS purchases.

agency CMBS purchases were new territory for the Federal Reserve; neither measure was used in the GFC. Total agency MBS purchases were gargantuan in March and April 2020, almost \$300 billion in each month, representing more than 100 percent of gross agency RMBS issuance (Urban Institute, 2021). The monthly pace of purchases in those months dwarfed that in the Federal Reserve's Large Scale Asset Purchase programs after the GFC, which peaked at just over \$120 billion in March 2009 (Potter, 2019).

The Federal Reserve also took steps to help restore liquidity to the private-label CMBS market. As part of a broad suite of market interventions on March 23, the Board announced that it was establishing the Term Asset-Backed Securities Loan Facility (TALF) to provide liquidity to the asset-backed securitization market and thereby support the flow of credit to households and businesses (Board of Governors, 2020d).¹⁴ TALF was first established during the GFC and was effective in that crisis in restoring liquidity to the CMBS market (Campbell et al., 2011). The Federal Reserve did not designate CMBS as TALF-eligible collateral on March 23. However, given the history of the GFC-era TALF program, CMBS issuers may have anticipated the subsequent April 9 announcement, again as part of a broad suite of interventions, that added private-label CMBS to the list of TALF-eligible assets (Board of Governors, 2020f). In contrast, private-label RMBS were not TALF-eligible collateral at any point.

As shown in Figures 2 and 3, these steps appear to have been successful in restoring liquidity to the RMBS and CMBS markets. After the March 23 announcements, TBA prices rose and spreads retreated on agency and private-label CMBS and on private-label RMBS. Private-label CMBS and RMBS spreads fell further after the April 9 announcements.¹⁵ Spreads on private-label RMBS, however, remained well above those on private-label CMBS until early September 2020, even though these two spreads were in line with each other before the pandemic. The elevated spreads on private-label RMBS were consistent with news reports that markets without government support took longer to recover (Eisen and Otani, 2020) and that investor demand for non-QM securitizations did not return to pre-pandemic levels until September 2020 (Ivey, 2020b).

Meanwhile, Congress in conjunction with federal regulatory agencies enacted measures to help mortgage borrowers. The Coronavirus Aid, Relief, and Economic Security (CARES) Act, signed into law on March 27, 2020, imposed an eight-week foreclosure moratorium on residential mortgages loans held in securitization pools guaranteed by Ginnie Mae or the GSEs. These loans were about 65 percent of

¹⁴ For more information on TALF, see Meisenzahl and Pence (2022) and Caviness et al. (2021).

¹⁵ Although the wide range of policy actions makes it difficult to attribute the spread changes to any particular program, Caviness et al. (2021) present evidence that TALF played a role in the decline in spreads.

outstanding home mortgages at the end of 2019, relative to 40 percent at the onset of the GFC.¹⁶ That moratorium was subsequently extended until July 31, 2021, by the relevant government agencies. Due to the perceived short-term nature of the pandemic and for reputational reasons, private-sector lenders followed suit (An et al., 2022). In June 2021, the CFPB issued a rule that imposed a number of heightened procedural requirements that applied to any foreclosure initiated before January 1, 2022; although the rule was not a foreclosure moratorium, it significantly damped foreclosure activity for the rest of 2021.¹⁷

The CARES Act also legislated a twelve-month forbearance benefit for federally guaranteed mortgages if the borrower affirmed that she or he faced a financial hardship that was directly or indirectly related to the Covid pandemic. Servicers of many mortgages that were not federally guaranteed also voluntarily offered forbearance to their borrowers.¹⁸ Finally, the CARES Act included generous cash assistance that helped many borrowers continue to make their payments (Bhutta, Blair, Dettling, and Moore, 2020).

Mortgage Borrowers

The GFC led to an extraordinary 7.8 million foreclosures from 2007 to 2016 (CoreLogic, 2017). The proximate cause of the foreclosures was primarily liquidity pressures—borrowers did not have enough cash to cover mortgage payments (Ganong and Noel, 2020). However, the mortgage payments became unaffordable both because borrowers lost their jobs and because the mortgage products were poorly or fraudulently underwritten, or otherwise inappropriate (Mayer, Pence, and Sherlund, 2009; Jiang et al., 2014; Amromin et al., 2018; Griffin, 2021). Plunging house prices also made it difficult for borrowers to resolve any payment issues by refinancing their mortgages or selling their homes.

Although the government put in place programs such as the Home Affordable Modification Program (HAMP) to encourage servicers to address these liquidity pressures by modifying loans, the government could not mandate modifications because the most troubled loans were held in private-label pools. Servicers also did not have the incentives or institutional capacity in many cases to carry out mortgage modifications (Cordell et al., 2008; Agarwal et al., 2017). A Federal Reserve report noted that servicers “lacked the systems and staffing needed to modify loans, engaged in unsound practices, and

¹⁶ Author’s calculations from Financial Accounts of the United States Table L.218. For the purpose of this calculation, mortgages are one-to-four family mortgages extended to households or nonprofits.

¹⁷ See National Housing Law Project (2021) for a summary of these actions. See An et al. (2022) Figure 1 for a depiction of foreclosure activity up to December 2021.

¹⁸ Regulators encouraged these modifications. See Federal Reserve Board (2020a).

significantly failed to comply with regulations” (Board of Governors, 2012a). The resulting foreclosures added to the downward pressures on house prices (Anenberg and Kung, 2014; Campbell, Giglio, and Pathak, 2011; Gupta, 2019; Piskorski and Seru, forthcoming).

Borrowers fared better in the pandemic crisis than the GFC. Although the share of borrowers who had not made a payment in three or months reached 5.8 percent in August 2020, the surge in nonpayment did not lead to a rise in foreclosures and subsequent housing fire-sales.¹⁹ Mechanically, of course, foreclosures did not occur because of the moratorium, but borrowers also faced fewer liquidity pressures and government interventions were more effective.

Liquidity pressures were lower in 2020 than 2008 because borrowers suffered income shocks during the pandemic, but not payment shocks from inappropriate mortgage products. Regulatory changes, such as the Consumer Financial Protection Bureau’s Ability to Repay and Qualified Mortgage standards, and the directive of the Federal Housing Finance Agency (FHFA) to the GSEs to only purchase mortgages with certain contract terms (FHFA, 2013), eliminated the worst of the underwriting excesses that contributed to the record defaults in the GFC. The CARES Act cash assistance and the nearly 30 percent rise in house prices from March 2020 to December 2021 also facilitated borrowers’ ability to repay their loans.²⁰

In addition, the CARES Act forbearance was more effective than HAMP at addressing borrowers’ liquidity pressures. The government could mandate widespread modifications because it guaranteed such a wide share of the market. In contrast to HAMP, the forbearance was simple and required minimal documentation; the HAMP experience made the importance of standardization and simplicity clear to stakeholders (U.S. Department of the Treasury et al., 2016). Servicers may also have been more prepared to implement modifications in 2020 than in the GFC as a result of their HAMP experience and new regulations, such as the CFPB’s 2016 mortgage servicing rule (Consumer Financial Protection Bureau, 2016). Nonetheless, as I discuss in the next section, there still appears to have been considerable variation across servicers in how effectively they implemented forbearance.

¹⁹ Data on borrower nonpayment are from Black Knight McDash Data as displayed in Federal Reserve Bank of Philadelphia (2022).

²⁰ House price increase from S&P Dow Jones Indices LLC, S&P/Case-Shiller U.S. National Home Price Index [CSUSHPINSA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/CSUSHPINSA>, February 27, 2022.

As a result of these factors, of the 7.5 million or so loans that exited forbearance by November 2021, roughly ten percent were delinquent in November 2021.²¹ Most of the other loans were in repayment status, often with the help of a mortgage modification, or had been paid off. The forbearances, and the successful transition out of them, may have contributed to the strength in house prices. Anenberg and Scharlemann (2021) suggest that widespread forbearance, for example, supported house prices.

Meanwhile, credit generally stayed available through government-supported channels in the pandemic, but credit funded through other means became less available. As one illustration, consider the number of lenders that posted mortgage offers on the Optimal Blue platform for a hypothetical borrower with a credit score of 680 in the GSE-eligible, Federal Housing Administration (FHA) insured, or jumbo (non-government guaranteed) channels.²² The lenders on Optimal Blue are primarily mortgage companies and small banks. In late February 2020, the number of lenders posting offers was around 125 for all three channels (Figure 4). After the onset of the pandemic, the number of lenders offering this loan through a GSE channel stayed about the same; the FHA number fell a bit; and the jumbo number plummeted to 5. Even by the end of 2020, only about 30 lenders had returned to the jumbo channel. The credit availability indexes estimated by the Mortgage Bankers Association (MBA) also showed a much greater contraction in jumbo lending than GSE or FHA lending in March 2020 (Mortgage Bankers Association, 2020b); that difference persisted for many months.

Mortgage companies

Mortgage finance companies failed in large numbers in the GFC. From 2006 to 2012, the number of mortgage companies reporting under the Home Mortgage Disclosure Act (HMDA) fell from 2,000 to 1,000.²³ Liquidity pressures were part of the reason why. On the origination side of their business, mortgage companies faced liquidity strains from their short-term funding—specifically, warehouse lines of credit extended by banks that are structured as reverse repurchase agreements—that they used to finance their originations.²⁴ These lines can be cancelled on short notice if the mortgage companies violate the covenants on the lines, or do not meet margin calls when the loan collateral falls in value (Kim et al., 2018). Originators also had short-term funding for their originations from asset-backed

²¹ Author's calculations based on data from An et al. (2022), Table 7, and Federal Reserve Bank of Philadelphia (2022). I excluded from the calculation loans with servicing that was transferred.

²² Data are from Fuster, Hizmo, Lambie-Hanson, Vickery, and Willen (2021), with special thanks to Aurel Hizmo.

²³ HMDA statistics from Bhutta and Canner (2013).

²⁴ The warehouse lines were structured as reverse repurchase agreements because that structure provided additional protections to creditors after changes to the bankruptcy code in 2005.

commercial paper (ABCP). On the servicing side, liquidity strains stemmed from the servicing contracts for loans in securitized pools. Those contracts require servicers to advance payments to investors on behalf of borrowers in default (“servicing advances”). Servicers are eventually reimbursed these funds, but have to finance them in the interim.

Both liquidity strains materialized during the GFC. Banks pulled the warehouse lines of credit after mortgage companies suffered multiple financial setbacks. First, they struggled to come up with the funds needed for “mortgage putbacks,” which are mortgages in default that mortgage companies were required to repurchase from securitized pools. Second, they struggled to move their originations off the warehouse lines once the private-label mortgage securitization (PLS) market began to falter. And third, their origination revenue was damped by the obstacles that kept borrowers from refinancing: job loss, negative home equity, tighter credit standards, and second liens (Amromin, Bhutta, and Keys, 2020). Originators also lost access to their ABCP funding after ABCP investors fled the market due to concerns about the credit quality of the collateral.²⁵ Meanwhile, mortgage companies struggled to finance their servicing advances (Kim et al., 2018). In some cases, servicers responded to these liquidity pressures by foreclosing on loans when modifications might have kept borrowers in their homes (Aiello, forthcoming).

After the GFC, mortgage companies rebounded: although their share of originations fell from 32 percent in 2005 to 20 percent in 2008, it subsequently rose to 55 percent in 2021.²⁶ Buchak et al. (2018), Fuster et al. (2019), and Kim et al. (2018) describe some of the reasons for the increase in the market share of mortgage companies. The organizational form of mortgage companies also shifted over this period, as banks jettisoned their affiliated mortgage companies after incurring large fines for the misdeeds of these companies (Board of Governors, 2011, 2012b, 2012c, 2013). In 2006, 66 percent of mortgage companies were independent and 34 percent were subsidiaries of a depository institution or affiliates of a bank holding company; by 2020, 93 percent were independent.²⁷

The increased market share of mortgage companies, combined with the GFC experience, has led commentators and regulators to express concern about the possible liquidity and other vulnerabilities of

²⁵ See Covitz, Liang, and Suarez (2013) for a review of the crisis and a discussion of the different types of ABCP conduits that held MBS as collateral. See also Bernanke (2015) pp. 137-45.

²⁶ Share for 2005 and 2008 from Kim et al. (2018). Share for 2021 is author’s calculation from the Financial Accounts of the United States and Urban Institute (2021).

²⁷ See Consumer Financial Protection Bureau (2021), Table 5A, and Avery, Bhutta, Brevoort, and Canner (2010), Table 1.

mortgage companies in an economic downturn (Kim et al., 2018; Financial Stability Oversight Council, 2020; Conference of State Bank Supervisors, 2021; Hubbard et al., 2021). Commentators have focused on these liquidity issues as a key vulnerability because mortgage companies, unlike depository institutions, cannot obtain liquidity from the Federal Reserve System or the Federal Home Loan Banks.²⁸ Mortgage companies also cannot fund liabilities with federally insured deposits, which typically surge during times of crisis. The mortgage companies are also not required by their regulators to maintain large liquidity buffers.

In the next sections, I trace out how these liquidity vulnerabilities unfolded in the COVID-19 crisis. By way of preview, by and large these concerns did not come to pass, with some notable exceptions. In fact, mortgage companies were wildly profitable in 2020 and 2021 (Fuster et al., 2021) and their cash positions improved; at the typical mortgage company, the amount of cash on hand rose from five weeks of expenses in 2019 to nine weeks in mid-2021 (Kim, Pence et al., 2022). Mortgage companies were so profitable because the Federal Reserve's cut in interest rates at the onset of the pandemic triggered an enormous refinancing wave. Unlike in the GFC, negative home equity and second liens did not impede households' ability to refinance.

Warehouse lending

During the pandemic, mortgage companies needed even more warehouse financing than usual in order to finance the heightened refinancing activity. There were some concerns about the ability of the banking system to supply this credit: in the first few weeks of the pandemic, businesses of all kinds were drawing heavily on their bank credit lines because of precautionary cash hoarding and because other funding sources such as commercial paper were under strain (Acharaya and Steffen, 2020). However, mortgage companies were largely able to get the warehouse credit that they needed (Muolo, 2020a). The banking system was in a better position in March 2020 than during the GFC because of post-GFC regulatory reforms and because of temporary pandemic measures, such as the Primary Dealer Credit

²⁸ A handful of nonbank mortgage originators that were structured as REITs retained some funding from the FHLBs during the Covid crisis through their captive insurance subsidiaries. Redwood Trust, for example, noted that it had financed \$38 million in single-family rental loans with FHLB financing in 2020:Q1 (Redwood Trust, 2020). In January 2016 the FHFA issued a final rule that prohibited captive insurance companies from being FHLB members, but granted certain captive insurance companies five years to terminate their memberships. See FHFA (2016) and Light (2016).

Facility and a change to the supplementary leverage ratio rule, that alleviated some of the strains on the banking system (Board of Governors, 2020e).²⁹

Warehouse lenders may also have been willing to continue to extend credit because they believed that the pandemic shock was temporary and that the refinancing revenue resulting from the potent combination of low interest rates and strong house prices would ensure the ongoing profitability of mortgage companies. And once the Federal Reserve stabilized the TBA market, warehouse lenders likely also derived comfort from the fact that mortgages financed on the warehouse lines would quickly be securitized through the GSEs or Ginnie Mae.

However, warehouse lenders remained reticent to finance mortgages without a guaranteed source of take-out securitization funding. In early April 2020, the mortgage industry became significantly concerned about the prospect that mortgages would enter forbearance while still funded on warehouse lines. In that case, the mortgages would not be eligible for sale to the GSEs. To limit this risk, some warehouse lenders placed limits on the characteristics of mortgages that were eligible to be funded through their lines. JP Morgan, for example, required all such loans to be originated to borrowers with a credit score of at least 700 (Muolo, 2020b). The concerns about this situation eased somewhat after FHFA announced that the GSEs would purchase certain types of mortgages already in forbearance, albeit with a very high fee (FHFA, 2020b).

Warehouse lenders were also reluctant to fund other types of loans that were not eligible for sale to the GSEs, such as jumbo mortgages and non-QMs (Muolo, 2020b, Nasiripour, 2020a). Many originators in this market shut down their operations entirely in the first weeks of the pandemic (Eisen, 2020).

Redwood Trust, one of the largest issuers of private RMBS collateralized by jumbo mortgages, noted in May 2020 that, “uncertainty related to the pandemic and its impact on the economy constrained liquidity for any [mortgage] sector not supported by the federal government” (Redwood Trust, 2020). Even as late as August 2020, many warehouse lenders were still only providing funding for non-QM loans originated to borrowers with high credit scores (Ivey, 2020a).

Servicing advances

The broad-based forbearance granted to mortgage borrowers by the CARES Act raised widespread concerns that mortgage companies would not have the liquidity to advance funds to investors on behalf

²⁹ See Alvarez (2014) for a summary of regulatory changes to the banking system after the GFC and Jiang (2021) for more discussion of warehouse lines of credit.

of borrowers in forbearance (Ackerman, 2020). The Mortgage Bankers Association (MBA) warned that “IMBs will face potentially severe liquidity challenges due to what could be an unprecedented level of required borrower forbearance” (Broeksmit, 2020b). Members of Congress from both parties sent letters to federal regulators warning that “the strain on these nonbank mortgage servicers will become too much for many institutions to bear” (Warner, 2020); “even those who may already have access to liquidity will likely have to divert resources from other businesses... in order to cover strains in their servicing businesses” (Lane, 2020); and, “we must not allow the pandemic to destabilize critical markets, including our housing market” (U.S. House Committee on Financial Services, 2020). A consortium of financial industry and affordable housing advocates called for government action (Mortgage Bankers Association, 2020a), as did the Conference of State Bank Supervisors. Treasury Secretary Mnuchin convened a Task Force on Nonbank Mortgage Liquidity to consider the issue (U.S. Department of the Treasury, 2020).

Both FHFA and Ginnie Mae took steps to ease the strain on mortgage servicers.³⁰ FHFA limited servicers’ exposure for loans in forbearance in GSE pools to four months of principal and interest advances (FHFA, 2020a). Previously, the four-month limit had applied to some types of GSE pools, but not all. Ginnie Mae set up a facility, the Pass-Through Assistance Program (PTAP), that extended loans to servicers to finance their principal and interest advancing obligations on loans in Ginnie Mae pools (Ginnie Mae, 2020).

The wave of mortgage refinancing also alleviated the pressures associated with financing the servicing advances. When a mortgage is refinanced, there is a lag of a few weeks between when a servicer receives the payoff on the old loan and when it has to transmit these funds to the mortgage investor. Servicers can use these “excess custodial funds” in the interim to pay servicing advances. This funding was so abundant that servicers made only minimal use of Ginnie Mae’s PTAP facility.

Although the servicing advances did not prove, ultimately, to be a fundamental threat to the viability of the nonbank finance companies, Kim, Lee et al. (2022) found that borrowers’ ability to access forbearance during the pandemic was greater if their servicer was larger in size or, in the case of nonbank servicers, had more liquidity. Meanwhile, Cherry et al. (2021) found that borrowers were more likely to receive forbearance during the pandemic if their loans were serviced by a bank than a nonbank. These findings are reminiscent of the result of Aiello (forthcoming) that the pressure of servicing

³⁰ See also Loewenstein (2021) for a review of this episode.

advances caused some servicers to pursue foreclosures when other resolutions would have been better for the borrower and investor. The relationship found in Kim, Lee et al. (2022) and Cherry et al. (2021) could stem from similar pressures, or perhaps servicers with less liquidity were also less likely to invest in their servicing infrastructure.

Pipeline hedging

The liquidity crisis that did threaten to put the mortgage companies out of business during the pandemic came from an unanticipated source: margin calls on the TBA hedges that mortgage originators took out to guard against changes in value in their mortgage originations. Specifically, if interest rates rise between the time when a mortgage borrower locks on a loan and the originator sells it to a securitization trust, the loan will fall in value and the originator's profits will decrease. Originators attempt to hedge this risk by shorting TBA securities, since this position will increase in value if interest rates rise. Originators post cash collateral ("margin") with the broker-dealer that sells them the hedge—typically a percentage of the collateral value. If TBA values rise after the hedge is originated, the originator must post more margin.

As noted earlier, TBA prices were extraordinarily volatile in the second half of March, plunging the week of March 16 and then surging the week of March 23 (Figure 2). Originators who put hedges in place during the week of March 16 faced massive margin calls the next week. One industry source estimated that the originators had to pony up nearly \$5 billion in unanticipated margin (Nasiripour, 2020b). The MBA noted that "broker-dealers' margin calls on mortgage lenders reached staggering and unprecedented levels by the end of the past week. For a significant number of lenders, many of which are well-capitalized, these margin calls are eroding their working capital and threatening their ability to continue to operate" and called upon the Financial Industry Regulatory Authority and the Securities and Exchange Commission to issue guidance to the broker-dealers to stop enforcing their margin calls (Broeksmit, 2020a).

These margin calls were primarily a short-term liquidity issue for the mortgage companies. Although the value of their hedges fell sharply, the loans in their pipelines rose in value. The issue was timing: their hedges were marked-to-market daily, whereas the profits on their loan originations were not realized until the loans were sold. This issue eased once the price gyrations in the TBA market stabilized. In the interim, though, the broker-dealers had the power—if they chose to exercise their margin calls ruthlessly—to put some mortgage originators out of business. Presumably the broker-dealers did not

do so because, as noted earlier, they were in a relatively strong capital position themselves and they valued their ongoing business relationship with the companies. In addition, many of the broker-dealers also extended warehouse lines of credit to the same mortgage companies, and so could observe that their loan collateral on those lines had increased sharply in value even as the hedges were performing poorly.

MBS Investors

In the run-up to the GFC, two key types of MBS investors financed themselves with short-term credit: ABCP conduits and mortgage REITs (mREITs). The rapid disappearance of that short-term credit was part of the reason why these investors failed in large numbers during the GFC. The failure of these investors and the fire sales of their MBS holdings amplified the price declines in the MBS market and contributed to the collapse in PLS issuance from nearly \$1.1 trillion in 2006 to \$3.5 billion in 2008.³¹

Turning first to ABCP, amounts outstanding surged from around \$650 billion in 2004 to a peak of \$1.2 trillion in August 2007 before plunging rapidly to around \$800 billion at year-end 2007 and around \$425 billion in August 2009.³² ABCP conduits structured as structured investment vehicles (SIV) were particularly likely to fund MBS; in 2007, \$370 billion of SIVs were outstanding, and 23 percent of their collateral was RMBS and 11 percent was collateralized debt obligations (CDOs) that included exposure to RMBS (Moody's Investor Service, 2007). As ABCP investors fled the market because of concerns about the underlying credit quality, the ABCP conduits stopped their purchases and wound down their holdings, in some cases disposing of the MBS at fire-sale prices (Sakoui and Davies, 2008).

Turning next to mREITs, their total financial assets increased from around \$100 billion at year-end 2003 to \$300 billion in mid-2007 before dropping to \$150 billion by early 2009.³³ The number of mREITs rose from 20 in 2003 to 38 in 2006 before falling back to 20 in 2008.³⁴ Mortgage REITs typically finance their MBS portfolios with repurchase agreements.³⁵ In 2008, as prices fell on the MBS collateral, mREITs faced margin calls on their financing that they were unable to meet (Barr, 2008).

³¹ MBS statistics from U.S. Mortgage Backed Securities Statistics, Securities Industry and Financial Markets Association (SIFMA), <https://www.sifma.org/resources/research/us-mortgage-backed-securities-statistics/>.

³² Federal Reserve Board, Commercial Paper Rates and Outstanding Summary, <https://www.federalreserve.gov/releases/cp/>.

³³ Financial Accounts of the United States, Table L.129.m.

³⁴ Number of REITs from NAREIT (2021). REIT assets from Financial Accounts of the United States, Table L.129.m.

³⁵ See also Frame and Steiner (forthcoming) and Frame, McCartney, and Steiner (2021) for more background on mREITs.

In 2020, the SIVs and ABCP conduits more broadly were not a factor. Financial Accounting Standards 166/167 required banking organizations to bring these entities on balance sheet, which increased the amount of capital needed to sponsor SIVs. In addition, banks and market participants had little appetite for these structures after the GFC highlighted their risks and instability.

In contrast, by the end of 2019, mREITs had long since recovered from the GFC and had total financial assets of \$681 billion. When MBS prices were volatile in March 2020, the mREITs had to shed assets rapidly to meet the margin calls on the repurchase agreements (Armstrong, 2020). In the first quarter of 2020, mREIT holdings of agency securities fell by a third, from \$335 billion to \$211 billion, and mREIT holdings of non-agency MBS also fell by a third, from \$41 billion to \$25 billion. Total mREIT financial assets at the end of the first quarter were \$523 billion.³⁶

Although mREITs held a fairly small share—about 5 percent—of outstanding agency securities at the end of 2019, their rapid deleveraging contributed considerably to the instability in the TBA market in March 2020.³⁷ They sold so many agency securities in part because of margin calls on these securities and in part because these MBS were easier to unload in a crisis than their other assets. The episode highlighted that the roll-over risk and other concerns raised by the Financial Stability Oversight Council in 2013 about REITs remained relevant (Financial Stability Oversight Council, 2013).

The mREITs that ultimately failed to make their margin calls, despite the heavy assets sales, were those that specialized in non-agency RMBS, CMBS, and whole loans (often known as “non-agency” or “hybrid” mREITs). In March 2020, MFA Financial (sixth in mREIT market capitalization as of February 2020), Invesco Mortgage Capital (seventh), New York Mortgage Trust (tenth), and AG Mortgage Investment Trust (sixteenth) failed to make margin calls, while other REITs suspended dividend payments to investors (Scaggs, 2020; MFA Financial, 2020). The poor performance of these mREITs, in contrast to the better performance of “agency” mREITs that specialized in GSE or Ginnie-Mae guaranteed securities, likely stemmed from the slower recovery of the part of the market that was not government guaranteed.

³⁶ Financial Accounts of the United States, Table L.129.m. Non-agency MBS are in the “corporate and foreign bond” category. New Residential Investment Corp (2020) and Two Harbors Investment Corp. (2020) describe two mREIT sales of non-agency MBS in March 2020.

³⁷ Statistic from Financial Accounts of the United States, Tables L.129.m. and Urban Institute (2020). Metrick and Tarullo (2021) and Timiraos (2022) also highlight the role that mREITs played in this episode.

The March 2020 episode also provided a case study of how quickly short-term financing arrangements can unravel and exacerbate fire-sale pressures on collateral values. At the beginning of March 2020, AG Mortgage Investment Trust (MITT) was perceived by the market as being in good financial shape, at least as measured by its February 28, 2020 stock price of \$44.91. On the evening of Friday, March 20, MITT notified its counterparties that “it doesn’t expect to be in a position to fund the anticipated volume of future margin calls” (AG Mortgage Investment Trust, 2020a). Subsequently, as narrated in a legal complaint that MITT filed against Royal Bank of Canada (RBC), on Monday, March 23, MITT did not meet a margin call from RBC on a repo position collateralized by agency and non-agency MBS and CMBS.³⁸ On Tuesday, March 24, RBC notified MITT of its intent to sell the collateral, and on March 25, 11 am, RBC liquidated its holdings. By the beginning of April, MITT’s stock price hit around \$5 and it entered into a forbearance agreement with most of its remaining lenders on April 13 (AG Mortgage Investment Trust, 2020b).

Takeaways

Liquidity pressures re-emerged in the mortgage market in March 2020. Originators and mortgage REITs both faced large and potentially destabilizing margin calls that led to some fire-sale dynamics in the MBS market. Mortgage companies also experienced sudden changes in the collateral that warehouse lenders were willing to fund, and those changes affected borrower access to mortgage credit as well as mortgage company profitability. The pandemic also highlighted the mismatch between the large liquidity obligations associated with mortgage servicing, on the one hand, and the lack of meaningful liquidity regulation or sources of liquidity available to these servicers, on the other.

On the whole, though, most mortgage-market participants emerged from this episode intact. Most borrowers maintained access to credit, foreclosures were limited, and mortgage companies were profitable. This strong performance, relative to the GFC, stems from reforms to the system since the GFC, the large government presence in the mortgage market, and robust house prices.

Turning first to reforms to the system, mortgage underwriting was stronger in the years before March 2020 than it was before the pandemic and so borrowers were in a better position to repay their loans. Reforms to the banking system meant that the banks that extended credit to mortgage companies and MBS investors were better capitalized than during the GFC and so were able to be a source of strength

³⁸ Complaint, *AG MIT CMO, LLC v. RBC (Barbados) Trading Corp.*, No. 1:20-cv-02547, 2020 WL 1486675 (S.D.N.Y. 2020). See also Hoffman and Zuckerman (2020) for more information on RBC’s asset sales in March 2020.

for other parts of the financial system. Meanwhile, the conduits that financed MBS investments with asset-backed commercial paper were largely gone.

Turning next to the government footprint, because the government had such a large market share, it was able to mandate forbearance, foreclosure moratoria, and streamlined mortgage modifications that gave borrowers some breathing room. Meanwhile, banks were willing to continue extending short-term credit to mortgage companies because the companies had guaranteed long-term takeout funding from the government securitization channels. And when MBS investors reliant on short-term funding, including mREITs, began fire sales of their holdings, thereby threatening to destabilize the government securitization channels and borrower access to mortgage credit, the Federal Reserve was able to quickly purchase more than \$1 trillion of agency MBS under its existing authorities because the MBS was government-guaranteed.

Turning last to house prices, house prices were extraordinarily strong throughout the pandemic. The combination of strong house prices and low interest rates led to a massive refinancing wave that buoyed the profitability and cash holdings of mortgage companies. The profitability encouraged the banks to continue lending to the nonbank mortgage companies, and the cash enabled servicers to handle the servicing liquidity strains associated with borrowers in forbearance.

However, the strong house prices were to some extent an endogenous response to the successful handling of the liquidity issues. Borrower liquidity issues could have led to foreclosures, and mortgage company and MBS investor liquidity issues could have led to volatility in the mortgage market if the liquidity issues resulted in mortgage and MBS fire sales. Both a glut of foreclosed homes on the market, and reduced access to credit stemming from market volatility, could have weighed on house prices.

The performance of the private-label residential mortgage market during the pandemic provides a glimpse of what the mortgage market might have looked like in the absence of government support. Credit availability dried up, lenders in this market cut back significantly on their originations and laid off staff, warehouse lenders rationed credit, and investors withdrew from the market. The consequences for the economy were limited, however, because private-label securitization was less than 5 percent of MBS issuance in 2019, compared with more than 55 percent in 2006 (Urban Institute, 2020).

In the academic literature, researchers are starting to document the structure and fragilities of the nonbank mortgage sector (Jiang, 2021; Jiang et al., 2020; Kim et al., 2018; Kim, Pence et al., 2022). However, much work remains to be done. For example, there is no existing framework that establishes

how much liquidity mortgage companies and REITs should hold. More research is also needed on how the system might adapt so that it can deliver mortgage credit to borrowers in a crisis in a stable manner with less reliance on government support.

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Figure 1. Stylized Schematic of Shadow Mortgage Banking System.

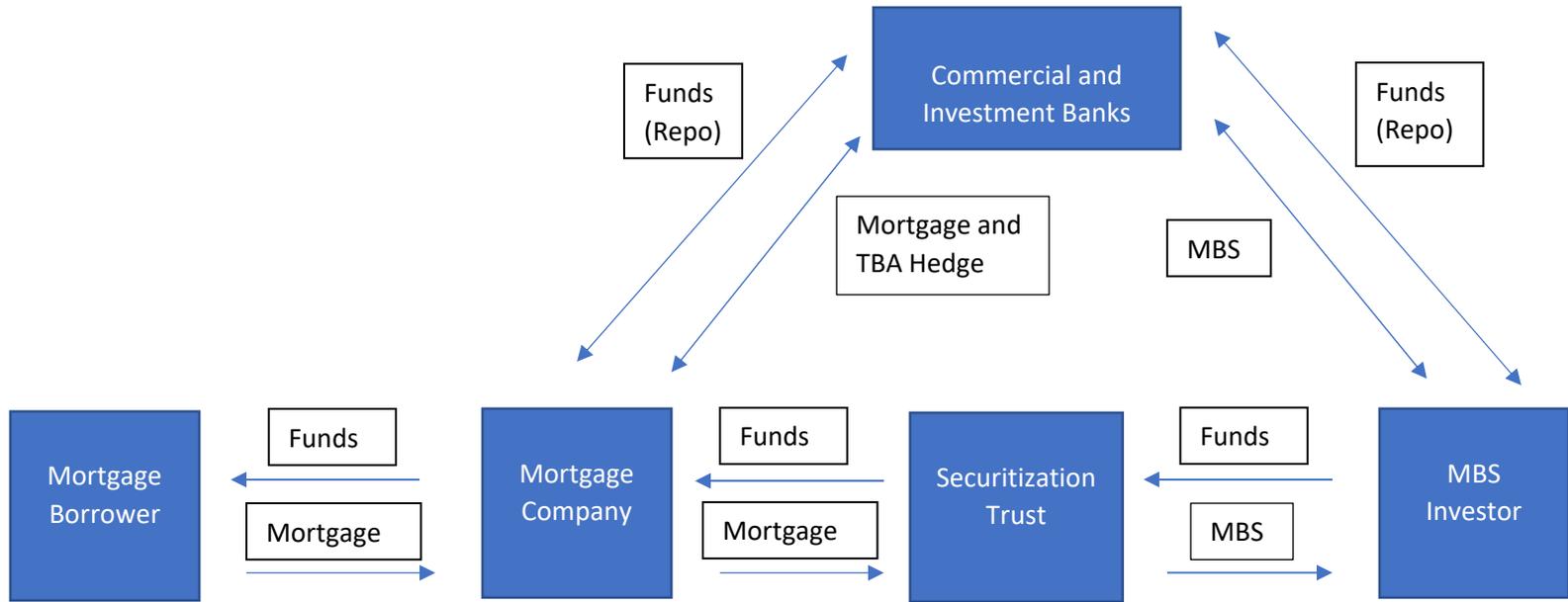
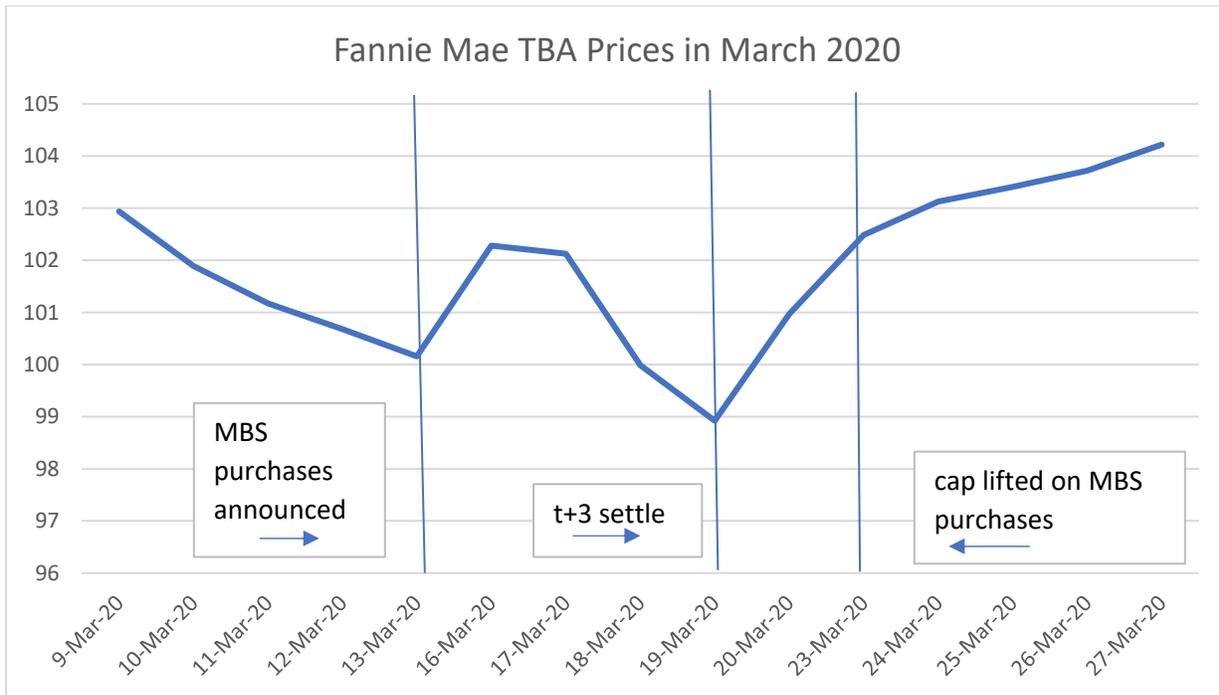


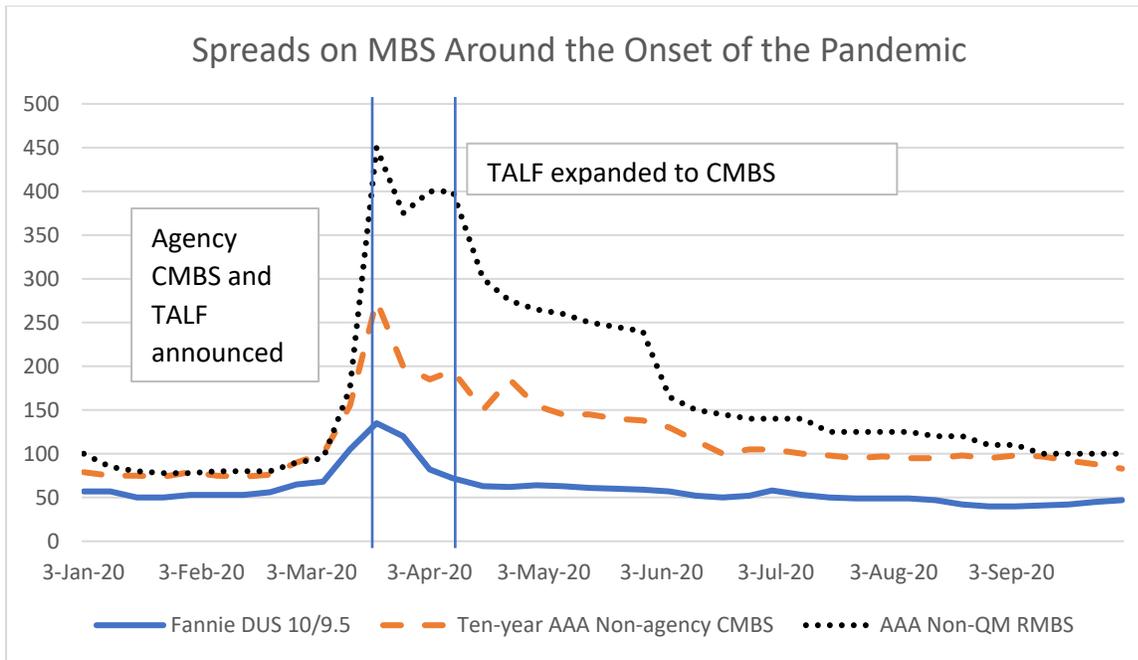
Figure 2. TBA Prices and Federal Reserve Actions in March 2020.



Source. Courtesy JPMorgan Chase & Co., Copyright 2021.

Note. The figure shows the price of a uniform mortgage-backed security issued by Fannie Mae trading in the To-Be-Announced (TBA) market and bearing a coupon of 3 percent. The first vertical line denotes the day that the Federal Reserve announced that it would begin purchasing MBS. The second vertical line denotes the day that the Federal Reserve announced that it would start purchasing MBS to settle in three days rather than on the standard (slower) schedule. The third line denotes the day that the Federal Reserve announced that it had lifted the cap on its MBS purchases.

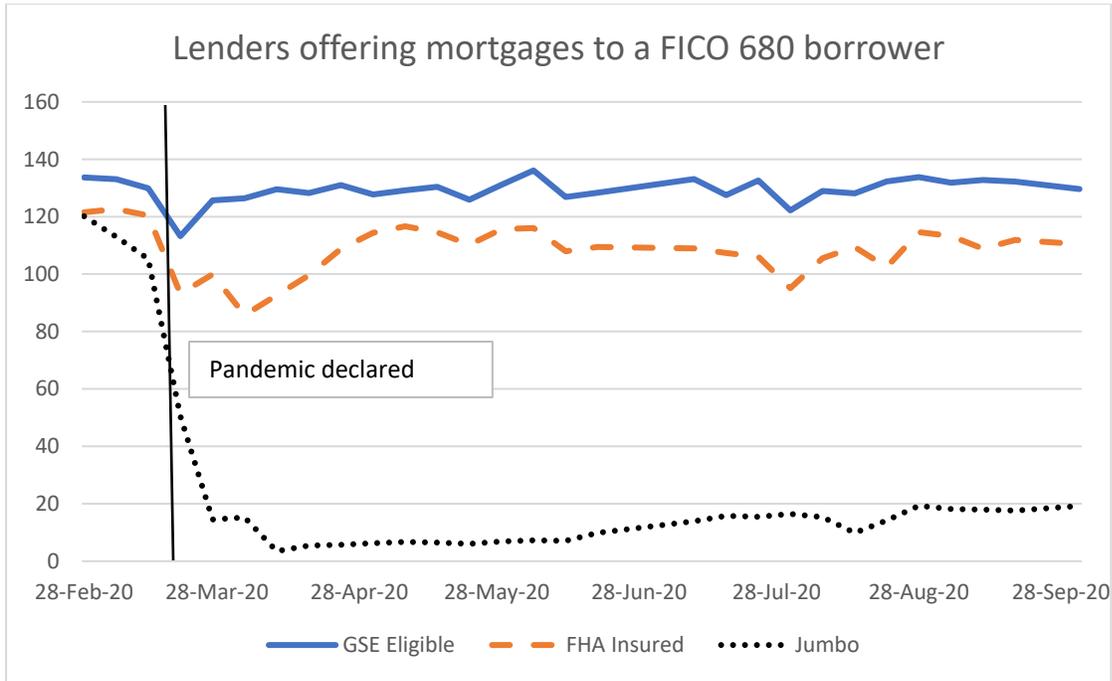
Figure 3. MBS Spreads and Federal Reserve Actions in 2020.



Source. Fannie DUS and ten-year AAA non-agency commercial-backed security (CMBS), courtesy JPMorgan Chase & Co, Copyright 2021; AAA non-qualified mortgage (QM) residential mortgage-backed security (RMBS), Citigroup, Inc., Citi Velocity.

Note. The figure shows spreads relative to comparable-maturity swaps for selected weeks in 2020 for agency CMBS (Fannie Mae DUS 10/9.5, where DUS stands for “Delegated Underwriting and Servicing,” “10” refers to the number of years in the balloon period, and “9.5” refers to the number of years in which a yield-maintenance charge applies), triple-A rated non-agency CMBS with a weighted average life of ten years, and triple-A rated non-QM RMBS. The first vertical line denotes the date on which the Federal Reserve announced that it would begin purchasing agency CMBS and that it would launch the Term Asset-Backed Securities Loan Facility (TALF). The second vertical line denotes the date on which the Federal Reserve announced that non-agency CMBS would be eligible collateral for loans under TALF.

Figure 4. Credit Availability by Funding Source During the Pandemic.



Source. Optimal Blue LLC, Optimal Blue Mortgage Price Data, as shown in Fuster, Hizmo, Lambie-Hanson, Vickery, and Willen (2021).

Note. The figure shows the number of lenders on the Optimal Blue platform that were willing to offer a GSE-eligible, FHA-insured, or jumbo mortgage to a hypothetical borrower with a credit score of 680 in selected weeks in 2020. The vertical line denotes the date on which the World Health Organization declared Covid-19 as a pandemic.