

Report to the Congress on the Effect of Capital Rules on Mortgage Servicing Assets

Board of Governors of the Federal Reserve System

Federal Deposit Insurance Corporation

Office of the Comptroller of the Currency

National Credit Union Administration



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Preface

Section 634 of the Consolidated Appropriations Act, 2016 (the act), requires the Board of Governors of the Federal Reserve System (Federal Reserve), Office of the Comptroller of the Currency (OCC), and Federal Deposit Insurance Corporation (FDIC) (the federal banking agencies or agencies), and National Credit Union Administration (NCUA) to jointly conduct a study and issue a report on the appropriate capital requirements for mortgage servicing assets (MSAs) for banking institutions and federally insured credit unions.¹

As required by the act, the study includes²

- the risk to banking institutions of holding MSAs;
- the history of the market for MSAs, including in particular the market for those assets in the period of the financial crisis;
- the ability of banking institutions to establish a value for MSAs of the institution through periodic sales or other means;
- regulatory approaches to MSAs and capital requirements that may be used to address concerns about the value of and ability to sell MSAs;

¹ “Banking institutions,” as used in this report, generally refers to insured depository institutions, bank holding companies, and savings and loan holding companies, but does not include federally insured credit unions, unless otherwise noted.

² Consolidated Appropriations Act, 2016, Pub. L. No. 114-113, 129 Stat. 2242 (2015).

- the impact of imposing the Basel III capital requirements and the NCUA capital requirements on banking institutions on the ability of those institutions—
 - to compete in the mortgage servicing business, including the need for economies of scale to compete in that business, and
 - to provide service to consumers to whom the institutions have made mortgage loans;
- an analysis of what the mortgage servicing marketplace would look like if the Basel III capital requirements and the NCUA capital requirements on MSAs—
 - were fully implemented, and
 - applied to both banking institutions and nondepository residential mortgage loan servicers;
- the significance of problems with MSAs, if any, in banking institution failures and problem banking institutions, including specifically identifying failed banking institutions where MSAs contributed to the failure; and
- an analysis of the relevance of the Basel III capital requirements and the NCUA capital requirements on MSAs to the banking systems of other significantly developed countries.

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Executive Summary

This report includes the results of the study conducted by the federal banking agencies and NCUA and incorporates analysis on MSAs that was undertaken by the federal banking agencies before the issuance in 2013 of the federal banking agencies' revised capital rule (revised capital rule) and by NCUA before the issuance in 2015 of the NCUA capital requirements.

While servicing is inherent in all mortgage loans, a mortgage servicing right (MSR) is created only when the act of servicing is contractually separated from the underlying loan. A firm, for example, that originates a mortgage, sells it to a third party, and retains the servicing would report an MSA on its balance sheet, if certain conditions are met.³ That MSA therefore would be subject to a capital requirement. Conversely, a firm would not report an MSA if the firm originates a mortgage, holds the mortgage on its balance sheet, and performs the servicing.

This study examines the evolution of the mortgage servicing market during the past 20 years and concludes that the market has been shaped by a variety of factors. These factors include

- changes in interest rates;
- sharp fluctuations in housing prices, and the corresponding changes in mortgage debt and surge in nonperforming loans;
- shifts in the desirability of securitizing mortgages versus holding them in portfolio; and

- regulatory, tax, and accounting changes related to mortgage servicing.

The report describes this historical evolution of mortgage servicing by examining the effects of these factors on the MSA holdings of banking institutions and federally insured credit unions. Further, the study analyzes historical changes in the ratio of MSAs to capital, and how changes in this ratio have varied across different types of banking institutions and federally insured credit unions.

In evaluating the characteristics of MSAs, the study identifies two key risks to a firm's mortgage servicing activities: business risk and valuation risk. Business risk refers to idiosyncratic risks related to a firm's mortgage servicing activities and can include legal, compliance, and reputational risk. Valuation risk refers to risks inherent in a firm's ability to accurately estimate a value for its MSAs and is driven mainly by interest rate risk but is also affected by default risk. The study also finds that MSA valuations are subject to forecast uncertainty that can be exacerbated under adverse financial conditions and result in liquidity strains.

Determining the fair value of an MSA can be difficult because MSAs do not trade in an active, open market with readily available and observable prices. This valuation difficulty is also in part because MSAs tend not to be homogenous assets, as they differ by loan size, interest rates, servicing fees, maturity, credit quality, and the entity, if any, that provides a credit guarantee on the underlying loan, among other characteristics. Thus, a firm is generally not able to value its MSAs based on sales alone, as those sales are unlikely to be sufficiently comparable to the MSAs being valued. As shown by the report, to estimate the value of MSAs, banking institutions use financial models, which estimate the present value of net

³ An MSR refers to a firm's contractual right to service a mortgage loan. An MSA, however, refers to an MSR in which the benefits of the servicing are more than adequate to compensate a servicer for performing the servicing. Conversely, if the benefits are not expected to adequately compensate a servicer for performing the servicing, the contractual right results in a servicing liability. Accounting Standards Codification (ASC) 860-50-30.

future cash flows associated with servicing activities, and compare and benchmark their estimate with several market-based sources.

Key Conclusions of the Study

- MSA valuations are inherently subjective and subject to uncertainty, as they rely on assessments of future economic variables. This reliance can lead to variance in MSA valuations across firms. Moreover, adverse financial conditions may cause liquidity strains for firms seeking to sell or transfer their MSAs.
- Between 2007 and 2015, Material Loss Reviews (MLRs) identified MSAs as a factor contributing to the failure of four insured depository institutions; there is evidence that other failed institutions experienced some degree of problems with their MSAs.
- Excluding MSAs transferred by the FDIC as receiver pursuant to a whole bank purchase and assumption transaction, since 2007 there were 36 failed banks that held MSAs and the MSAs at 31 of those failed banks had no net value in a sale transaction.
- The federal banking agencies have long limited the inclusion of MSAs and other intangible assets in regulatory capital because of the high level of uncertainty regarding the ability of banking institutions to realize value from these assets, especially under adverse financial conditions.⁴
- MSAs represent a small share of both the aggregate amount of total bank assets and the aggregate amount of common equity tier 1 (CET1) capital.⁵ From 1998 to 2015, the highest levels that MSAs ever reached as a percentage of assets and MSAs as a percentage of CET1 capital were 0.7 percent and 9 percent, respectively.⁶ By the fourth quarter of 2015, these levels were lower, at 0.25 percent as a percentage of assets and 2.8 percent as a percentage of CET1 capital.⁷
- Most banks in the United States—around 83 percent—do not hold any MSAs.⁸
- Nonbank servicers have gained significant market share since 2011. The gain in nonbank market share of servicing appears largely attributable to large-bank sales of crisis-era legacy servicing portfolios and an increase in mortgage origination activity among nonbanks.
- Banking institutions continue to service most residential mortgage loans that they sell to Fannie Mae and Freddie Mac (government-sponsored enterprises, or GSEs).
- The mortgage servicing market remains quite competitive as it is not highly concentrated, as gauged by standard measures of market concentration.
- Although MSAs have become a smaller share of banking sector assets in the aggregate, the number of banks that held MSAs increased during the 1998 to 2015 period.⁹ The increase stems almost entirely from small banks (total assets less than \$10 billion), which, for example, held less than 2 percent of total MSAs in 2009 as compared to 8 percent in 2015. Most banks with MSAs have small holdings and would not exceed the threshold that would trigger a capital deduction under the revised capital rule.
- Assuming fully phased-in implementation of the revised capital rule, the vast majority of banking institutions would be able to satisfy minimum risk-based capital requirements without any change to their mortgage servicing activities or portfolios.
- A pullback of aggregator banking institutions (i.e., banking institutions that purchase mortgage loans and servicing rights from other firms) from the MSA market could have effects on MSA pricing and liquidity; conversely, the effects of stronger bank capital requirements and mortgage reforms may make the residential mortgage market and its bank lenders more resilient and a recurrence of crisis-era problems less likely.
- The capital requirements that apply to banking institutions would not necessarily be appropriate for nonbank servicers. If the capital requirements applicable to banking institutions were hypothetically applied to nonbanks, the impact on the nonbank servicing institutions would vary according to

⁴ Since NCUA adopted a system of Prompt Corrective Action in 2000, for NCUA-supervised credit unions, no MSAs have been deducted from capital measures but instead have been assigned a risk weight.

⁵ “Banks,” as used in this report, generally refers to all insured depository institutions, excluding saving associations.

⁶ Since NCUA began collecting MSA data in 2004, the highest level of MSAs to assets and MSAs to net worth were 0.2 percent and 1.96 percent, respectively.

⁷ As of December 31, 2015, federally insured credit unions held MSAs equivalent to 0.19 percent of assets and to 1.77 percent of net worth.

⁸ Ninety-two percent of federally insured credit unions do not hold MSAs.

⁹ The number of federally insured credit unions that held MSAs increased from 240 in 2004 to 509 in 2015.

their business model. Real estate investment trust (REIT)-type servicers, which represent a small share of the nonbank servicing market, would be minimally affected because they hold significant portfolios of assets other than MSAs. Nonbank mortgage servicers with significant holdings of MSAs relative to their capital and with limited or no business diversification would likely not be able to satisfy minimum capital requirements on a stand-alone basis unless they took remedial actions (e.g., changed their business models, increased their capital ratios).

The past several years have demonstrated that the mortgage servicing market continues to evolve. While the federal banking agencies and NCUA do not recommend any additional statutory or regulatory actions at this time, the federal banking agencies and NCUA will continue to monitor developments in mortgage servicing industry standards and practices, and will exercise their regulatory and supervisory authorities, as appropriate, to pursue their respective statutory mandates, including ensuring the safety and soundness of depository institutions and the stability of the U.S. financial system.

Background

A mortgage servicer provides the ongoing management and upkeep of a mortgage loan. The servicer's tasks include collecting principal and interest payments from the borrower and sending these amounts to the investors, collecting and distributing escrow payments for insurance and property taxes, advancing payment to investors on behalf of delinquent borrowers, working with borrowers to modify mortgage terms, and, in the case of borrower default, pursuing liquidation options, including foreclosure or short sale.

Servicing is performed by banking institutions, credit unions, and nonbanks. Nonbanks refer to financial institutions that do not have a depository institution within their overall operating structure.

While servicing is inherent in all mortgage loans, an MSR is created only when the act of servicing is contractually separated from the underlying loan. An MSA therefore is created when a firm retains the right to service a loan that it sells to a third-party, such as an issuer of mortgage-backed securities (MBS), and certain other conditions are met.¹⁰ From that point forward, the MSA is considered a separate asset from the underlying mortgage loan, and the servicing rights can be retained by the loan originator or transferred to another firm (subject to the consent of the owner of the underlying mortgages).¹¹ An MSA is not created when a firm services a loan that the firm originates and holds for long-term investment.

There are several reasons why a firm may choose to sell a mortgage loan while retaining the servicing rights. The primary reasons to sell a mortgage loan include generating capital that the firm can use to make additional investments, including new mortgage loans, and managing interest rate risk. By retaining the servicing rights, the firm maintains its relationship with the borrower, thereby allowing the firm to

cross-sell products to the borrower and to earn a servicing fee.

A servicer's primary source of revenue for this activity is the servicing fee. The servicing fee is generally a fixed percentage of the unpaid principal balance (UPB) of the underlying mortgage loan. The servicer may also receive ancillary fees (e.g., late fees and loan modification fees) and interest (or "float") earned on principal and interest and taxes and insurance collected and held by the servicer before distribution. The servicing fees, ancillary fees, and float typically exceed the cost of servicing the loans, resulting in a profit for the servicer.

Servicers may incur a variety of expenses in the process of servicing loans. These expenses include the basic costs to operate a business, including employee salaries and benefits, premises costs, and technology costs. Nonperforming loans contribute significantly to a servicer's costs and can reduce profitability. For a mortgage that is delinquent or has defaulted, a servicer will need to employ additional staff to perform collection activities, loss mitigation activities, or to manage the foreclosure process. A servicer also may be required to advance payments to the investors, insurers, and taxing authorities, and may be required to pay third-party fees related to foreclosure proceedings. In addition, a servicer will incur costs related to unreimbursed foreclosure costs and real-estate owned losses.¹²

The majority of mortgage loans originated in the United States ultimately are sold in the secondary market and packaged into securities guaranteed by the GSEs or by Ginnie Mae.¹³ The GSEs may also hold in their portfolios the loans that they have pur-

¹⁰ Conversely, a firm could retain the loans it originates and sell the servicing rights, but this practice is not common.

¹¹ ASC 860-50-25-1.

¹² Laurie Goodman, "Servicing Is an Underappreciated Constraint on Credit Access," Urban Institute, December 2014, 2, www.urban.org/sites/default/files/alfresco/publication-pdfs/2000049-Servicing-Is-an-Underappreciated-Constraint-on-Credit-Access.pdf.

¹³ Laurie Goodman et al., "Housing Finance at a Glance: A Monthly Chartbook, April 2016," Urban Institute, 6, www.urban.org

chased. The remaining loans are either held for investment by the originating firm or sold to the secondary market and packaged into private-label MBS. The GSEs and Ginnie Mae do not service mortgages directly. This fact creates a need for a robust third-party servicing industry.

[.urban.org/research/publication/housing-finance-glance-monthly-chartbook-april-2016/view/full_report](http://www.urban.org/research/publication/housing-finance-glance-monthly-chartbook-april-2016/view/full_report).

Various federal and state rules and regulations address regulatory capital requirements for firms holding MSAs and mortgage servicing standards generally. In addition, the GSEs and Ginnie Mae require servicers to comply with guidelines to service loans guaranteed by these entities, while separate contractual provisions govern the servicing of loans in private-label MBS or for other firms.

Risks to Firms Holding Mortgage Servicing Assets

MSAs pose two key risks to a firm: valuation risk and business risk. Valuation risk refers to risks inherent in a firm's ability to estimate accurately a value for its MSAs and is driven mainly by interest rate risk and default risk.¹⁴ MSA valuations are inherently subjective and subject to uncertainty, as they rely on assessments of future economic variables. This reliance can lead to variance in MSA valuations across firms. Moreover, adverse financial conditions may cause liquidity strains for firms seeking to sell or transfer their MSAs. Business risk refers to idiosyncratic risks related to a firm's actual mortgage servicing activities and can include legal, compliance, and reputational risk.

Valuation Risks

The fair value of an MSA is defined as the price that would be received to sell the MSA in an orderly transaction between market participants as of the measurement date.¹⁵ MSAs, however, do not trade in an active, open market with readily available and observable prices. Because the significant inputs and assumptions used to determine fair value are unobservable, the MSA fair values are Level 3 under U.S. generally accepted accounting principles (GAAP).¹⁶ The valuation difficulty is in part because a firm's MSA portfolio tends not to consist of homogenous assets, as each portfolio is typically associated with mortgages that differ by loan size, interest rates, ser-

vicing fees, maturity, credit quality, and the entity, if any, that provides a credit guarantee on the underlying loan, among other characteristics. Accordingly, a firm generally will not be able to value its MSAs based on comparable sales alone.

To compensate, a firm may use financial modelling to determine the fair value of its MSAs. To do so, a firm will estimate the present value of net future servicing cash flows and compare and benchmark its estimate with several market-based sources.¹⁷ The primary determinant of future cash flows is the prepayment rate on the associated mortgage loans, which is driven largely by expectations about the interest rate environment. Another key assumption is default risk, which is the risk that a borrower will default on the mortgage loan. Default risk is influenced by geographic and macroeconomic conditions, and by the credit quality of the underlying loans.

The valuation of MSAs is best performed at the loan level of the mortgages that underlie the MSA portfolio. This approach allows the risk characteristics of each loan to be captured in the MSA valuation. To reduce processing time, servicers may aggregate loan level data into groups with similar risk characteristics (e.g., by interest rate and geography). However, servicer decisions about how to aggregate are subjective, and higher levels of aggregation can lead to the loss of important risk characteristics and, consequently, reduced valuation precision.

Most importantly, because MSA valuations must rely on assessments of future economic variables, they are inherently subjective and subject to uncertainty. This reliance can lead to variance in MSA valuations across firms and could result in valuation or impairment charges as assumptions change.¹⁸ For example, some nonbank servicers recorded significant write

¹⁴ This study does not separate the total mortgage servicing market into GSE and non-GSE MSAs. Available data generally do not distinguish between GSE and non-GSE MSAs. We note, however, that non-GSE MSAs are structurally different than GSE MSAs, and are more susceptible to credit risk. Credit risk factors that do not exist in GSE servicing can affect non-GSE MSAs' ancillary income, cost structure, and hence valuations. Because non-GSE MSAs can rapidly transition to problem loan servicing, non-GSE MSAs cost structure can rapidly increase, limiting the number of investors interested in such assets, and thus requiring higher rates of return. As a result, non-GSE MSA valuation changes are not linear across the spectrum of valuation assumptions.

¹⁵ ASC 820, Fair Value Measurement.

¹⁶ See ASC 820-10-35.

¹⁷ Sources include trust interest-only securities, broker appraisals, bulk sales of MSAs, and peer group surveys.

¹⁸ Federal Housing Finance Agency, *Alternative Mortgage Servicing Compensation Discussion Paper* (Washington, DC: 2011), 9, www.fhfa.gov/PolicyProgramsResearch/Research/

downs related to the valuation of their MSAs in the first quarter of 2016, raising concerns about the valuation methods used by these firms.¹⁹ Consequently, MSA values may be difficult to realize or may not be realizable at all.

Generally, larger firms with more resources will build and maintain proprietary MSA valuation models, use complex modelling techniques, and actively hedge their MSAs. In contrast, smaller firms rely more heavily on third-party vendors for valuation services, are more likely to use less complex models, and do not actively hedge their MSAs.

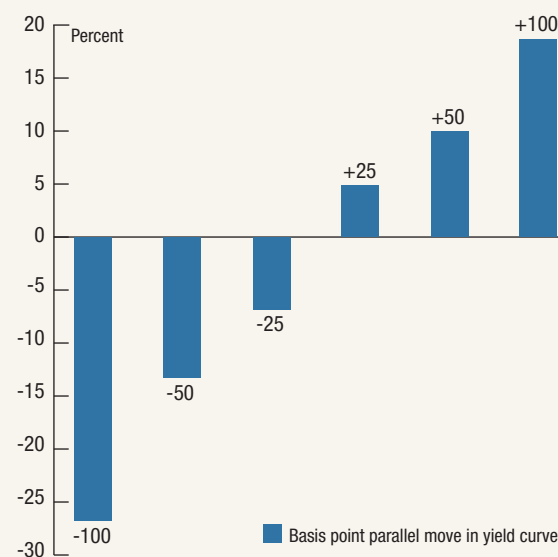
Prepayment Risk

Prepayment rates on mortgage loans are driven largely by interest rate changes. Declining interest rates incentivize borrowers to refinance their mortgages, the act of which extinguishes the servicer's income stream associated with those loans. If interest rates decline more than expected, MSAs are likely to lose value because the loans associated with those MSAs are more likely to be paid off sooner. Conversely, in an increasing interest rate environment, borrowers are less likely to prepay their mortgages, thus extending the duration of the loan and in turn the servicer's income stream. In such an environment, MSA values are likely to rise.

Historically, the relationship between MSA values and interest rate changes is not uniform but rather exhibits negative convexity. That is, MSA values decrease at a faster rate in a declining interest rate environment but do not rise as quickly in an increasing interest rate environment. The impact of interest rate changes on MSA values therefore depends on both the direction and severity of interest rate movements.

An analysis of estimates from a sample of large bank holding companies (BHCs) of how their MSA valuations would change under a variety of stress scenarios demonstrates that MSA valuations are sensitive to changes in interest rates, and that they are relatively more sensitive to interest rate declines than to interest rate increases.²⁰ These estimates are based

Figure 1. Average percent change in BHC forecasts of their MSA valuations in interest-rate stress scenarios



Note: The labels on the bars represent the size of the change in the yield curve in each of the stress scenarios.

Source: Staff calculations from FR Y-14 data.

on each BHC's servicing portfolio as of year-end 2015 and on each BHC's valuation model, which in some cases is its own proprietary model and in other cases is a vendor model. As figure 1 shows, on average, these BHCs forecast that a 100 basis point increase in the yield curve would increase their MSA values by almost 19 percent, while a 100 basis point decrease would reduce their MSA values by almost 27 percent.

The sample of large BHCs also indicates that MSA valuations are, on average, responsive to changes in forecasts of how fast borrowers will prepay their mortgages, also known as the conditional prepayment rate (CPR). As shown in figure 2, the BHCs forecast that their MSA values would decrease, on average, as the CPR increases. Specifically, a 1,000 basis point increase in the CPR is forecasted to decrease MSA valuations by about 29 percent.

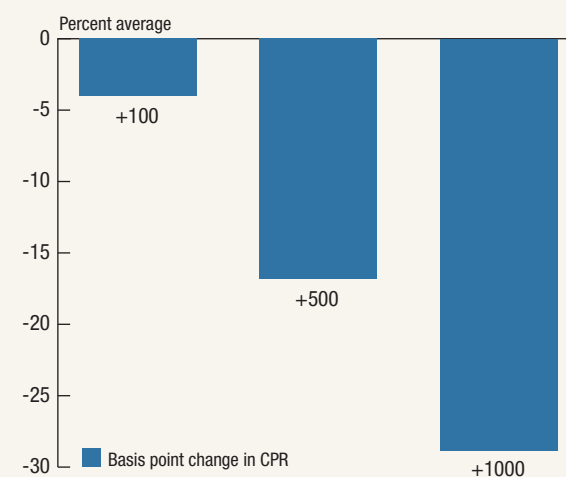
[PaperDocuments/20110927_DP_AltMortgageServicing_508.pdf](#).

¹⁹ Kroll Bond Rating Agency, "Non-Bank Mortgage Companies Suffer from MSR 'Fair Value' Volatility," May 16, 2016.

²⁰ To verify that these results are not unduly influenced by the estimates of any given bank, table A.1 in the appendix shows the average percent change in MSA valuation weighted by the

unpaid balance of loans serviced and the median percent change in these scenarios. These robustness checks are consistent with the main results in the text of the report. Table A.1 also shows the changes in MSA valuations in response to changes in the foreclosure time frame, servicing costs, the unemployment rate, and housing prices. Various shocks to these variables would change MSA values by less than 4 percent.

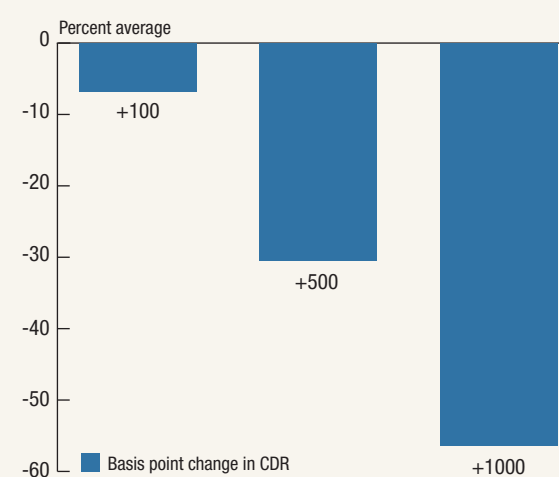
Figure 2. Average percent change in BHC forecasts of their MSA valuations in CPR stress scenarios



Note: The labels on the bars represent the size of the change in the conditional prepayment rate in each of the stress scenarios.

Source: Staff calculations from FR Y-14 data.

Figure 3. Average percent change in BHC forecasts of their MSA valuations in CDR stress scenarios



Note: The labels on the bars represent the size of the change in the conditional default rate in each of the stress scenarios.

Source: Staff calculations from FR Y-14 data.

Default Risk

Default risk in the context of this report generally refers to the extent to which defaults exceed estimated levels. If defaults exceed estimated levels, MSAs could suffer an unexpected loss in value due to an unexpected loss of servicer fees and higher than expected costs related to servicing nonperforming loans.²¹ Default risk is directly related to the quality of loan underwriting (i.e., poorly underwritten loans exhibit higher rates of default), as well as to macro-economic conditions and local economic conditions. Thus, default risk is most prevalent when the underwriting of the loans associated with the MSAs does not meet expected standards or when there is an adverse financial condition, causing a subsequent deterioration of the credit quality of mortgage loans and more borrowers to become delinquent and to default. Servicer expenses in the event of default can also be affected by the type of entity, if any, providing a credit guarantee on the underlying loan. For example, the BHC data indicate that defaults on loans guaranteed by the Federal Housing Adminis-

tration (FHA) or the Veterans' Administration (VA) are generally more expensive to the servicer than those provided by the GSEs. Strategies to manage default risk include servicing diversified geographic areas and loan types, and having strict underwriting standards.

Analysis of the data from the BHC sample illustrates that these BHCs forecast that an increase in the default rate, also known as the conditional default rate (CDR), is expected, on average, to reduce MSA valuations. As shown in figure 3, a 1,000 basis point increase in the CDR is forecasted to decrease MSA valuations by about 56 percent.

Adverse Financial Conditions and Liquidity Risk

An adverse financial condition poses liquidity risks for MSAs, as well. For instance, during an adverse financial condition a firm could find it difficult to sell its MSAs as there may be fewer buyers interested in purchasing nonperforming loans due to their higher costs to service. In addition, the GSEs and Ginnie Mae have approval rights over the transfer of MSAs associated with securities that these entities guarantee. While this fact could dampen transfers to some degree during normal economic conditions, it becomes particularly important during adverse financial conditions, when the credit quality of potential transferees may also deteriorate, thus further limiting

²¹ When a foreclosure is completed, the servicer generally recoups a portion of its expenses from the foreclosure proceeds. The reimbursement percentage varies by investor. In addition, periods of high mortgage default tend to be periods when house prices decline significantly; although the increase in defaults reduces MSA values, the decline in house prices also tends to slow prepayment as borrowers who are current and would otherwise have refinanced (given lower interest rates) might be unable to refinance because their loan-to-value ratios have become too high. This factor can increase the MSA values.

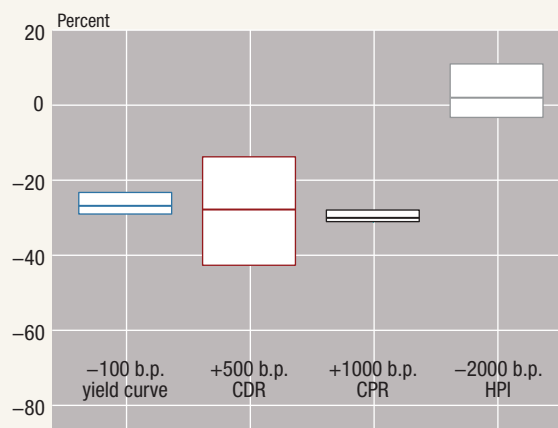
the number of firms that the GSEs and Ginnie Mae would approve to service. Moreover, investors have consent rights to servicing sales and transfers. As a condition to providing the consent, investors have historically required that the buyer of the MSAs assume direct recourse liability for origination and servicing defects, regardless of whether that buyer, as the new servicer, originated the loan or caused the servicing defect. This fact could further erode MSA values, particularly if the firm did not adequately consider the contingent recourse liability when initially valuing its MSAs. Consequently, during an adverse financial condition a servicer's ability to realize value from its MSAs may deteriorate at a time when the need to raise liquidity and capital and reduce risk is most acute.

Forecast Uncertainty

As noted, MSA valuations are heavily assumption-driven, and firms may differ in the models used to estimate valuations and in the assumed values of the variables that are inputs to those models. To illustrate this variation, figure 4 shows a box plot of the sample of BHCs' forecasts of the changes in their MSA valuations in four stress scenarios (a 100 basis point decrease in the yield curve, a 500 basis point increase in the CDR, a 1,000 basis point increase in the CPR, and a 2,000 basis point decrease in the national CoreLogic house price index (HPI)). The upper edge of each box represents the 75th percentile of the distribution of the stress scenario forecasts across firms; the middle line of the box represents the median; and the bottom edge of the box represents the 25th percentile. It is important to note that the variation across firms may represent differences in the characteristics of their servicing books as well as differences in their models and in the inputs to these models. Some firms may have servicing books that are more susceptible to prepayment in the event of an interest rate change, for example, and others may have servicing books weighted more heavily with loans that are costly to service in the event of default, such as those guaranteed by FHA or VA. Some caution therefore is warranted in interpreting these results as evidence of forecast uncertainty.

As shown in figure 4, the median forecast across firms for the change in their MSA valuations in the event of three scenarios—a 100 basis point decrease in the yield curve, a 500 basis point increase in the CDR, and a 1,000 basis point increase in the CPR—is a decrease in the range of 25 to 30 percent. However, the box around the median for the yield

Figure 4. MSA valuation changes from different shocks



Note: The upper edge of each box represents the 75th percentile of the distribution of the changes in the BHC MSA valuations in the particular stress scenario; the middle line represents the median; and the bottom of the box represents the 25th percentile. B.p. = basis point.

Source: Staff calculations from FR Y-14 data.

curve and CPR scenarios is quite narrow, indicating that most of the sample of BHCs' forecasts are fairly similar. In contrast, the box for the CDR scenario is quite wide (that is, the interquartile range is large), and spans nearly 30 percentage points, indicating greater variation across the BHCs' forecasts. Similarly, although the median forecast of the sample of BHCs in the event of a 2,000 basis point decrease in the HPI is for MSA valuations to be about unchanged, the box is quite wide, spanning 14 percentage points. The findings indicate that the BHC forecasts for the changes in their MSA valuations for prepayment scenarios are more in line with each other than their forecasts for default scenarios; it is not clear, however, whether this difference stems primarily from less of a consensus across BHCs as to how to model default or from differences in the characteristics of BHC servicing portfolios.

Hedging

Firms may attempt to hedge prepayment risk either through new originations, often referred to as a "natural hedge," or through an active hedging strategy. Under a natural hedge, a firm will seek to originate new mortgage loans to replenish any servicing rights it lost due to prepayments. A natural hedge, however, has shortcomings. Whereas the change to MSA values due to interest rate shifts is immediate, new loan originations may lag behind interest rate changes, highlighting a timing weakness. In addition, new originations are not assured to keep pace with

prepayments, as competitors may vie for the same business.

A firm may also choose to actively hedge its MSA portfolio against prepayment risk to protect against adverse changes in market values and to minimize earnings volatility. Active hedging strategies vary depending on the sophistication of the servicer but typically include the use of derivative instruments (e.g., mortgage “to-be-announced” securities, swaps, and futures), though no financial instrument acts as a perfect hedge to changes in MSA values. Moreover, an active hedging strategy has its own set of challenges. It requires a specialized skill set, analytical tools, and regulatory and economic capital to use certain hedging instruments,²² the latter of which could become more expensive during a market freeze or when liquidity is not available.²³ An active hedging strategy can be difficult to implement successfully, given that MSAs are not traded in an observable market.²⁴ Moreover, an active hedging strategy is economically viable only within a certain interest rate range, and substantial interest rate movements could result in a net loss for the firm.²⁵

Some firms choose not to hedge their MSAs.²⁶ Not actively hedging MSAs can, however, introduce sig-

nificant volatility to earnings, potentially causing substantial losses.²⁷

Business Risks

Mortgage servicing is governed by regulations and contracts that can pose significant legal and compliance risks. Various federal and state agencies’ rules and regulations address mortgage servicing standards, including consumer protections. In addition, the GSEs and Ginnie Mae require servicers to comply with guidelines to service loans guaranteed by those entities, while separate contractual provisions govern the servicing of loans in private-label MBS. Mistakes or omissions by servicers can lead to lawsuits, fines, and loss of income. Use of subservicers or other contractors can compound this risk.²⁸ In addition, when a servicer does not comply with the standards established by the GSEs or Ginnie Mae, these entities can confiscate the servicing, forcing the servicer to charge off the value of the MSA.

Moreover, negative publicity can lead to reputational harm, which can have adverse effects on other lines of business and on a firm’s MSA portfolio itself. Potential borrowers may be less likely to originate a loan with a firm that has had servicing issues, and in some instances reputational harm may have led some banking institutions to leave or divest from their mortgage servicing activities.²⁹

²² *Alternative Mortgage Servicing*, 10.

²³ Karan Kaul and Laurie Goodman, “Nonbank Servicer Regulation: New Capital and Liquidity Requirements Don’t Offer Enough Loss Protection,” Urban Institute, February 2016, 6, www.urban.org/sites/default/files/alfresco/publication-pdfs/2000633-Nonbank-Servicer-Regulation-New-Capital-and-Liquidity-Requirements-Don't-Offer-Enough-Loss-Protection.pdf.

²⁴ Mortgage Bankers Association and PricewaterhouseCoopers, “The Changing Dynamics of the Mortgage Servicing Landscape,” June 2015, 7, www.mba.org/Documents/Policy/MBA_PWC_Servicing_White_Paper.pdf.

²⁵ Kaul and Goodman, *Nonbank Servicer Regulation*, 4-5.

²⁶ Kroll, *Non-Bank Mortgage Companies Suffer*, 3.

²⁷ *Ibid.*

²⁸ Office of the Comptroller of the Currency, “Third-Party Relationships: Risk Management Guidance,” October 30, 2013, www.occ.gov/news-issuances/bulletins/2013/bulletin-2013-29.html.

²⁹ Pamela Lee, “Nonbank Specialty Servicers: What’s the Big Deal?” Urban Institute, August 4, 2014, 3, www.urban.org/sites/default/files/alfresco/publication-pdfs/413198-Nonbank-Specialty-Servicers-What-s-the-Big-Deal-.PDF.

Role of Mortgage Servicing Assets in Bank Failures

Of the 518 banking institutions that failed between 2007 and year-end 2015, 66 had MSAs on their books at the date of failure.³⁰ In statutorily mandated MLRs of failures of insured depository institutions, problems with MSAs were described as a significant factor leading to the failure of one institution and as contributing to the failures of three others. A broader review of financial data reported by failed banks, and indirect evidence from FDIC receiverships, suggests that problems with MSAs were likely among the issues that other failed institutions were facing.

Financial Data Reported by Failed Insured Depository Institutions

Information about the 20 failed insured depository institutions that had the largest MSA holdings as of the date of their last financial statement is presented in [table 1](#). A number of these institutions reported significant reductions in the values of their MSAs during the quarters (in some cases years) leading up to their failure. As a percentage of peak MSA values recorded after 2004 but before failure, there were subsequent material reductions in the value of MSAs ranging from 33 to 99 percent in 11 of the 20 failed institutions.

A difficulty in evaluating the reasons for these trends is that while banks reported the amount of one- to four-family mortgages serviced for others, comparable and comprehensive data for savings associations are not readily available. Accordingly, [table 1](#) shows this information for the banks and leaves it omitted for the savings associations. Six of the 10 banks materially reduced the volume of mortgages they serviced for others in the period before they failed. Reductions in MSA values for the banks were mostly commensurate with reductions in the volume of serviced mortgages in the years and quarters

before failure, although for a few banks the MSA value reductions were proportionally more than the reductions in the volume of serviced mortgages.

Significant reduction in MSA values, volume of serviced mortgages, or both, during the time period leading to an institution's failure is a strong indicator, although not a conclusive one, that the institution experienced losses on its servicing activities. Some of the failing banks listed in [table 1](#) had relatively high concentrations of MSAs to regulatory capital. Such institutions may have attempted to sell their MSA portfolios to meet a capital or liquidity shortfall. Data on whether such MSA sales occurred or their financial impact on the selling institutions is not readily available. An assessment of the financial impact of any sales of servicing by these institutions would require knowledge of the proceeds they received in comparison to the amount of the MSA value that was extinguished as a result of the sale, as well as the nature of any negotiated concessions or indemnifications that may have been needed to complete sales. Because such negotiated concessions and indemnifications are often agreed to in connection with sales of servicing rights, especially when there are issues or concerns with the underlying mortgages or about the ongoing creditworthiness of the selling institution, it may have been difficult for some of the troubled institutions listed in [table 1](#) to have realized full value in sales of MSAs. The reasons sellers may need to make such concessions are described below, in the section on the FDIC's receivership experience.

Data on the volume of serviced mortgages for savings associations were not readily obtainable,³¹ so it is not possible to isolate the effects of any MSA valuation changes compared to changes in the volume of serviced mortgages. That said, savings associations in [table 1](#) are disproportionately represented among the institutions that reported little or no deterioration in

³⁰ NCUA had no recent failures with material amounts of MSAs at the time of failure.

³¹ The 10 savings associations in [table 1](#) can be identified by the blanks occurring in columns specifying the highest amounts of mortgages serviced for a given quarter.

Table 1. Failed insured depository institutions with 20 largest MSAs

Millions of dollars, except as noted

Name	City	State	Last financial reporting date				Quarter with highest amount of MSA since 2004:Q4					Quarter with highest amount of 1-4 family serviced since 2004:Q4			
			Date	MSA	MSA to tier 1 capital	1-4 Family serviced amount ¹	Qtrs from last report date	Max MSA	MSA to tier 1 capital	Change from last report	Percent change	Qtrs from last report date	1-4 Family serviced amount	Change from last report	Percent change
Washington Mutual Bank	Henderson	NV	2008:Q2	\$6,175	29.1%	\$ 0	8	\$9,162	42.3%	(\$2,987)	-32.6%				
IndyMac Bank, F.S.B.	Pasadena	CA	2008:Q2	\$2,546	263.9%	\$ 0	1	\$2,560	139.3%	(\$ 14)	-0.6%				
AmTrust Bank	Cleveland	OH	2009:Q3	\$ 286	101.2%	\$ 0	0	\$ 286	101.2%	\$ 0	0.0%				
Doral Bank	San Juan	PR	2014:Q4	\$ 90	68.7%	\$6,375	29	\$ 164	29.3%	(\$ 74)	-45.0%	29	\$11,337	(\$ 4,962)	-43.8%
Charter Bank	Santa Fe	NM	2009:Q4	\$ 29	Neg.	\$ 0	2	\$ 44	48.5%	(\$ 15)	-34.6%				
Downey Savings and Loan Association, F.A.	Newport Beach	CA	2008:Q3	\$ 23	2.4%	\$ 0	1	\$ 24	2.5%	(\$ 1)	-3.2%				
TierOne Bank	Lincoln	NE	2010:Q1	\$ 19	25.9%	\$ 0	0	\$ 19	25.9%	\$ 0	0.0%				
Franklin Bank, S.S.B.	Houston	TX	2008:Q3	\$ 16	14.3%	\$1,214	1	\$ 18	5.3%	(\$ 1)	-7.7%	0	\$ 1,214	\$ 0	0.0%
R-G Premier Bank of Puerto Rico	Hato Rey	PR	2010:Q1	\$ 14	6.3%	\$1,043	16	\$ 46	7.7%	(\$ 33)	-70.2%	18	\$ 2,555	(\$ 1,513)	-59.2%
New South Federal Savings Bank	Irondale	AL	2009:Q3	\$ 10	236.8%	\$ 0	1	\$ 10	22.1%	(\$ 0)	-1.4%				
Community South Bank	Parsons	TN	2013:Q2	\$ 9	394.2%	\$ 9	21	\$ 19	44.8%	(\$ 10)	-54.1%	13	\$ 40	(\$ 31)	-77.5%
United Western Bank	Denver	CO	2010:Q4	\$ 6	7.1%	\$ 0	24	\$ 27	23.1%	(\$ 21)	-79.1%				
Irwin Union Bank and Trust Company	Columbus	IN	2009:Q2	\$ 5	3.3%	\$ 859	17	\$ 387	66.9%	(\$ 382)	-98.6%	18	\$28,429	(\$27,570)	-97.0%
United Commercial Bank	San Francisco	CA	2009:Q3	\$ 5	1.9%	\$ 275	12	\$ 14	1.9%	(\$ 8)	-61.7%	3	\$ 439	(\$ 164)	-37.4%
The RiverBank	Wyoming	MN	2011:Q3	\$ 4	126.7%	\$ 595	8	\$ 5	13.3%	(\$ 1)	-11.0%	3	\$ 606	(\$ 11)	-1.9%
Lydian Private Bank	Palm Beach	FL	2011:Q2	\$ 4	14.7%	\$ 0	13	\$ 17	14.1%	(\$ 13)	-75.8%				
Westernbank Puerto Rico	Mayaguez	PR	2010:Q1	\$ 4	0.9%	\$ 297	0	\$ 4	0.9%	\$ 0	0.0%	21	\$ 297	(\$ 0)	0.0%
Home Savings of America	Little Falls	MN	2011:Q4	\$ 3	Neg.	\$ 0	0	\$ 3	Neg.	\$ 0	0.0%				
Republic Federal Bank, National Association	Miami	FL	2009:Q3	\$ 2	44.2%	\$ 148	9	\$ 6	13.7%	(\$ 4)	-65.5%	10	\$ 427	(\$ 279)	-65.4%
Citizens First National Bank	Princeton	IL	2012:Q3	\$ 2	10.9%	\$ 372	5	\$ 3	5.0%	(\$ 1)	-42.1%	3	\$ 404	(\$ 31)	-7.8%

Note: Ranking includes only institutions that failed after 2007.

¹ The failed savings associations in the ranking report zero for 1-4 Family serviced amount for the table above since Thrift Financial Reports exclude this line item.

their MSAs prior to failure. It may be that the comparative lack of downward movement of savings associations' MSAs reflected that these institutions were less likely to reduce the amount of mortgages they serviced. With the benefit of hindsight, it is also possible that some of their MSA valuations were overestimated. Indirect evidence for this possibility comes from the FDIC's experience as receiver of failed banks, which has generally been that MSAs of failing institutions either have no value or can only be sold at substantial discounts from book values. This experience and the reasons for it are described in more detail below.

Material Loss Review Reports

In accordance with section 38(k) of the Federal Deposit Insurance Act (FDI Act), when the Deposit

Insurance Fund incurs a material loss with respect to an insured depository institution, the inspector general of the appropriate federal banking agency shall make a written report to that agency reviewing the agency's supervision of the institution (including the agency's implementation of prompt corrective action provisions of section 38), which shall ascertain why the institution's problems resulted in a material loss to the Deposit Insurance Fund and make recommendations for preventing any such loss in the future.³² Under the FDI Act, a loss was material if it exceeded the greater of \$25 million or 2 percent of an institution's total assets at the time the FDIC was appointed receiver.³³

³² 12 USC 1831o(k)(1)(A) (2009).³³ 12 USC 1831o(k)(2)(B) (2009).

The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) amended section 38(k) of the FDI Act by increasing the MLR threshold from \$25 million to \$200 million for losses that occur for the period January 1, 2010, through December 31, 2011, to \$150 million from January 1, 2012, through December 31, 2013, and to \$50 million for losses on or after January 1, 2014.³⁴

A review of the MLRs found several instances in which a bank's mortgage servicing activities were a contributing factor in the bank's failure:

- The bank failed, in part, because of its aggressive growth strategy in MSAs and insufficient capital relative to the risk level of its servicing portfolio, as well as inadequate controls to develop and execute MSA hedging strategies. The deterioration of the bank's servicing portfolio resulted in significant losses, which diminished earnings and capital and, ultimately, led to the bank's failure.³⁵
- The bank's servicing activities contributed to volatility in earnings and capital levels. The bank ultimately recorded an impairment charge related to its MSAs, as the asset's fair value was lower than its amortized cost.³⁶
- The bank did not follow supervisory recommendations to implement controls for its servicing activities, including developing an understanding of the MSA market and MSA hedging. The bank ultimately incurred net losses in its servicing activities and subsequently sold its MSAs to reduce future earnings volatility.³⁷
- The bank did not hedge effectively the market risk associated with its MSAs, which decreased the bank's net income. The bank ultimately sold its MSA portfolio, resulting in net losses.³⁸

³⁴ Pub. L. No. 111-203, 124 Stat. 1376 (2010); 12 USC 1831o(k)(2)(B).

³⁵ U.S. Department of the Treasury, *Failed Bank Review of American National Bank*, OIG-11-016 (Washington, DC: 2010), [www.treasury.gov/about/organizational-structure/ig/Documents/OIG11016%20\(Failed%20Bank%20LR%20-%20American%20National%20Bank\).pdf](http://www.treasury.gov/about/organizational-structure/ig/Documents/OIG11016%20(Failed%20Bank%20LR%20-%20American%20National%20Bank).pdf).

³⁶ U.S. Department of the Treasury, *Material Loss Review of Charter Bank*, OIG-11-072 (Washington, DC: 2011) [www.treasury.gov/about/organizational-structure/ig/Documents/OIG11072\(Charter%20MLR\).pdf](http://www.treasury.gov/about/organizational-structure/ig/Documents/OIG11072(Charter%20MLR).pdf).

³⁷ U.S. Department of the Treasury, *Material Loss Review of Downey Savings and Loan, FA*, OIG-09-039 (Washington, DC, 2009), www.treasury.gov/about/organizational-structure/ig/Documents/OIG09039.pdf.

³⁸ Board of Governors of the Federal Reserve System, *Material Loss Review of Irwin Union Bank and Trust* (Washington, DC:

FDIC's Experience with MSAs in Its Capacity as the Receiver of Failed Banks

The FDIC's process of disposing of MSAs from failed or failing institutions can be complicated by various factors that erode the value of MSAs. Specifically, a buyer's uncertainties about exposure to contingent recourse liability for a selling bank's origination and servicing defects can materially impair the marketability of MSAs, making it difficult for a receiver to sell MSAs at a price that is consistent with its book value.

As noted, investors (i.e., the owners of the mortgage loans) have consent rights to servicing sales and transfers. As a condition to providing the consent, investors have historically required that the buyer of the MSAs assume direct recourse liability for origination and servicing defects, regardless of whether that buyer, as the new servicer, originated the loan or caused the servicing defect. The buyer is typically protected from incurring losses as a result of its assumption of the seller's recourse liability by an indemnification provided by the seller. This structure, however, creates counterparty risk as the value of the MSAs is, in part, dependent on the value of the indemnification that the seller provides to the buyer and on the perceived quality of the seller's underwriting, origination, and servicing. As a result, a failing bank could have difficulty in realizing the value of its MSAs in a market sale if a buyer views the failing bank as not creditworthy or questions the quality of the origination, underwriting, or servicing of the failed bank.

In connection with the resolution of failed banks, the FDIC's recovery of value from MSAs has been negatively affected by two main factors. First, the contingent recourse liability impairs the value of MSAs. Second, most of the failed banks had very small MSA portfolios and the relatively fixed transaction costs associated with a sale frequently exceeded the value of these MSAs.

The FDIC determines and executes the resolution strategy that maximizes the value of each pool of MSAs at a failed bank. Prior to August 2010, most MSA pool acquisitions were done through whole-bank purchase and assumption transactions. In such transactions, the acquiring bank submits a single bid

2010), http://oig.federalreserve.gov/reports/Irwin_UBT_final_report_4_29_10.pdf.

to the FDIC for all the assets of the failed bank. As a result, asset-level purchase prices are not provided by the acquiring bank in a whole-bank purchase and assumption transaction. During this time, MSAs from four failed banks were sold outside the purchase and assumption transaction, and it became clear that the purchase and assumption bidders were increasingly disinterested in acquiring the MSAs along with the failed bank's recourse liabilities.

As a result, in August 2010, the FDIC changed its practice and began marketing the assets and liabilities of a failed bank without the MSAs. Since that time, MSAs have been evaluated to determine whether the FDIC can recover value from a separate sale of the MSAs. In doing so, the FDIC considers both the transaction costs and either (1) the amount charged by the investor for a release of the FDIC and the buyer from all of the recourse liability related to the failed bank's actions, or (2) the amount the FDIC would expect to spend if it provided an indemnification for all losses incurred by the buyer resulting from its assumption of the failed bank's recourse liability.

If the FDIC determines that an MSA pool likely has no net value in a market sale transaction, it will surrender the MSAs to the investor.³⁹ Of the 32 banks

that had MSAs and failed after August 2010, only one bank had MSA pools with net value to the FDIC in an MSA sale.

If the FDIC determines that it can likely recover value from a pool of MSAs, it pursues a competitive market sale transaction. Since 2008, the FDIC has sold one or more MSA pools from each of five failed banks. Data on these sales are available on the FDIC's website.⁴⁰ These data reflect that the aggregate gross proceeds from these sales was 29 percent of the book value of the MSAs (as reported by the failed bank prior to failure). The size of this discount is indirect evidence that the value of some MSA pools was overestimated by some banks. Even this substantial discount from book value overstates the value recovered by the FDIC. The FDIC's gross proceeds were reduced by transaction costs and either the cost to obtain a release from the failed bank's recourse liabilities or the out-of-pocket amounts paid by the FDIC in accordance with its indemnification obligations to the buyer. As noted, open banks attempting to sell MSAs, especially open banks in a troubled condition, may face similar issues of needing to indemnify or otherwise compensate MSA buyers or investors for recourse liabilities, and this may detract from their ability to realize the full book value when selling MSAs.

³⁹ In many of those cases, the mortgage loan sale and servicing agreements were repudiated. However, if the investor was a secured creditor holding collateral to secure the recourse liabilities or owed the FDIC reimbursement of advances and had a contractual right to offset such amounts against the failed

bank's recourse liability, the FDIC typically negotiated a settlement with the investor in order to maximize the recovery of the collateral or the advance receivables.

⁴⁰ FDIC MSA sales can be located at www.fdic.gov/buying/historical/mortgage_servicing_assets.html.

Regulatory Approaches for Mortgage Servicing Assets

The federal banking agencies have established minimum regulatory capital requirements to ensure that banking institutions have a capital base that allows them to operate in a safe and sound manner as credit intermediaries in the economy. Well-capitalized banking institutions contribute to the stability of the financial system by operating as credit intermediaries even during adverse financial conditions.

In 2013, the federal banking agencies issued a revised capital rule for banking institutions that, among other things, strengthened the eligibility criteria for regulatory capital to ensure it is able to absorb losses.⁴¹ In addition, the regulatory capital framework has long limited the inclusion in capital of certain assets (e.g., intangible assets and certain deferred tax assets) that have values that may be difficult to realize or may not be realizable at all under adverse financial conditions.

Mortgage loan servicing can be an appropriate activity for banking institutions when conducted in a safe and sound manner with appropriate operational controls and risk-management processes. As described earlier in this report, however, MSAs pose certain risks. Accordingly, the federal banking agencies have limited the inclusion of MSAs in regulatory capital for many years to address the high level of uncertainty regarding the ability of banking institutions to realize value from MSAs, especially under adverse financial conditions. Other precedent exists for a cautious approach to the financial statement recognition of MSAs. Prior to 1996, GAAP did not allow firms that originated and sold mortgages, while retaining the servicing, to recognize an MSA for those serviced mortgages. Limiting the amount of MSAs in regulatory capital mitigates the risk that market value fluctuations of these assets will adversely affect banking institutions' regulatory capital bases and undermine their safety and soundness. Moreover, the FDIC, as receiver of failed institutions, has found MSAs of

troubled or failed institutions to be generally unmarketable at book value during periods of market volatility.

The federal banking agencies use two primary approaches in their capital framework to address the risks of MSAs: (1) requiring deduction from regulatory capital of amounts of MSAs above certain thresholds, and (2) applying risk weights to MSAs that are not deducted from regulatory capital.

Under the federal banking agencies' previous regulatory capital framework, MSAs (combined with non-MSAs and purchased credit card relationships) were limited to 100 percent of tier 1 capital (net of goodwill, other intangibles, and other disallowed assets), and the amount of an MSA that a banking institution was able to include in regulatory capital was the lesser of 90 percent of the MSA's fair value or 100 percent of the MSA's carrying amount.⁴² Amounts not deducted from tier 1 capital received a 100 percent risk weight.⁴³

The limitation of MSAs to 90 percent of their fair value under the previous regulatory capital framework could result in an effective risk weight of up to 215 percent for MSAs to the extent that a banking institution either (1) used the fair value measurement method to determine the carrying amount of the MSAs or (2) used the amortization method and took an impairment on the MSAs to bring the carrying amount down to fair value.⁴⁴ This effective risk

⁴² See, for example, 12 CFR part 225, appendix A, section II.B.1 (Federal Reserve) and 12 CFR 325.5(f) (FDIC).

⁴³ See, for example, 12 CFR part 225, appendix A, section III.C.4 (Federal Reserve) and 12 CFR part 325, appendix A, section III.C.4 (FDIC).

⁴⁴ A banking institution will initially record the amount of the MSA at fair value and then subsequently measure the MSA under either the amortization method or the fair value measurement method. Under the amortization method, the MSA is to be amortized in proportion to, and over the period of, estimated net servicing income for assets (servicing revenues in excess of servicing costs). The MSA is to be assessed for impairment or increased obligation based on fair value at each quarter-end report date. Under the fair value measurement method, MSAs

⁴¹ NCUA issued a revised regulatory capital framework in 2015 that will apply in 2019.

weight is because a deduction or haircut approach (e.g., the 90 percent fair value haircut under the previous regulatory capital framework) is broadly equivalent to a 1,250 percent risk weight, assuming an 8 percent regulatory capital level. Specifically, for \$100 of MSAs, applying a 1,250 percent risk weight to \$10 (i.e., \$125 in risk-weighted assets) and a 100 percent risk weight to the remaining \$90 (i.e., \$90 in risk-weighted assets) could result in an effective risk weight for the \$100 of MSAs of 215 percent (i.e., \$215 in risk-weighted assets).

After considering certain lessons learned during the 2008 financial crisis, the revised capital rule established standards to improve the quality and increase the quantity of regulatory capital. For instance, the treatment of MSAs became stricter under the revised capital rule reflecting the high level of uncertainty regarding the ability of firms to realize value from these assets.

In developing the current regulatory approach to MSAs, the federal banking agencies considered diverse perspectives on MSAs, and took steps to ensure that the approach was adequately informed in all significant respects. In this regard, the federal banking agencies took into consideration MSA-related statutory requirements, conducted impact and regulatory burden analyses for the revised capital rule, and considered issues raised through the public comment process prior to finalizing the current regulatory approach to MSAs. In particular, the federal banking agencies evaluated a range of appropriate treatments during the rulemaking process, including fully deducting MSAs from regulatory capital, deducting MSAs above a certain threshold (or thresholds) and risk weighting the amount not deducted at 250 percent, and risk weighting all MSAs at a level substantially higher than 100 percent (for example, 250 percent). The agencies ultimately

are measured at fair value at each reporting date and changes are reported in fair value in earnings in the period in which the changes occurred. A banking institution can elect to use either measurement method for different classes of MSAs within the banking institution's portfolio, but the same measurement method must apply to each MSA in a class of MSAs.

decided on and continue to support the approach of deducting MSAs in excess of certain thresholds and risk weighting the MSAs that are not deducted. In contrast, the revised capital rule requires a full deduction from capital of all other intangible assets.

Specifically, under the revised capital rule any amount of MSAs above 10 percent of a firm's CET1 capital must be deducted from CET1 capital.⁴⁵ In addition, any amount of MSAs, certain deferred tax assets arising from temporary differences, and significant investments in the capital of unconsolidated financial institutions in the form of common stock (collectively, "threshold items") above 15 percent of a firm's CET1 capital must also be deducted from CET1 capital.⁴⁶ Starting January 1, 2018, any amount of the threshold items that is not deducted from CET1 capital will be risk weighted at 250 percent.⁴⁷

NCUA's previous capital requirements applied a 100 percent risk weight to MSAs. Under NCUA's revised capital framework (issued in 2015), MSAs will receive a 250 percent risk weight, starting January 1, 2019.⁴⁸ Federally insured credit unions are not required to deduct any amount of MSAs from regulatory capital. Since 1998, federally insured credit unions have been prohibited from purchasing MSAs.⁴⁹

⁴⁵ 12 CFR 3.22(d)(1) (OCC), 12 CFR 217.22(d)(1) (Federal Reserve), 12 CFR 324.22(d)(1) (FDIC).

⁴⁶ 12 CFR 3.22(d)(2) (OCC), 12 CFR 217.22(d)(2) (Federal Reserve), 12 CFR 324.22(d)(2) (FDIC).

⁴⁷ *Ibid.* As discussed elsewhere in this report, the federal banking agencies determined that, based on the conservative treatment of MSAs under the revised capital rule, statutory factors were consistent with a determination that the 90 percent of fair value limitation could be removed.

⁴⁸ In establishing the MSA capital requirements for credit unions that goes into effect in 2019, NCUA relied upon the analysis published by the federal banking agencies, conducted its own impact analysis, and considered issues raised during the comment period prior to finalizing the regulation.

⁴⁹ NCUA instituted the prohibition on the purchase of MSAs in 1998 after the National Credit Union Share Insurance Fund was exposed to significant losses related to purchased mortgage servicing operations obtained by a federally insured credit union. 12 CFR 703.16(a).

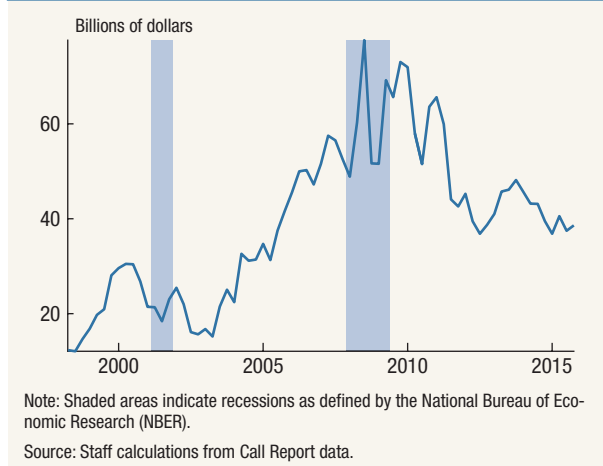
Evolution of the Mortgage Servicing Market since 1998

The evolution of the market for MSAs has been shaped by a variety of factors. Over the time period considered in this section—1998 to 2015—these factors include

- changes in interest rates, as well as an extended period of historically low interest rates;
- the sharp rise and fall in house prices, and the corresponding changes in mortgage debt and surge in nonperforming loans;
- changes in firms' interest in serving as aggregators by purchasing the servicing rights and originations of other firms;
- shifts in the incentives to securitizing mortgages versus holding them in portfolio; and
- regulatory, tax, and accounting changes related to mortgage servicing.

As reflected in [figure 5](#), total bank MSA valuations increased from roughly \$20 billion in 1998 to nearly \$78 billion at the end of the third quarter of 2008.⁵⁰ MSA values dropped 33 percent in the fourth quarter of 2008 at the height of the crisis, fell significantly further in 2011 and 2012 and have since hovered between \$30 billion and \$40 billion.⁵¹ This measure includes only the MSA holdings of banks, and does not include savings associations.⁵² Savings associations were excluded because they were primarily supervised by the former Office of Thrift Supervision (OTS) prior to July 2011, and therefore filed Thrift Financial Reports (TFRs) rather than the Call

Figure 5. Bank fair value MSA balances, 1998–2015



Reports filed by banks.⁵³ The TFR data did not align sufficiently well with the Call Report data to create a consistent time series that combined both types of institutions. Although savings associations began filing Call Reports in 2012 after their supervision was transferred from the OTS to the OCC or FDIC, depending on an institution's charter, savings associations were excluded from the analysis for the entire time period for consistency. The assets of savings associations that failed and were acquired by banks will, however, appear in the Call Report data. The implications of this consistency issue are discussed later in this report.

⁵⁰ This analysis is based on Call Report data for all insured depository institutions for 1998:Q2 to 2015:Q4, excluding savings associations. Banks began reporting CET1 capital on the Call Reports starting January 1, 2015; the report uses tier 1 capital less preferred stock and related surplus as a proxy for CET1 for data prior to January 1, 2015.

⁵¹ Our estimates throughout this report are based on the fair value of MSAs. The book value results are very similar to their fair value counterparts.

⁵² MSAs in federally insured credit unions have grown from \$332 million in 2004 to \$1.3 billion as of December 31, 2015.

⁵³ The Dodd-Frank Act streamlined the supervision of depository institutions and their holding companies by abolishing the OTS and transferring its regulatory and rulemaking authority to the Federal Reserve, OCC, and FDIC. Enhancing Financial Institution Safety and Soundness Act of 2010, Title III of the Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 300, 124 Stat. 1376, 1520 (2010).

Factors Determining Fluctuations of MSA Values Held by Banks

The fluctuations in banks' MSA holdings reflect several factors. To set the stage, 1996 was the first full year in which GAAP permitted the recognition of an MSA associated with loans a bank originated and sold, but for which it retained the servicing. This accounting development may have given banks an incentive to conduct business in a way that gave rise to MSAs. From the second quarter of 1998, the beginning of the time series data considered in this report, to the third quarter of 2008, banks' MSA holdings rose because of an increase in mortgage debt outstanding, as well as an increase in the share of mortgages that were securitized. During the financial crisis, banks' MSA holdings increased further as nonbank servicers withdrew from the market in response to funding and liquidity pressures. Post-crisis, banks have decreased their MSA holdings, reflecting a contraction in mortgage debt outstanding, a decline in MSA valuations due to the fall in interest rates, and an increase in nonbank market share. The increase in nonbank market share appears most directly attributable to a number of significant nonbank acquisitions of crisis-era legacy servicing portfolios of large banking institutions, as well as an increase in the nonbank market share in the mortgage origination market, and more indirectly from several regulatory changes and policy actions.

Mechanically, MSA holdings are equal to the price (or "multiple") the firm is willing to pay to service one dollar of UPB, times the servicing fee, times the UPB of the mortgages that a firm is servicing for others. In other words:

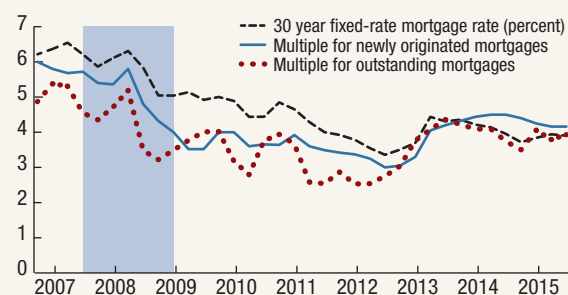
$$\text{MSA holdings} = \text{multiple} * \text{servicing fee} * \text{UPB}.$$

The following sections describe the factors that have affected two of these components—the multiple and the UPB—of bank MSA holdings during the past years.

Changes in MSA Multiple

Firms determine how much they are willing to pay to service a given portfolio of loans based on their valuation models, which, as described earlier, forecast the value of servicing based on assumptions about interest rates, default probabilities, and other factors. A firm might decide, for example, that it is willing to pay \$2,000 to service a \$200,000 mortgage that comes

Figure 6. Multiples and mortgage interest rates, 2007–15



Note: Interest rates and multiples pertain to 30-year fixed-rate mortgages eligible for a guarantee from Fannie Mae or Freddie Mac. Shaded areas are NBER-defined recessions.

Sources: For the 30-year fixed-rate mortgage rate, Freddie Mac Primary Mortgage Market Survey; for the multiple for newly originated mortgages, Phoenix Capital, Inc.; for the multiple for outstanding mortgages, OCC.

with a 0.25 percentage point servicing fee. The multiple—which is 4 in this example—is backed out of the overall \$2,000 valuation as follows:

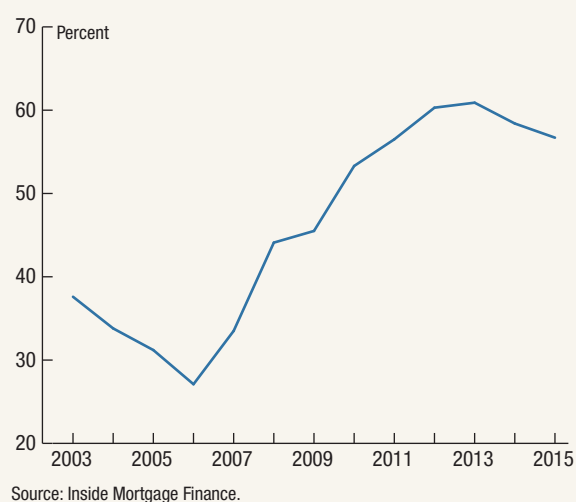
$$4 = \$2,000 / (\$200,000 * 0.25\%)$$

The MSA multiple thus serves as a shorthand metric for firms to compare the value of MSAs across portfolios and over time. A rise in the multiple, therefore, means that a firm is willing to pay more to service a given portfolio, or alternatively, that servicing those loans is perceived as being more valuable.

Historically, MSA multiples have increased when interest rates rise, and, conversely, have declined when interest rates fall. This relationship holds because an increase in interest rates typically equates to a decrease in prepayment, which means that the firm will be receiving the servicing fee on the mortgage for a longer period of time. To illustrate this point, [figure 6](#) displays two measures of MSA multiples for the 2007 to 2015 period for 30-year, fixed-rate mortgages eligible for a GSE guarantee. One measure is an estimated multiple for a hypothetical servicing portfolio of newly originated mortgages with a 25 basis point servicing strip.⁵⁴ The other measure is the average of the multiples that a group of banks and savings associations used to value their existing books of mortgages serviced for others. These banks and savings associations in total serviced loans with

⁵⁴ These estimates were provided by Phoenix Capital, Inc. (Phoenix), a mortgage banking advisor that specializes in mortgage servicing rights. Phoenix has collected this data to represent an average multiple of the service fee for a co-issue/concurrent delivery of a 25 basis point strip of GSE 30-year fixed rate servicing. Phoenix makes no representations or warranties on the completeness of this data.

Figure 7. Share of mortgages originated through lender retail channels, 2003–15



between \$2.9 trillion and \$5.4 trillion in unpaid balances over this period.⁵⁵

The changes in these multiples are compared with the change in the average rate charged on a 30-year conventional fixed-rate mortgage, which is the interest rate most pertinent to mortgage prepayment for existing books of mortgage servicing.⁵⁶ As reflected in figure 6, the MSA multiple has generally changed in tandem with the mortgage interest rate, with both the MSA multiple and the interest rate moving lower on net since 2007.

In the years preceding the financial crisis, large banking institution aggregators significantly increased their purchases of MSAs. During and after the financial crisis, large-banking institution aggregators revisited this business model in the wake of their large losses on loans originated through these channels, and instead focused on loans originated through their retail channel, as shown in figure 7. The decline of purchase activity on the part of large banking institution aggregators reduced the demand for MSAs, and put downward pressure on the multiple during the financial crisis.

In addition to the decline in aggregator purchase activity, the other housing-market related events during the crisis, such as the sharp fall in house prices

and significant increase in borrower defaults, put downward pressure on the multiple. One way to see this fact is to note that reported book values of MSAs held by banks decreased by 33 percent in the fourth quarter of 2008 alone, from about \$76 billion to about \$51 billion.⁵⁷ Since the volume of one- to four-family residential mortgages serviced for others by these institutions increased during that quarter, in aggregate, all of the reduction in MSA value during the fourth quarter of 2008 appears to be attributable to value decreases and none appears to be attributable to a reduction in the volume of serviced mortgages.

Other factors have also affected the trends in the MSA multiple over time, including, as discussed later in this report, tighter servicing regulations, significant legal settlements involving large banking institutions, and increases in the cost of servicing. That said, the MSA multiple currently exceeds the lows reached in 2012, and generally moved sideways in the range of 3 to 4 during 2014 and 2015.

Changes in Outstanding Unpaid Principal Balance on Mortgages Serviced for Others

The fluctuations in the UPB component of bank MSA holdings stem from four main factors: mortgage debt outstanding, bank acquisitions of the assets of failed savings associations, the bank's decision whether to hold the loan in portfolio and retain the servicing, and the shift in servicing market share between banks and nonbanks. In turn, the market shares of banks and nonbanks have been affected by an assortment of regulatory changes.

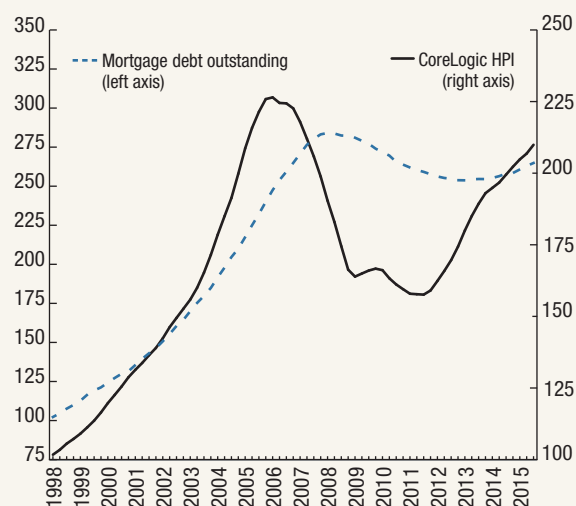
Mortgage Debt Outstanding

House prices rose sharply from 1998 to 2006, then contracted substantially through 2011 (see CoreLogic HPI in figure 8). During the build up in housing prices until 2006, mortgage debt rose in part because borrowers needed larger loans in order to purchase more expensive homes, and in part because borrowers extracted equity from their homes in order to finance other purchases (see Mortgage Debt Outstanding in figure 8). Mortgage debt started decreasing in 2008, as new mortgage originations contracted because of a lack of credit supply and demand, while

⁵⁵ These data are collected by the OCC.

⁵⁶ The mortgage rate shown is the one collected in the Freddie Mac Primary Mortgage Market Survey, available at www.freddiemac.com/pmms/index.html.

⁵⁷ Declines in the fair value of MSAs, which are also reported on bank Call Reports, were almost identical.

Figure 8. Changes in house prices and mortgage debt, 1998–2015

Note: Series are indexed to 100 in 1998:Q1. The house-price index is seasonally adjusted by Federal Reserve Board staff.

Sources: For house prices, CoreLogic; for mortgage debt outstanding, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

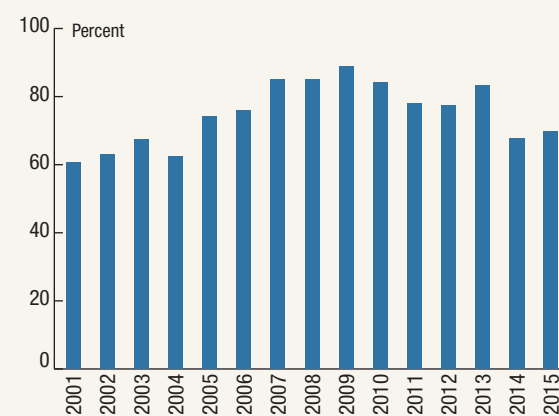
an unprecedented increase in foreclosures led to an extinguishment of mortgage debt.⁵⁸

Bank Acquisitions of the Assets of Failed Savings Associations

Savings associations were generally heavily invested in mortgage-related assets because the qualified thrift lender test required these institutions to have qualifying investments (including mortgage-related assets) equal to at least 65 percent of their portfolio assets.⁵⁹ Savings associations that followed the "originate-to-distribute" model typically had particularly large concentrations in MSAs. Countrywide Bank, FSB and Washington Mutual Bank, FSB were two such savings associations that had large MSA holdings and were acquired by banks at the peak of the crisis. Effinity Financial Corporation (parent to Countrywide Bank, FSB) reported \$18.4 billion in MSAs as of June 30, 2008, on its last TFR before acquisition. Similarly, Washington Mutual Inc. (parent to Washington Mutual Bank, FSB) reported \$6.2 billion in MSAs as of June 30, 2008, on its last TFR before acquisition. Although some of these MSAs were sold or written off prior to acquisition, a meaningful amount of these assets were assumed by the acquir-

⁵⁸ Neil Bhutta, "The Ins and Outs of Mortgage Debt during the Housing Boom and Bust," *Journal of Monetary Economics* 76, (2015): 284–298.

⁵⁹ 12 USC 1467a(m).

Figure 9. Total securitization rate for home mortgages, 2001–15

Source: Inside Mortgage Finance.

ing bank and were reported in the acquiring banks' subsequent Call Reports. These acquisitions thus contributed to a spike in MSAs reported by banks between the second and third quarter of 2008.

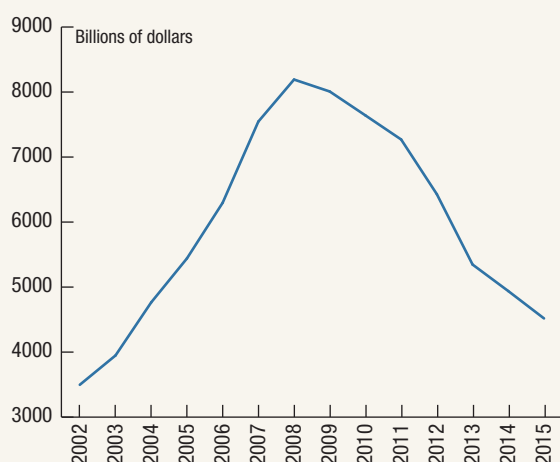
Banks' Decision to Hold Loans in Portfolio

As shown in figure 9, the share of all loan originations that were securitized (as calculated by Inside Mortgage Finance) rose from 61 percent in 2006 to 89 percent in 2009. The first part of the rise (in 2006 and early 2007) was due to a substantial increase in activity in the private-label MBS market. After the housing bubble burst in 2007 and the private-label MBS market froze, mortgage securitizations guaranteed by the GSEs or Ginnie Mae rose, facilitated in part by an increase in the conforming loan limit, which is the maximum loan size eligible for FHA and GSE credit guarantees.⁶⁰ Under the assumption that loans originated by banking institutions are securitized at a roughly similar rate as mortgage originations overall, the increase in securitization share from 2005 to 2009 likely contributed to the increase in MSAs recorded on banking institutions' books during that period.

After the crisis, private capital began to re-enter the mortgage market, the conforming loan limit was lowered (in October 2011),⁶¹ and the securitization rate gradually decreased. In 2014 and 2015, the securitiza-

⁶⁰ Robert Dietz and Natalia Siniavskaja, "GSE and FHA Loan Limit Changes for 2011: Scope of Impact," National Association of Home Builders, June 1, 2011, www.nahb.org/~media/Sites/NAHB/Unmapped/PDF/A-M/LoanLimitImpactAnalysis_20110531122550.ashx?la=en.

⁶¹ Ibid.

Figure 10a. Dollar volume serviced by banking institutions in top 30 servicers, 2002–15

Note: Includes all loans serviced by firms, not just those serviced for others.

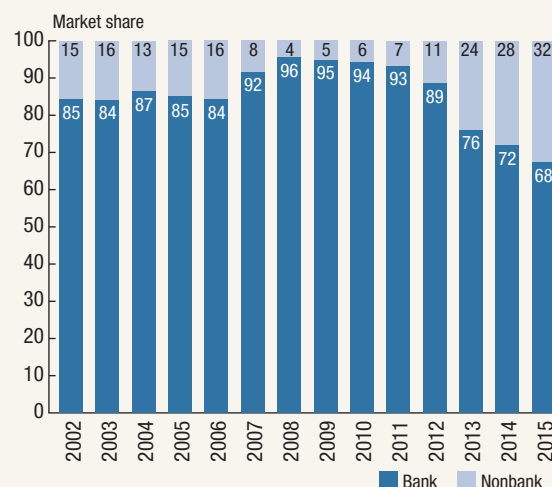
Source: Staff calculations from Inside Mortgage Finance data.

tion rate dropped to around 70 percent, in part because of ongoing growth in banks' originations of loans larger than the conforming loan limit, which banks largely held in portfolio. The lower securitization rate in 2014 and 2015 may have dampened MSA holdings by banks. That is, as banks hold a greater share of the mortgages they originate on their balance sheet, their holdings of MSAs may diminish.

Shift in Servicing Market Share between Banks and Nonbanks

The dollar volume of mortgages serviced by banking institutions rose until 2008 (the left panel of figure 10), reflecting the fact that mortgage debt overall peaked in 2008 and the fact that the banking institution market share of mortgage servicing increased from 2006 to 2008 (the right panel of figure 10).⁶²

⁶² The estimates described in this section are based on data provided by Inside Mortgage Finance. These data include all loans serviced by a firm, not just those for whom the firm recorded an MSA. "Banking institution" for the purposes of the calculations based on Inside Mortgage Finance data is defined to include insured depository institutions, BHCs, savings and loan holding companies, and credit unions. The Inside Mortgage Finance data have varied over time in the number of mortgage servicers contained in its lists. To maintain comparability over time, the statistics shown here are based on the top 30 servicers in each year. Statistics based on a larger number of servicers (in the years when available) show a similar pattern to the top-30 statistics. The market share statistics refer to the banking institution and nonbank share of mortgages serviced by the top 30 holders and not each type of institution's share of the entire market. For an estimate of nonbank servicer market share relative to the entire mortgage servicing market, see Government Accountability Office, *Nonbank Mortgage Servicers: Existing*

Figure 10b. Market share of banking institutions and nonbanks in the top 30 servicers, 2002–15

Note: Includes all loans serviced by firms, not just those serviced for others. Market share statistics are for each type of firm's share of mortgages relative to total mortgages serviced by the top 30 firms in each year.

Source: Staff calculations from Inside Mortgage Finance data.

During the financial crisis, many nonbank lenders and servicers experienced significant funding strains and either scaled back their origination and servicing operations or left the business entirely. As the strains of the financial crisis eased, nonbank mortgage originators and servicers regained and then built upon their market share in both mortgage originations and mortgage servicing. Data collected under the Home Mortgage Disclosure Act (HMDA), for example, indicate that the share of home-purchase mortgages originated by independent mortgage companies rose from 23 percent in 2007 to 47 percent in 2014.⁶³

Nonbanks also boosted their mortgage servicing market share through bulk purchases of MSAs. Many of these purchases were composed of portfolios related to nonperforming loans originally held by

Regulatory Oversight Could Be Strengthened, GAO-16-278 (Washington, DC: 2016), 9, www.gao.gov/assets/680/675747.pdf.

⁶³ Statistic from Neil Bhutta, Jack Popper, and Daniel R. Ringo, "The 2014 Home Mortgage Disclosure Act Data," *Federal Reserve Bulletin* 101, (November 2015): Figure 8, www.federalreserve.gov/pubs/bulletin/2015/articles/hmda/2014-hmda-data.htm. In the HMDA data, only mortgages that a lender originates through its retail or broker channels are recorded as originations for that lender. In contrast, the Inside Mortgage Finance data include in a lender's originations mortgages originated through retail and broker channels, as well any mortgages that a lender sources through its correspondent channels. As a result, market share statistics based on HMDA data may differ from those based on Inside Mortgage Finance data.

banking institutions,⁶⁴ most notably in 2013, when nonbank servicers purchased from banks in bulk sales the MSAs corresponding to more than \$500 billion in mortgages.⁶⁵ These sales included a \$215 billion sale from Bank of America Corporation to Nationstar Mortgage LLC (Nationstar), a \$93 billion sale from Bank of America Corporation to Walter Investment Management Corp. (Walter), an \$87 billion sale from Ally Financial Inc. to Ocwen Financial Corp. (Ocwen), a \$78 billion sale from OneWest Bank to Ocwen, a \$40 billion sale from Flagstar Bank to Two Harbors Investment Corp., and a \$9 billion sale from EverBank Financial Corp. to Walter.⁶⁶ By 2015, roughly one-third of MSAs were held by nonbanks, whereas before the financial crisis, the nonbank share was around 15 percent.

Role that the challenges of servicing nonperforming loans had on the shift. As suggested by these bulk sales, banks' difficulties managing their portfolios of nonperforming loans appear to have played a key role in the growth of the nonbank servicer sector. Before the financial crisis, the mortgage servicing business was generally dominated by banking institutions and their affiliates, and was oriented toward handling large volumes of performing loans.⁶⁷ This model began to show its weaknesses as the housing market deteriorated and the number of delinquent loans rose. Through the supervisory process and other means, the federal banking agencies had begun to identify widespread problems throughout the mortgage servicing market, such as accounts of poor communication with borrowers, lost information, improper or no documentation, and inadequate staffing. The increase in mortgage delinquencies and foreclosures that occurred during the financial crisis further highlighted servicing deficiencies. These weaknesses resulted in findings of unsafe and unsound practices, violations of applicable federal and state law and requirements, and widespread consequences for the national housing market and borrowers.⁶⁸

⁶⁴ "Nonbanks Continue Expanding Their Share of Mortgage Servicing Market at Evolutionary Pace," Inside Mortgage Finance, November 7, 2014, 3. "Some of the decline reflects the slow evaporation of the supply of mortgage debt outstanding, but it mostly is the result of handing off distressed servicing to firms designed to handle such assets and the Basel III restrictions on MSR that are on the horizon."

⁶⁵ Kroll Bond Rating Agency, "Update – Residential Loan Origination and Mortgage Servicing Sector," April 9, 2015.

⁶⁶ Ibid.

⁶⁷ Lee, *Nonbank Specialty Servicers*, 2–3.

⁶⁸ Board of Governors of the Federal Reserve System, Office of the Comptroller of the Currency, and Office of Thrift Supervision, "Interagency Review of Foreclosure Policies and Prac-

tics," April 2011, www.federalreserve.gov/boarddocs/rptcongress/interagency_review_foreclosures_20110413.pdf.

In 2011, the Federal Reserve and OCC mandated improvements to servicing practices through enforcement actions against 10 banks.⁶⁹ In 2012, further improvements were mandated through a legal settlement among the U.S. Department of Justice (DOJ), the U.S. Department of Housing and Urban Development, 49 state attorneys general, and 5 large bank mortgage servicers (DOJ settlement).⁷⁰ These actions and settlements involved large civil penalties, including more than \$25 billion in penalties and consumer relief under the terms of the DOJ settlement.

Banks' difficulties in servicing their nonperforming loans, in conjunction with these enforcement actions and settlements, appear to have motivated banks to sell MSAs to nonbanks. Nonbank servicers were willing to pick up much of this servicing, in part because of their cost advantage relative to bank servicers in handling nonperforming loans. That cost advantage stemmed from both their specialization in this type of servicing⁷¹ and from their ability to harness technological innovations in order to reduce costs.⁷² The specialty servicers also got a boost from Fannie Mae's "High Touch Servicing Program," which was designed to facilitate the transfer of nonperforming loans from banks to specialty servicers.⁷³

In January 2014, new servicing standards and requirements mandated by the Consumer Financial

ties," April 2011, www.federalreserve.gov/boarddocs/rptcongress/interagency_review_foreclosures_20110413.pdf.

⁶⁹ Office of the Comptroller of the Currency, "OCC Takes Enforcement Action Against Eight Servicers for Unsafe and Unsound Foreclosure Practices," news release, April 13, 2011, www.occ.gov/news-issuances/news-releases/2011/nr-occ-2011-47.html; Board of Governors of the Federal Reserve System, news release, April 13, 2011, www.federalreserve.gov/newsevents/press/enforcement/20110413a.htm.

⁷⁰ U.S. Department of Justice, "Federal Government and State Attorneys General Reach \$25 Billion Agreement with Five Largest Mortgage Servicers to Address Mortgage Loan Servicing and Foreclosure Abuses," news release, February 9, 2012, www.justice.gov/opa/pr/federal-government-and-state-attorneys-general-reach-25-billion-agreement-five-largest.

⁷¹ Kaul and Goodman, *Nonbank Servicer Regulation*, 1–3. "Banks, having encountered very low delinquencies historically, didn't have much experience servicing large volumes of delinquent loans and were therefore ill-prepared for this task. Nonbanks...were better situated to respond to the changing landscape."

⁷² Marshall Lux and Robert Greene, "What's Behind the Non-Bank Mortgage Boom?" Harvard Kennedy School, M-RCBG Associate Working Paper Series no. 42: 25–31 (June 2015), www.hks.harvard.edu/centers/mrcbg/publications/awp/awp42.

⁷³ Lee, *Nonbank Specialty Servicers*, 2; and Federal Housing Finance Agency, *Evaluation of FHFA's Oversight of Fannie Mae's Transfer of Mortgage Servicing Rights From Bank of America to High Touch Servicers*, EVL-2012-008 (Washington, DC: 2012), www.fhfa.gov/Content/Files/EVL-2012-008.pdf.

Protection Bureau (CFPB) became effective.⁷⁴ These requirements applied to both banking institution and nonbank servicers, as the Dodd-Frank Act provided the CFPB with the authority to supervise banking institutions with assets over \$10 billion and nonbank mortgage servicers, and to issue rules that addressed consumer protection issues in mortgage servicing.⁷⁵ Under its authority under the Truth in Lending Act, as implemented by Regulation Z, and the Real Estate Settlement Procedures Act, as implemented by Regulation X, the CFPB issued rules that require changes in the notices and statements provided to borrowers, the way in which payments are credited, and servicer recordkeeping. The new rules also establish minimum standards that servicers must follow when handling delinquent mortgages or engaging in loss mitigation.

Although servicing conducted by banking institutions was the primary focus of regulatory scrutiny between 2011 and 2013, more recently servicing provided by nonbank servicers has been the subject of review by the CFPB, the Federal Trade Commission, and state regulators.⁷⁶ The Financial Stability Oversight Council (FSOC), the Government Accountability Office, and Federal Housing Finance Agency's (FHFA) inspector general have also highlighted possible risks posed by nonbank servicers.⁷⁷

Role of changes in the REIT tax treatment of excess MSAs. In 2013, the Internal Revenue Service (IRS)

⁷⁴ Mortgage Servicing Rules Under the Real Estate Settlement Procedures Act (Regulation X), 78 Fed. Reg. 10,695 (February 14, 2013), www.federalregister.gov/articles/2013/02/14/2013-01248/mortgage-servicing-rules-under-the-real-estate-settlement-procedures-act-regulation-x, as amended by 78 Fed. Reg. 44,685 (July 24, 2013), 78 Fed. Reg. 60,381 (Oct. 1, 2013), and 78 Fed. Reg. 62,993 (Oct. 23, 2013). Mortgage Servicing Rules Under the Truth in Lending Act (Regulation Z), 78 Fed. Reg. 10,901 (February 14, 2013), www.federalregister.gov/articles/2013/02/14/2013-01241/mortgage-servicing-rules-under-the-truth-in-lending-act-regulation-z, as amended by 78 Fed. Reg. 44,685 (July 24, 2013), 78 Fed. Reg. 60,381 (Oct. 1, 2013), and 78 Fed. Reg. 62,993 (Oct. 23, 2013).

⁷⁵ The specific authorities exercised by the CFPB stemmed from the Truth in Lending Act, as implemented by Regulation Z, and the Real Estate Settlement Procedures Act, as implemented by Regulation X.

⁷⁶ For example, see Federal Trade Commission, "National Mortgage Servicing Company Will Pay \$63 Million to Settle FTC, CFPB Charges," news release, April 21, 2015, www.ftc.gov/news-events/press-releases/2015/04/national-mortgage-servicing-company-will-pay-63-million-settle.

⁷⁷ Financial Stability Oversight Council, *2014 Annual Report* (Washington, DC: 2014), 10, www.treasury.gov/initiatives/fsoc/Documents/FSOC%202014%20Annual%20Report.pdf; *Nonbank Mortgage Servicers*; and Federal Housing Finance Agency, *FHFA Actions to Manage Enterprise Risks from Nonbank Servicers Specializing in Troubled Mortgages*, AUD-2014-014 (Washington, DC: 2014), 4–5, <http://fhfa.ig.gov/Content/Files/AUD-2014-014.pdf>.

issued a private letter ruling (PLR) that provides an incentive for REITs⁷⁸ to invest in certain cash flows associated with MSAs.⁷⁹ Servicers have the option of splitting their servicing revenue into two pieces: the "base servicing," representing the servicer's compensation for carrying out its servicing duties, and the "excess servicing," representing the revenue beyond the servicer's costs. The PLR established that the excess servicing spread portion of an MSA is a qualifying asset for a REIT and that the excess servicing strip is more similar to an interest-only mortgage strip than compensation for performing servicing.⁸⁰ This clarification in tax treatment appears to correspond to an increased appetite on the part of REITs for investing in MSAs.

Trends in Banks' MSA Values Relative to Assets and to Capital

MSAs represent a very small share in the aggregate of total bank assets and CET1 capital. As illustrated in figure 11, the amount of MSAs relative to total assets during the 1998 to 2015 period ranged from nearly zero to 0.7 percent, and stood at 0.25 percent in 2015. Meanwhile, the amount of MSAs in relation to CET1 capital (or tier 1 capital less preferred stock and related surplus, prior to January 1, 2015) ranged from 2 percent to 9 percent during the 1998 to 2015 period, and was 2.8 percent in 2015.⁸¹

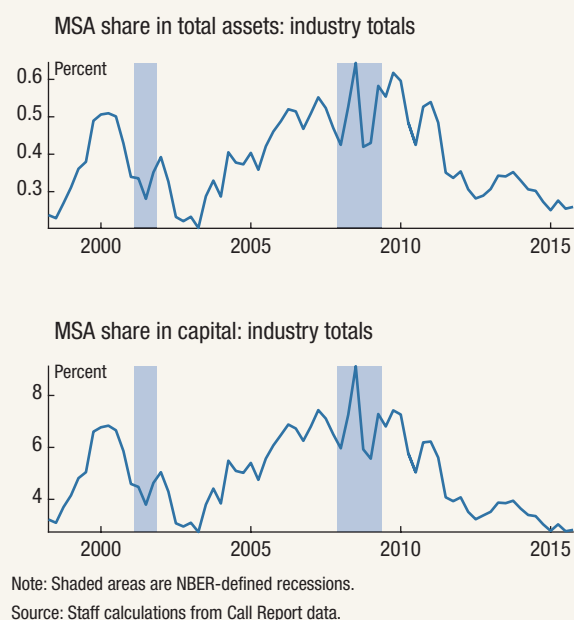
The time-series pattern of MSAs relative to total assets and to CET1 capital shown in figure 11 shares

⁷⁸ A REIT is a company that is required to hold passive investments in real estate and real estate-related assets and make certain distributions in order to maintain a tax-advantaged status. The tax advantage associated with REITs is that the income is taxed only at the level of the investor, and not subject to an additional level of taxation at the trust level.

⁷⁹ Internal Revenue Service, Ltr. Rul. 105442-12 (May 24, 2012), www.irs.gov/pub/irs-wd/1234006.pdf.

⁸⁰ In most circumstances the interest-only strip that results from the excess servicing is not treated as a separate asset for regulatory capital purposes. In certain discrete instances, however, an interest-only strip may be recognized apart from the related MSA. This recognition can occur, for example, when the parties to the contract associated with the MSA renegotiate to lower the servicing fee, thus separating the original MSA into two components. The agencies understand that this practice is not common. Moreover, while an interest-only strip and an MSA are both subject to similar risks, such as prepayment risk and default risk, an interest-only strip and an MSA differ in important ways. Primarily, an interest-only strip is a passively owned financial asset, whereas the holder of an MSA must perform specific activities and obligations related to the servicing.

⁸¹ Since NCUA started collecting MSA data in 2004, the highest levels of the MSAs to assets ratio and the MSAs to net worth ratio were 0.2 percent and 1.96 percent, respectively.

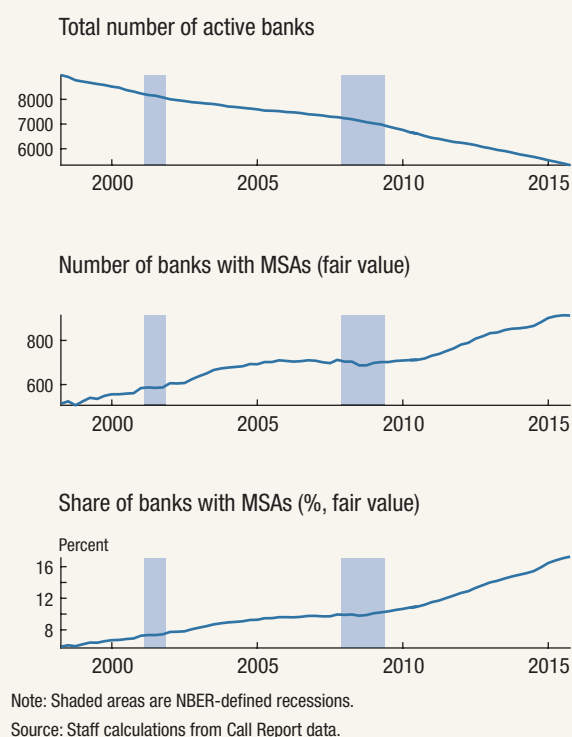
Figure 11. Total bank MSAs/total bank capital*100%, 1998–2015

many of the same peaks and troughs as the time series of MSAs alone in figure 5. However, the MSAs to assets and to CET1 capital series have declined more sharply since 2008 than the MSA valuations alone. This fact suggests that the capital and the assets of banks have risen by more than MSA holdings since the financial crisis.

Although MSAs have become a smaller share of banking sector assets in the aggregate, the number of banks that held MSAs increased considerably during the period, from 513 in the second quarter of 1998 to 913 in the fourth quarter of 2015, as shown in figure 12. Figure 12 also shows that the share of banks with MSAs rose even more during this period—from 6 percent in 1998 to 16 percent in 2015—in part because the overall number of banks contracted significantly. The increase in the number and share of banks holding MSAs appears to have started accelerating around 2009.

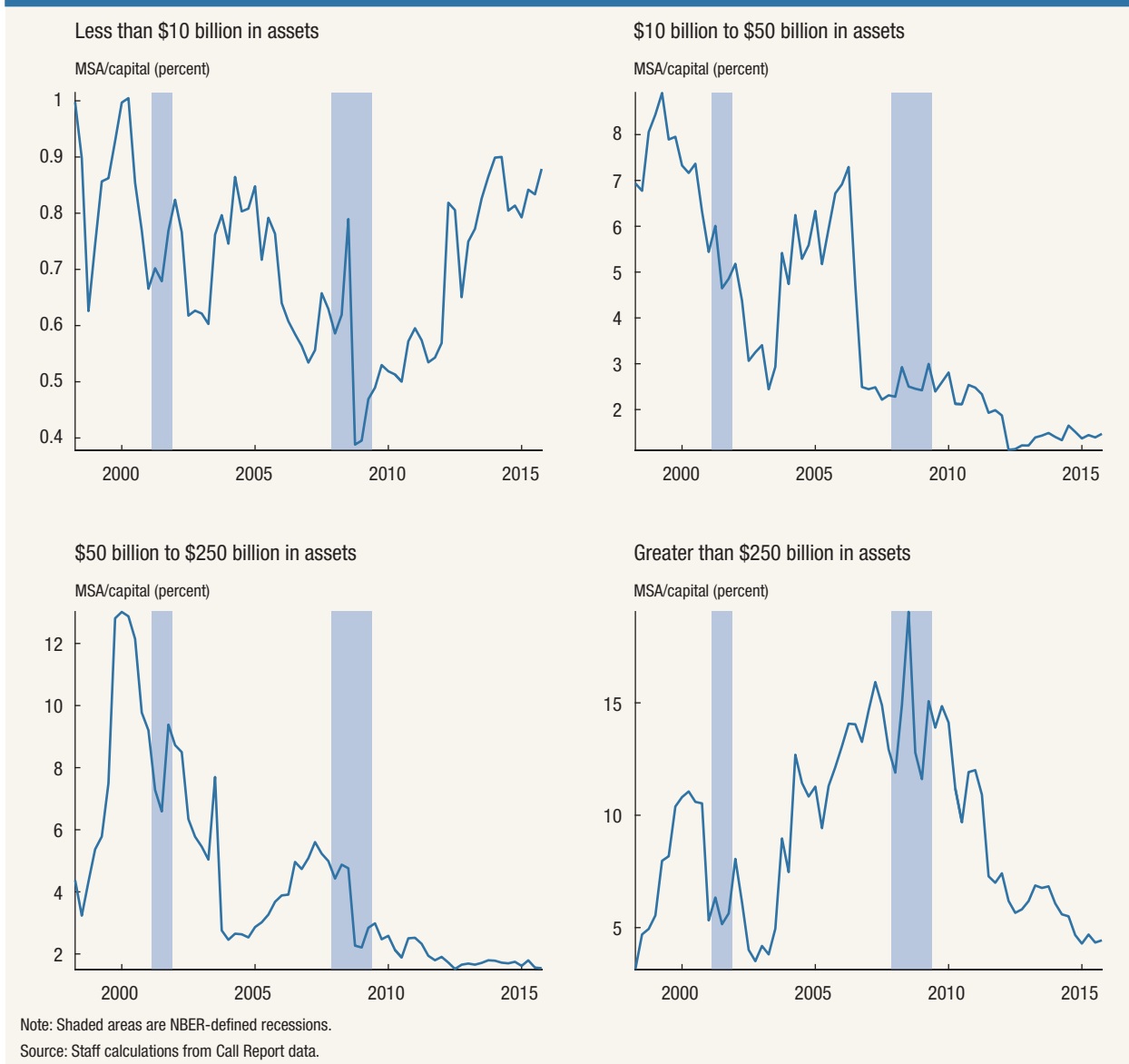
Shifts between Small Bank and Large Bank Holdings of MSAs

That MSA balances have been decreasing while the number of banks holding MSAs has been increasing is due to the fact that large banks—which hold the

Figure 12. Evolution of the total number of banks and banks with MSAs, 1998–2015

majority of MSAs—are decreasing their holdings, whereas small banks—which make up the majority of banks that hold any amounts of MSAs—are increasing their holdings. On this point, figure 13 shows the MSAs to CET1 capital ratio for banks of four different asset sizes: less than \$10 billion, between \$10 billion and \$50 billion, between \$50 billion and \$250 billion, and more than \$250 billion. Of the four groups, banks with less than \$10 billion in assets have, by far, the lowest MSAs to CET1 capital ratio. However, the aggregate MSAs to CET1 capital ratio for these banks has increased from less than 0.4 percent in 2009 to about 0.9 percent in 2015. Likewise, the share of total MSAs held by banks with less than \$10 billion in assets also rose over that period, from less than 2 percent in 2009 to 8 percent in 2015. In contrast, banks with assets greater than \$250 billion have seen a steady decline in MSA holdings since the third quarter of 2008, when they had an MSAs to CET1 capital ratio of 19 percent, compared with 4.4 percent at the end of 2015.

The increase in the MSAs to CET1 capital ratio for small banks and the decrease in the same ratio for all other banks could reflect differences between these two groups in either the multiple or the UPB of loans

Figure 13. Total MSAs/total capital*100, by asset size, 1998–2015

served for others. Data are not publicly available on MSA valuation multiple by bank size. However, data on the UPB of mortgages serviced by others seems to explain the differences in the MSAs to CET1 capital ratio. As shown in [table 2](#), from 2010 to 2015, for example, the UPB of mortgages serviced for others declined by roughly \$2 trillion, or about 40 percent, for banks with more than \$250 billion in total assets. It increased by around \$70 billion, or 44 percent, for banks with less than \$10 billion in total assets.

Distribution of Banks by MSAs to CET1 Ratios

Most banks—83 percent—hold no MSAs.⁸² The number of banks with no MSAs has decreased significantly since 1998, but that decline almost entirely

⁸² Ninety-two percent of federally insured credit unions do not hold MSAs, and of those with MSAs over 90 percent have MSAs to net worth ratios of less than 5 percent.

Table 2. Changes in unpaid balances of loans serviced for others by banks

Billions of dollars, except as noted

Asset size category	Total 1–4 family mortgages serviced for others reported by banks			
	Year-end 2010	Year-end 2015	Percent change	Number of banks in 2015
Greater than \$250 billion	\$4,819	\$2,928	-39%	6
\$50 to \$250 billion	\$ 545	\$ 418	-23%	26
\$10 to \$50 billion	\$ 213	\$ 163	-24%	48
Less than \$10 billion	\$ 159	\$ 230	44%	5,258
Total	\$5,736	\$3,739	-35%	5,338

Source: Staff calculations from Call Report data.

reflects the contraction in the number of banks overall during this period. Of banks with MSAs, the vast majority—646 in 2015—held relatively small quantities, less than 3 percent of CET1 capital. As shown in figure 14, 120 banks have MSAs to CET1 capital ratios of 3 to 5 percent and 67 have MSAs to CET1 capital ratios of 5 to 8 percent. Finally, 19 banks have MSAs to CET1 capital ratios of 8 to 10 percent and 61 have ratios in excess of 10 percent. The number of banks in each of these categories has, on net, increased since 1998.

The increase in the number of banks with higher MSAs to CET1 capital ratios, however, masks a significant difference in the trends for small and large banks. Figure 15 shows the share of banks by asset size with MSAs that are more than 10 percent of their CET1 capital. The number of banks that have less than \$10 billion in assets and MSAs to CET1 capital ratios in excess of 10 percent rose from 20 at the recent low point in the fourth quarter of 2008 to 58 in the fourth quarter of 2015. To put this rise in context, these 58 banks represent only about 1 percent of the 5,258 U.S. banks with assets less than \$10 billion. In contrast, the number of banks with MSAs to CET1 capital ratios in excess of 10 percent has decreased significantly for banks with more than \$10 billion in assets. In total, only 3 such banks currently have ratios of MSAs to CET1 capital in excess of 10 percent, compared with 11 at the recent high point in 2009. These banks represent about 4 percent of banks with assets greater than \$10 billion.

Reason for MSA Decreases among Large Banking Institutions

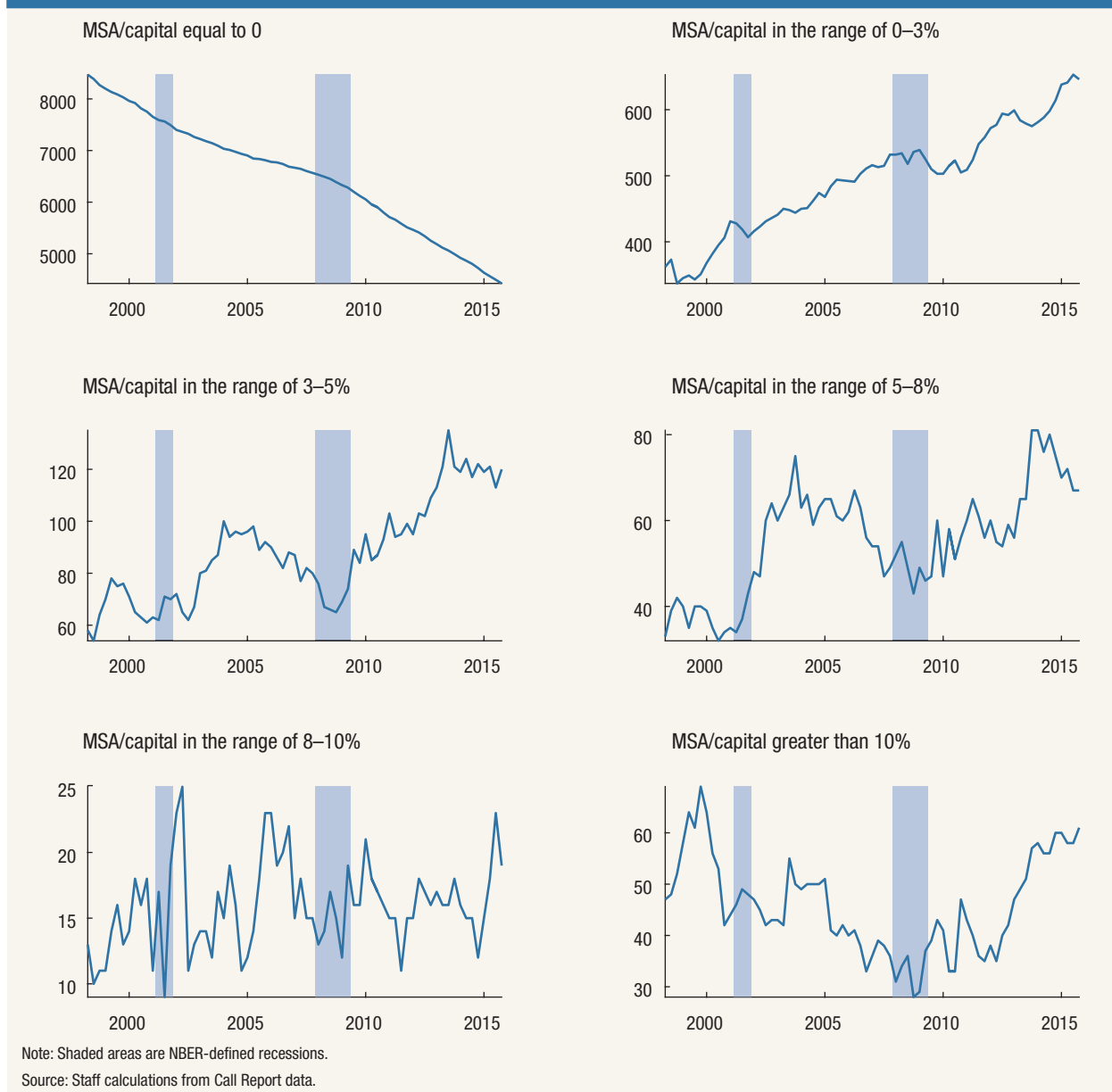
As discussed earlier in this report, much of the servicing contraction in large banking institutions appears related to banking institutions' desires to rid themselves of the servicing on nonperforming loans. The MSA treatment under the revised capital rule is unlikely to be a motive for the banking institution bulk sales of nonperforming loans because the MSA valuations for nonperforming loans tend to be low, and so selling the servicing on these loans may not be an effective way to reduce the MSAs to CET1 capital ratio.⁸³ Some of the contraction also results from large banking institutions scaling back somewhat their mortgage origination activity more generally during the post-crisis period. For example, data reported by Inside Mortgage Finance indicate that the large banking institution⁸⁴ share of mortgages originated to purchase homes fell from 53 percent in 2008 to 28 percent in 2015.⁸⁵ The overall amount of mortgages directly or indirectly financed by large banking institutions is more difficult to determine. Large banking institutions provide significant funding to some nonbank mortgage companies, and under some business models banking institutions source some of the mortgage loans that nonbank lenders originate.

Large reductions in servicing portfolios by large banking institutions were widespread after the crisis for the reasons described in this report, both for institutions whose MSA concentrations fell far short of the 10 percent deduction threshold and for those that

⁸³ Laurie Goodman, "Servicing Costs and the Rise of the Squeaky Clean Loan," *Mortgage Banker*, February 2016, 2–3, www.urban.org/sites/default/files/alfresco/publication-pdfs/2000607-Servicing-Costs-and-the-Rise-of-the-Squeaky-Clean-Loan.pdf. "MSRs tend to have the lowest value when the borrower is higher risk and the property is located in a long-timeline judicial state."

⁸⁴ For purposes of this calculation, a large banking institution is a BHC with assets greater than \$250 billion.

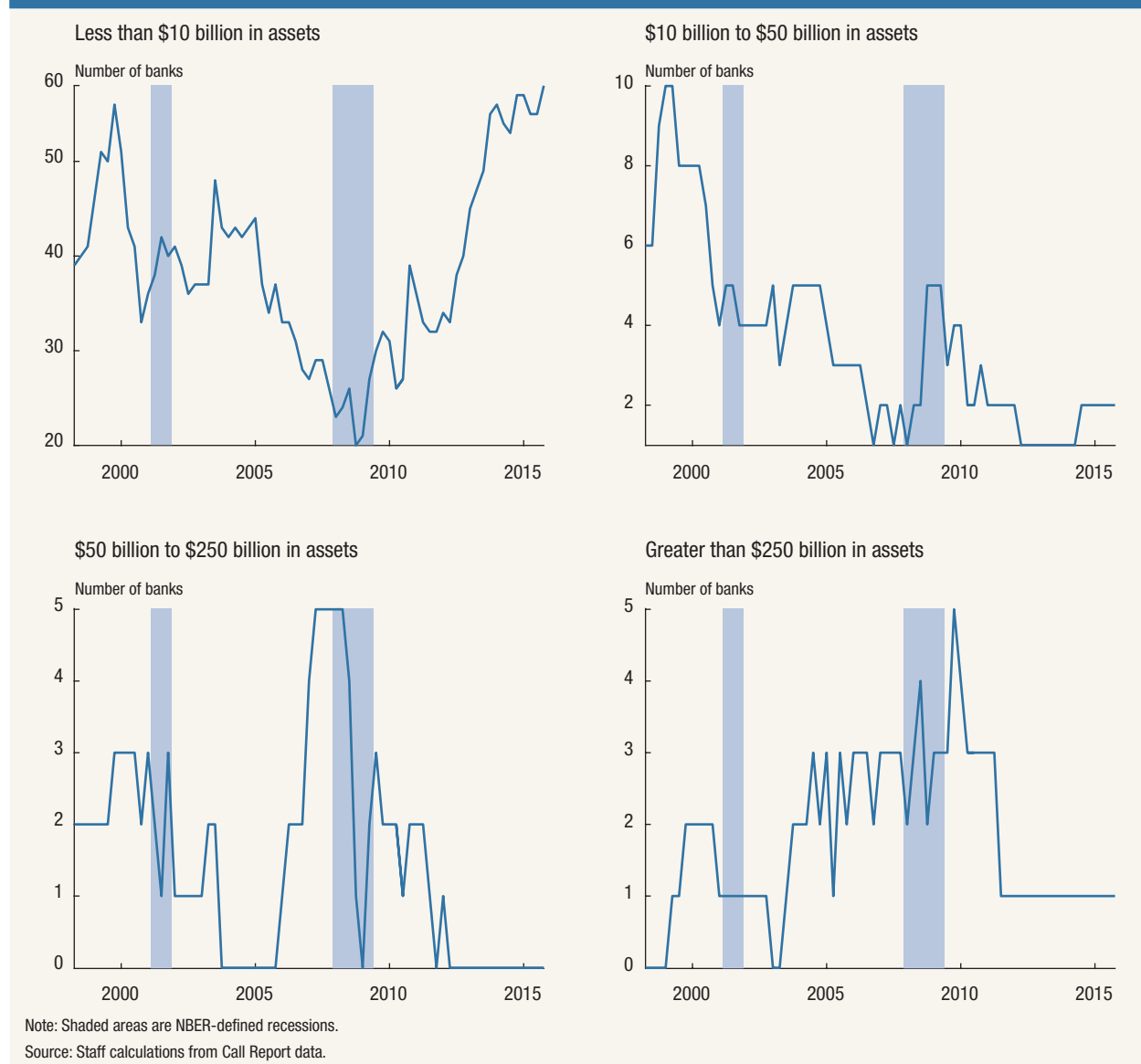
⁸⁵ The corresponding shares in the HMDA data for banks with assets greater than \$250 billion are 31 percent in 2008 and 12 percent in 2014 (the most recent year of data available). The HMDA shares are lower for large banks because HMDA only counts mortgages that a lender sources through its retail or broker channels as originations for that lender. Mortgages that a lender sources through its correspondent channel are counted as originations of the correspondent lender. The Inside Mortgage Finance data, in contrast, attribute to a lender loans sourced through its correspondent channel.

Figure 14. Number of banks with different MSAs to capital ratios, 1998–2015

exceeded it. Nonetheless, the decline in the number of large banks with MSAs to CET1 capital ratios in excess of 10 percent is partially explained by increases in capital levels at these firms during the last few years and suggests that large banks' economic incentive to avoid regulatory capital deductions resulting from MSAs above the 10 percent threshold is one of the factors that is influencing the amount and distribution of MSAs.

Reason for Increase in MSAs among Small Banks

As noted earlier, the number of banks with less than \$10 billion in assets and MSAs to CET1 capital ratios higher than 10 percent has risen considerably since 2010. This increase appears to stem, in part, from at least two factors. First, unlike the trend for

Figure 15. Number of banks with MSAs to CET1 capital ratios higher than 10% by asset size, 1998–2015

large banks, banks with less than \$10 billion in assets have increased their mortgage origination market share from 13 percent in 2008 to 19 percent in 2014.⁸⁶ Second, small banks appear to have switched their MSA business models after the financial crisis. During the housing bubble, some of the larger firms typically served as aggregators by purchasing loans and their accompanying servicing rights from smaller banks. The aggregator business was profitable, in part, because the GSEs charged lower guarantee

fees⁸⁷ to firms that brought them larger quantities of loans.⁸⁸ Aggregators, in turn, shared some of these cost savings with the smaller banks from whom they purchased loans.

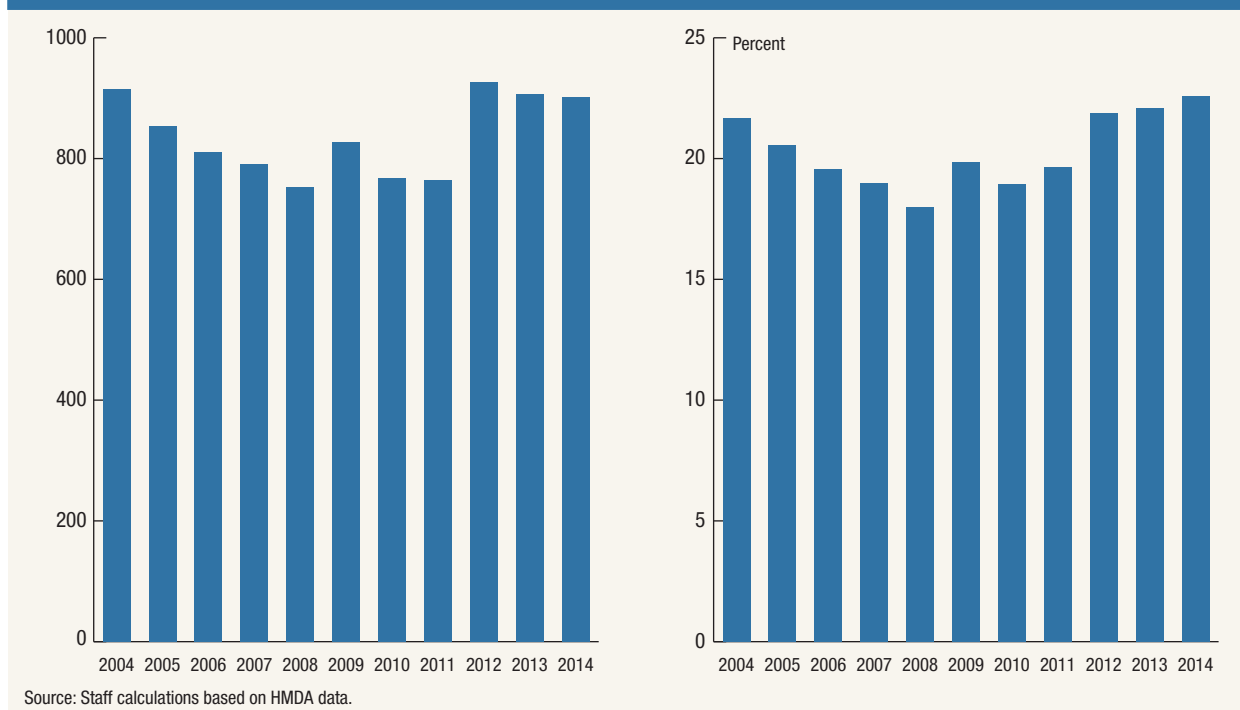
During and after the financial crisis, aggregators pulled back sharply on their purchases of loans from

⁸⁶ This calculation is based on HMDA data.

⁸⁷ The GSEs charge lenders a fee to compensate the GSEs for their costs in taking on the credit risk of the loan.

⁸⁸ Federal Housing Finance Agency, *Recent Trends in the Enterprises' Purchases of Mortgages from Smaller Lenders and Non-bank Mortgage Companies*, EVL-2014-010 (Washington, DC: 2014), 14, https://origin.www.fhfa.gov/Content/Files/EVL-2014-010_0.pdf.

Figure 16. Number and percent of banks with less than \$10 billion in assets with any loans sold to Fannie Mae or Freddie Mac, 2004–14



smaller banks. This pullback reflected several factors. First, the guarantee fee pricing became less favorable to aggregators.⁸⁹ Second, the GSEs began increasing their demands that banks repurchase loans that had performed poorly since being sold to the GSEs.⁹⁰ Aggregators' losses on these repurchases were disproportionately concentrated among loans that they had purchased from other firms.⁹¹ Third, the revised capital rule, stricter mortgage servicing regulations, and the litigation experience of some banks may have dampened aggregators' interest in amassing large portfolios of MSAs.⁹²

With the withdrawal of the aggregators from the market, smaller banks found it advantageous to sell their loans directly to the GSEs through the cash window.⁹³ However, the GSEs, unlike the aggregators, do not purchase the servicing rights along with the underlying loans. Some of these smaller banks

now appear to be retaining the servicing rights after selling the loans that they originate to the GSEs, and thereby recording an MSA, when they likely would not have done so with a sale to an aggregator.

To illustrate the shift in business strategy on the part of small banks, figure 16 shows the number and share of small banks that sold any loans to the GSEs in a given year. This calculation is based on data reported by lenders under HMDA.⁹⁴ Between 2011 and 2012, the number of small banks that sold loans to the GSEs rose from 765 to 927, and remained around this level through 2014.⁹⁵ This 150-bank increase in the number of small banks selling loans to the GSEs is roughly comparable to the increase in the number of banks recording an MSA during the same period.

⁸⁹ Federal Housing Finance Agency, "FHFA Announces Increase in Guarantee Fees," news release, August 31, 2012, www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Announces-Increase-in-Guarantee-Fees.aspx.

⁹⁰ *Recent Trends*, 16.

⁹¹ *Ibid.*

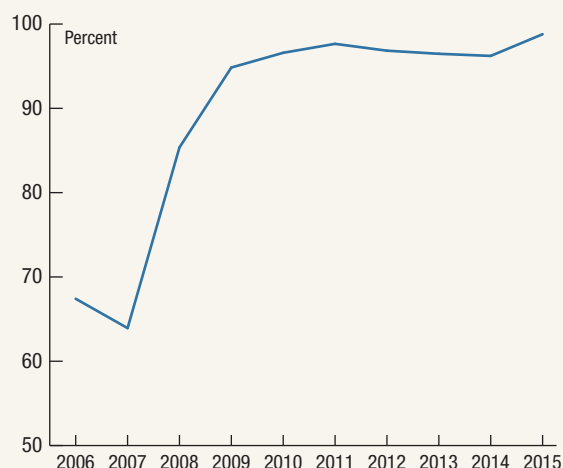
⁹² *Ibid.*

⁹³ The cash window refers to the manner by which the GSEs buy individual loans directly from mortgage originators.

⁹⁴ The calculation is restricted to mortgages originated in the first nine months of the year. Some loans that are originated in the fourth quarter of the year are not sold until the next calendar year, so calculations that include loans originated in that quarter may understate the share of loans that are sold.

⁹⁵ This calculation may understate the number of small banks that shifted their strategy, because banks with assets under a certain threshold and banks that operate only in rural areas are not required to report their loan originations under HMDA. The share of larger banks that sold loans to the GSEs also increased during this period; these data are not shown because only a few banks are in this category.

Figure 17. Percentage of loans sold to Freddie Mac in which the selling bank retained the servicing, 2006–15



Source: Staff calculations from Freddie Mac loan-level disclosures.

The HMDA data do not include information on whether any of these small banks retained the servicing rights after selling the loan to the GSEs. However, separate data from Freddie Mac suggest that the selling bank typically has retained the servicing, particularly in recent years. An important caveat is that these results are based on sellers and servicers with market shares greater than 1 percent, as the identity of smaller sellers and servicers is masked in the Freddie Mac data. Thus, these results may not reflect fully the behavior of small banks. That said, as shown in [figure 17](#), the share of loans securitized by Freddie Mac in which the selling bank retained the servicing rose from around 65 percent in 2007 to nearly 100 percent by 2011, and has held steady around that level since.

Potential Impact of the Revised Capital Rule on the Mortgage Servicing Business

Cost of Loan Servicing and Economies of Scale

One of the most significant factors affecting the ability of all firms to compete in the mortgage servicing business is the increase in the cost of servicing loans. For example, as shown in [figure 18](#), data collected by the Mortgage Bankers Association indicate that the annual cost of servicing a performing loan more than doubled from \$59 in 2008 to \$175 in 2015, whereas the annual cost of servicing a nonperforming loan more than quadrupled from \$482 to \$2,375 in the same time period.⁹⁶ In addition, the time it takes a servicer to resolve a nonperforming loan has increased substantially, adding to the total servicing cost.⁹⁷

Against this backdrop of rising costs overall, a firm may also achieve lower servicing costs if it is able to harness economies of scale. Some aspects of mortgage servicing become cheaper—as measured by the average cost to service a loan—when the firm services a larger number of loans. This relationship, known as “economies of scale,” stems from the fact that some costs, such as investments in technology and staff expertise in regulatory compliance, are upfront investments with benefits that are spread out across the firm’s mortgage servicing book.

To illustrate this point, [table 3](#) shows the average cost to service a loan broken out by the size of the firm’s servicing book. The estimates are based on data submitted by 160 independent mortgage companies and subsidiaries of banks through their Quarterly Mortgage Bankers Financial Reporting Forms.⁹⁸ The aver-

⁹⁶ Data are from the Mortgage Bankers Association Servicing Operations Study and Forum.

⁹⁷ Goodman, *Servicing Costs*, 2–3.

⁹⁸ For more information on the Mortgage Bankers Financial Reporting Form (MBFRF), see www.fanniemae.com/content/guide_form/form-1002-mortgage-bankers-financial-reporting-form. Companies may choose to release their MBFRF data to the Mortgage Bankers Association for use in aggregate industry statistics.

Table 3. Mortgage servicing, dollar cost per loan

Expense	Servicing volume, number of loans			
	Less than 2,500	2,500-10,000	10,000-50,000	Greater than 50,000
Total direct expenses	\$ 254	\$ 170	\$ 219	\$ 242
Personnel	\$ 96	\$ 76	\$ 92	\$ 115
Occupancy and equipment	\$ 7	\$ 4	\$ 9	\$ 8
Technology-related	\$ 2	\$ 4	\$ 8	\$ 10
Subservicing fees paid	\$ 138	\$ 70	\$ 70	\$ 52
Other miscellaneous expenses	\$ 12	\$ 17	\$ 39	\$ 58
Average number of loans serviced	1,231	5,166	22,940	368,327
Seriously delinquent rate (% based on \$)	0.85	1.30	2.45	7.67
Number of companies reporting	36	45	47	32

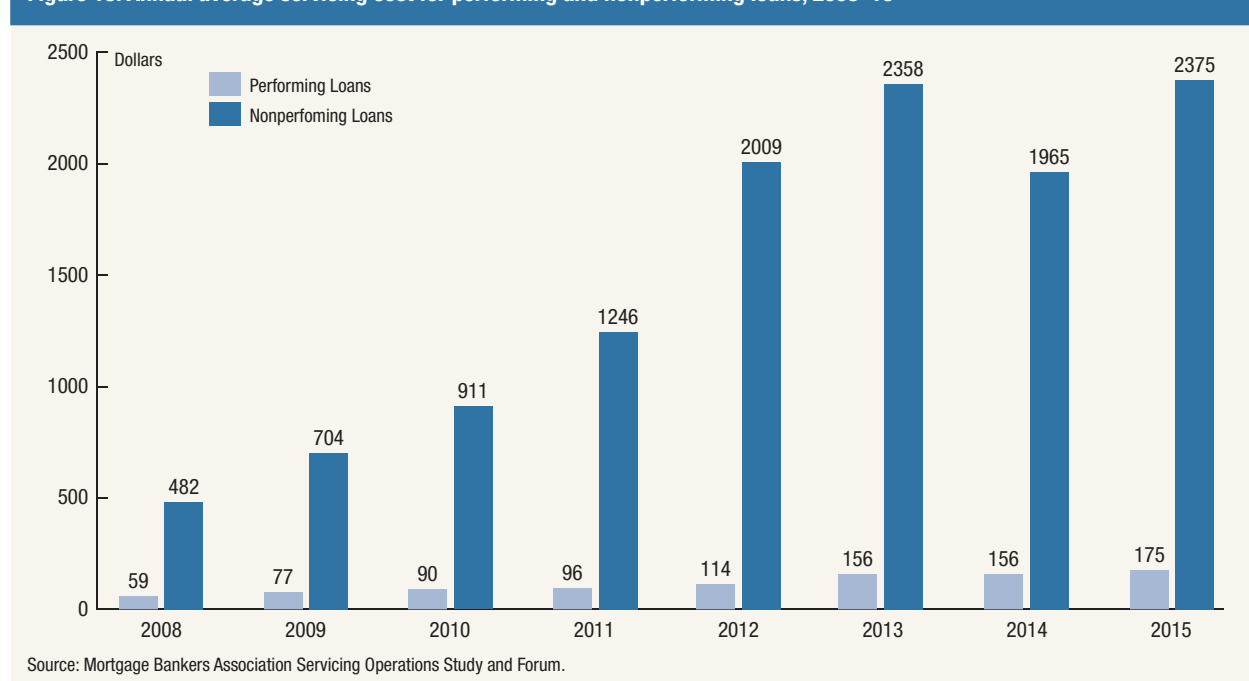
Note: Expenses may not sum to total because of rounding.

Source: Mortgage Bankers Association, *Quarterly Mortgage Bankers Performance Report*, 2015.

age cost to service a loan follows a U-shape. The average annual cost as measured by total direct expenses is roughly around \$250 a year for the smallest and the largest firms; the average annual costs are lower for the firms servicing between 2,500 and 10,000 loans and between 10,000 and 50,000 loans, at \$170 and \$219, respectively.

The differences in average cost reflect both economies of scale and the composition of the firms’ servicing book. As shown in the last row of the table, the serious delinquency rate for the firms that service the largest amount of loans (more than 50,000) is 7.7 percent, approximately eight times the delinquency rate of the firms with the smallest amount of loans (less than 2,500). The high average servicing cost for the firms with the largest amount of loans likely reflects primarily their outsized share of delinquent loans.

That said, the fact that firms that service between 2,500 and 10,000 loans a year have lower average servicing costs than firms that service less than 2,500 loans is consistent with the idea that economies of

Figure 18. Annual average servicing cost for performing and nonperforming loans, 2008–15

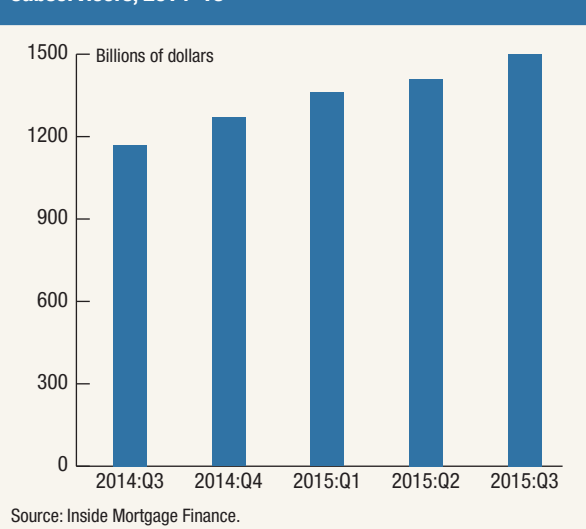
scale exist in mortgage servicing. Further, the costs are lower in these data for the firms that service between 2,500 and 10,000 loans a year despite the fact that these firms service mortgages with slightly higher delinquency rates than firms that service less than 2,500 loans.

In recent years, moreover, the growth in the subservicing industry has made it easier for small firms to harness economies of scale by contracting out certain servicing functions. Small firms can leverage subservicers' technology infrastructure, for example, or their specialized knowledge of the regulations applicable to nonperforming loans.⁹⁹ As shown in figure 19, subservicing has grown significantly since at least the middle of 2014, with an estimated \$1.5 trillion in mortgage loans serviced by subservicers by the fourth quarter of 2015.

As represented, at least, by the share of their servicing costs spent on subservicing fees, small firms appear more likely than larger firms to make use of subservicers. Table 3 indicates that subservicing fees represent about half of the servicing costs (\$138 out of \$254) for firms that service less than 2,500 loans, compared with around 20 percent of the costs (\$52

out of \$242) for firms that service more than 50,000 loans.

On the whole, the data suggest that smaller firms face higher costs to service a loan than larger firms, holding constant the characteristics of the underlying loans. To some extent, the cost disadvantage to smaller firms is offset by the rise in subservicing. Nonetheless, small banks that want to achieve an effi-

Figure 19. Total UPB of mortgages serviced by subservicers, 2014–15

⁹⁹ Note that under a subservicing arrangement, the MSAs remain on the servicer's balance sheet.

cient cost structure through having a higher concentration of MSAs may face a tradeoff with the higher risks inherent in higher MSA concentrations and the costs of compliance with the revised capital rule, particularly if the bank's MSAs to CET1 capital ratio increases beyond 10 percent.¹⁰⁰

Serve Consumers

Banking institutions take into account several factors when deciding whether to engage in the business of servicing loans held by other firms. Such factors include the cost, complexity, and risks involved with servicing mortgage loans; valuing the MSAs; and regulatory compliance, including regulatory capital requirements and servicing regulations. As noted, the growth of subservicers may make it easier for smaller firms to enter the mortgage servicing market.

For most banking institutions that hold MSAs, the MSA treatment under the revised capital rule generally has a minor impact. Based on the earlier analysis of banks' MSAs to CET1 ratios, the deduction threshold does not affect the vast majority of banking institutions. As discussed, the increase in the risk weight for a banking institution with an MSAs to CET1 capital ratio below 10 percent could have a relatively small effect, given that under the previous regulatory capital framework the amount of MSAs includable in regulatory capital was limited to the lesser of 90 percent of the MSAs' fair value or 100 percent of the MSAs' carrying amount, potentially resulting in an effective risk weight of up to 215 percent. For other banking institutions the increase in the risk weight for MSAs could be more significant starting in 2018. That said, Call Report data as of June 30, 2015, adjusted to estimate the impact of the fully phased-in regulatory capital requirements, show that approximately 99 percent of all insured depository institutions are above the 4.5 percent CET1 capital minimum ratio and approximately 99 percent of all insured depository institutions are above a 7 percent CET1 capital ratio, which is equivalent to the 4.5 percent minimum CET1 capital ratio plus the fully phased-in 2.5 percent capital conservation buffer. Thus, the vast majority of banking institutions would not face restrictions on capital distributions and certain discretionary bonus payments under the revised capital rule when accounting for the fully phased-in capital

requirements, including the revised MSA treatment. Finally, the revised capital rule's treatment of MSAs generally does not impact banking institutions that service mortgages that these firms originate and hold for investment in their portfolio.

The revised capital rule is likely to have the greatest continuing effect on banking institutions that want to specialize as aggregators of MSAs. Such banking institutions face incentives under the revised capital rule to keep their servicing books under a certain size because MSA values above certain thresholds must be deducted from CET1 capital. Inasmuch as there are economies of scale in mortgage servicing, it may be difficult for certain smaller firms that want to specialize as aggregators of MSAs both to achieve an efficient cost structure and to maintain an amount of MSAs that is below the deduction threshold.

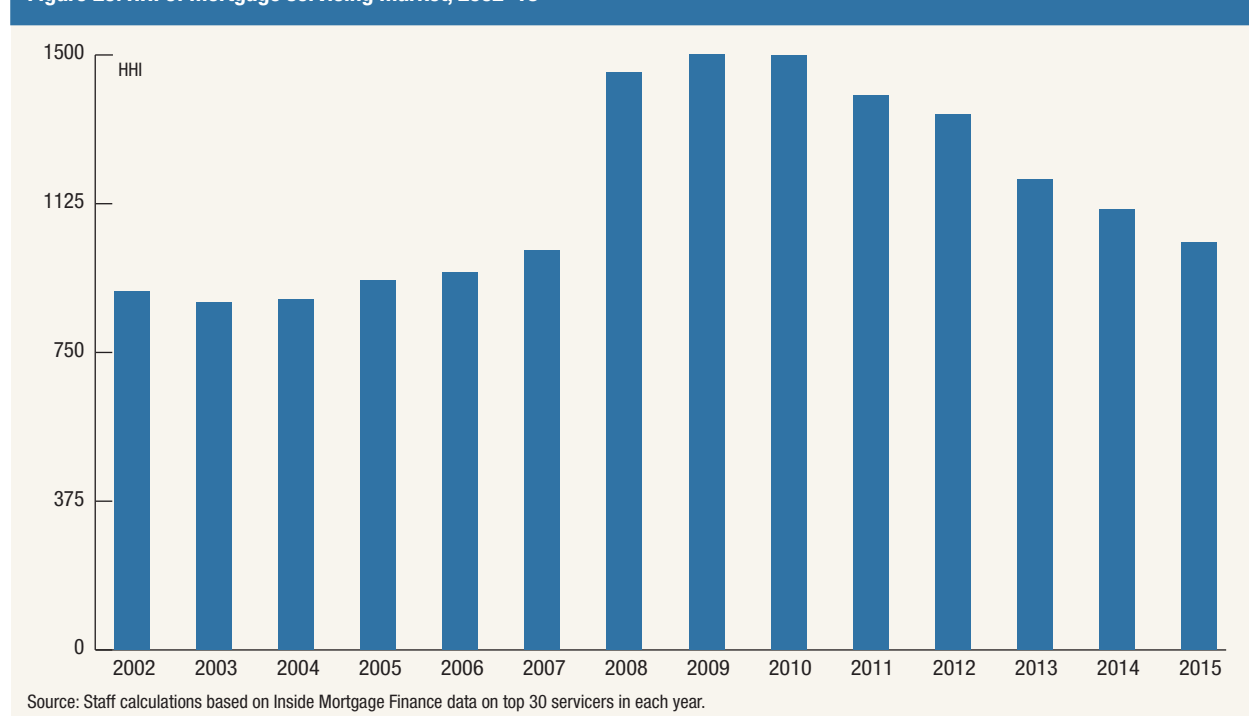
A pullback of aggregator banking institutions from the MSA market could have effects on other firms and on MSA pricing and liquidity. However, the findings suggest that most banking institutions have sufficient capital to comply effectively with the MSA treatment under the revised capital rule. The increased capital strength and resiliency of banking institutions as a result of the revised capital rule will also make it easier for institutions to navigate periods of stress.

The extent to which a pullback by aggregators affects the mortgage servicing market depends on the extent to which other firms are interested in servicing mortgage loans. As noted earlier, the vast majority of banking institutions have MSAs to CET1 capital ratios well below 10 percent. These banking institutions may be willing to increase their purchases of MSAs, and indeed, small banks appear to be increasing their MSA market share. Nonbanks may also be interested in purchasing servicing rights.

To date, the mortgage servicing market appears to have stayed competitive. On this point, [figure 20](#) displays the evolution of a standard measure of market concentration, the Herfindahl–Hirschman Index (HHI).¹⁰¹ High values of this index suggest that the industry is heavily dominated by a small number of firms, whereas low values signal that the market

¹⁰⁰NCUA capital requirements do not deduct any MSAs from regulatory capital.

¹⁰¹The HHI is defined as the sum of squares of individual firms' market shares (expressed in percentage points) at a given point in time. These estimates will overstate the HHI because they are based only on the 30 largest firms. If they were based on all mortgage servicers, the HHI would be lower. Our estimates are similar to those calculated by the GAO. *Nonbank Mortgage Servicers*, 65–67.

Figure 20. HHI of mortgage servicing market, 2002–15

shares are relatively evenly distributed among a large number of competitors. The DOJ defines a market as moderately concentrated if its HHI is between 1,500 and 2,500 points, and as highly concentrated if its HHI is in excess of 2,500 points.¹⁰²

¹⁰²Information on the HHI can be located at www.justice.gov/atr/herfindahl-hirschman-index.

Before the financial crisis, the HHI hovered around 1,000, well below the levels of concern. The contraction in servicing during the financial crisis pushed it up to 1,500. In recent years, though, as many large banks have reduced their MSA holdings, the concentration has returned to close to pre-crisis levels, and well below the levels that indicate concern about market concentration.

Potential Impact of the Revised Capital Rule on Nonbanks

This section describes how the mortgage servicing market might change if the revised capital rule were also applied to nonbank firms. The analysis is a hypothetical exercise based on estimates from public filings. The federal banking agencies only have the authority to set capital requirements for nonbanks that are subject to the supervision of one of the agencies, such as nonbank financial companies that the FSOC has determined shall be supervised by the Board.¹⁰³ Other agencies have some ability to set financial requirements for nonbank servicers. Under its conservatorship authority, FHFA has the ability to set financial strength requirements for the GSEs' servicer counterparties. Ginnie Mae can also set criteria for its servicer counterparties. Ginnie Mae and FHFA recently enacted increases in these requirements, which took effect January 1, 2015,¹⁰⁴ and December 31, 2015,¹⁰⁵ respectively. State regulators have also proposed prudential standards that would apply to nonbank servicers.¹⁰⁶

Capital requirements for insured depository institutions must be strong enough to limit the moral hazard associated with government-provided deposit insurance, which also tends to reduce the incentive for private market participants to monitor the risk-taking behavior of regulated banks. However, nonbank firms, including nonbank servicers, do not have access to deposit insurance and thus are more closely monitored by a range of counterparties and stakeholders. This difference implies that the capital requirements that apply to banking institutions

would not necessarily be appropriate for nonbank servicers.

If the revised capital rule were applied to nonbank firms, the MSA treatment would likely affect nonbank activity in the mortgage servicing market. However, the deduction of MSAs from regulatory capital would prove far more consequential for nonbank servicers than the 250 percent risk weight for MSAs that are not deducted. The discussion in this section, therefore, focuses on the potential effect of the MSA deduction approach.

The effect of this approach on nonbank servicers depends on the structure of the nonbank servicer's balance sheet, which in turn depends on the servicer's corporate structure and business model. Broadly speaking, nonbank servicers fall into three groups, although most servicers are some combination of these models. The first group consists of servicers that have a REIT structure. The portfolios of REITs, in order to meet REIT tax requirements, are heavily weighted towards passive real-estate investments such as MBS and whole loans held for investment. The second group consists of firms that primarily specialize in servicing and that grow their portfolios by purchasing MSAs in bulk. These firms have balance sheets weighted heavily towards servicing advances and MSAs. The third group consists of firms that primarily originate mortgages, sell them into the secondary market, and retain the servicing rights. These firms typically have portfolios of loans held for sale in addition to MSAs and servicing advances.

Currently, aggregate holdings of MSAs by REITs are small. REITs serviced 6 percent, measured by the UPB, of mortgages serviced by nonbanks in 2015.¹⁰⁷ However, direct REIT investments in MSAs increased significantly in the wake of the 2013 IRS PLR referenced earlier in this report. In particular, REIT holdings of MSAs increased from \$5 million in

¹⁰³See 12 USC § 5365.

¹⁰⁴"Eligibility Requirements," Ginnie Mae, www.ginniemae.gov/doing_business_with_ginniemae/issuer_resources/how_to_become_an_issuer/Pages/eligibility_requirements.aspx/.

¹⁰⁵Federal Housing Finance Agency, "Fannie Mae and Freddie Mac Issue New Eligibility Requirements for Seller/Servicers," news release, May 20, 2015, www.fhfa.gov/Media/PublicAffairs/Pages/New-Eligibility-Requirements-for-SellerServicers.aspx.

¹⁰⁶Conference of State Bank Supervisors and American Association of Residential Mortgage Regulators, "State Regulators Propose Prudential Regulatory Standards for Non-Bank Mortgage Servicers," news release, March 25, 2015, www.csbs.org/news/press-releases/pr2015/Pages/PR-032515.aspx.

¹⁰⁷Tabulation based on Inside Mortgage Finance data of the top 50 holders of MSAs in 2015.

Table 4. Balance sheet components and selected capital ratios for selected large nonbank mortgage servicers

Thousands of dollars, except as noted

Entity	MSAs, fair value	Servicing advances	Residential mortgages	Real estate securities	Total assets	CET1 proxy	MSAs at FV/total assets	MSAs at FV/CET1 proxy
Two Harbors	493,688	37,499	3,985,158	7,825,320	14,575,772	3,576,561	3%	14%
Hatteras	269,926	0	361,307	14,302,230	16,137,526	1,865,105	2%	14%
Redwood Trust	191,976	1,000	3,928,803	1,233,256	6,231,027	1,146,265	3%	17%
PHH	880,000	691,000	743,000	0	3,652,000	1,318,000	24%	67%
Stonegate Mortgage	199,637	19,374	645,696	0	1,280,626	261,628	16%	76%
Ocwen	1,222,745	2,151,066	2,902,299	7,985	7,404,809	851,562	17%	144%
Nationstar Mortgage	3,358,327	2,223,083	9,117,664	0	16,654,070	1,758,114	20%	191%
Walter Investment	1,810,416	1,595,911	13,214,845	0	18,591,501	804,676	10%	225%
PennyMac	1,426,592	299,354	1,101,204	0	3,505,294	270,826	41%	527%

Source: Staff calculations based on SEC Form 10-K data.

2012 to nearly \$1 billion in 2015, while total assets of these REITs contracted over this period from \$48 billion to \$37 billion.¹⁰⁸

The effect of REITs on nonbank servicers, though, is larger than this tabulation suggests. Many nonbank servicers have a relationship or affiliation with a REIT. Such nonbank servicers typically finance part of their balance sheet by selling their excess servicing as an interest-only strip associated with the MSAs to a third-party REIT. Nonbanks have been increasing their use of this financing structure. Two REITs that buy these excess servicing strips, for example, increased their holdings of these assets from \$250 million in 2012 to \$2.5 billion in 2015, at a time when their overall assets increased from \$48 billion to \$52 billion.¹⁰⁹ REITs have also provided nonbank servicers with funding for servicing advances.

Table 4 shows selected components of the balance sheets of nine large publicly traded nonbank servicers.¹¹⁰ This balance sheet information was used to estimate a proxy of each firm's ratio of MSAs to CET1 capital.¹¹¹ The analysis focuses only on publicly traded firms—which hold about 60 percent of the UPB of loans serviced for others by nonbanks—because data are not available on privately held

firms.¹¹² The analysis does not include several large privately held nonbank servicers, including Quicken Loans Inc. (Quicken), Caliber Home Loans, Inc., Lakeview Loan Servicing, LLC, and Freedom Mortgage Corporation, and may overweigh firms that elect REIT tax treatment because these firms are more likely to be publicly traded.

As suggested by the discussion above, servicers that are REITs can have large portfolios of mortgages and MBS relative to their holdings of MSAs. As a result, the ratios of MSAs to a CET1 capital proxy would be relatively low for this subset of nonbank servicers (Two Harbors, Hatteras, and Redwood Trust)—around 14 to 17 percent. Although complying with the revised capital rule would increase some of these firms' incentives to increase capital and might induce them to shed some servicing rights or otherwise rebalance their portfolios, their fundamental business model likely would remain viable.

Because MSAs constitute a larger share of the total assets of other nonbank servicers compared with those structured as REITs, such nonbank servicers could incur substantial capital deductions, unless they substantially increased their capital levels. Two such nonbank servicers—PHH Corporation and Stonegate Mortgage Corporation—have fairly significant holdings of whole loans relative to their MSAs, and would have MSAs to CET1 capital proxy ratios in the range of 65 to 75 percent. Three of the nonbank servicers—Ocwen, Nationstar, and Walter—would have MSAs to CET1 capital proxy ratios around 150 to 225 percent and PennyMac, as a result of its corporate structure, could potentially have an

¹⁰⁸Tabulation based on the public filings of Redwood Trust, Inc. (Redwood), Hatteras Financial Corp. (Hatteras), and Two Harbors Investment Corp (Two Harbors).

¹⁰⁹Tabulation based on the public filings of New Residential Investment Corporation and PennyMac Investment Trust (PennyMac).

¹¹⁰Estimates are based on the public 2015 10-K filings of these firms, available at www.sec.gov/edgar/searchedgar/webusers.htm.

¹¹¹The proxy CET1 is the sum of common stock, additional paid-in capital, retained earnings, accumulated other comprehensive income net of distributions, and treasury shares.

¹¹²The estimate of the market share of the nine banks in the sample is based on data from Inside Mortgage Finance.

MSAs to CET1 capital proxy ratio of around 525 percent. Thus, nonbank servicers without a REIT structure would face pressures to increase their capital levels or change their business models significantly, or both, if they were subject to the revised capital rule.

In the event that these nonbank servicers—other than the three publicly traded REITs—left the mortgage servicing business, the concentration of the servicing industry, based on the HHI, would double, from roughly 850 for the mortgage servicing industry in 2015 to around 1,600.¹¹³ The analysis assumes, for purposes of this exercise, that no new servicers enter the market, and the portfolios of the nonbanks that exit the market are spread across the remaining servicers in proportion to their current servicing share. Although the increase in concentration is significant under this scenario, it is generally consistent with the HHI values in 2009 and 2010—the last time period when nonbank servicers significantly reduced their market share. Importantly, this higher value does not appear to be problematic from a competition perspective, as DOJ guidelines consider markets with HHIs between 1,500 and 2,500 to be moderately concentrated. Under these conditions, mortgage servicers would likely still have limited market power.

The assumptions underlying this exercise may not be true in practice. For example, banking institution servicers may be reluctant to increase their market

share. In some cases, this reluctance may stem from concerns about breaching the 10 percent deduction threshold, particularly in a scenario where a banking institution is considering acquiring the servicing portfolio of a large nonbank. For example, as of the fourth quarter of 2015, only three banking institution servicers that had a significant presence in the servicing market would have been able to take on the entire servicing portfolio of the two biggest nonbank servicers (Nationstar and Walter) without the acquiring banking institution breaching the deduction threshold in the revised capital rule; only four banking institution servicers would have been able to take on the entire servicing portfolio of any of the six largest nonbank servicers (Nationstar, Walter, PennyMac, Quicken, Ocwen, and PHH) without breaching the threshold.¹¹⁴ In other cases, a banking institution's reluctance to increase its servicing portfolio might stem from the higher costs of servicing loans and the banking institution's experiences with nonperforming loans during and after the crisis. Offsetting this consideration to some extent is the fact that the compensation for servicing loans might increase after the nonbank firms left the market. This increased compensation might offset any increases in capital costs and might also induce new servicers to enter the market.

¹¹³This estimate is based on Inside Mortgage Finance data on the top 50 servicers. The HHI presented earlier in the report was based on the top 30 servicers in order to maintain comparability across time. The HHI estimate in this section is lower than this earlier estimate because it is based on a larger number of servicers.

¹¹⁴We consider a servicer to have a significant presence in the servicing market if it is listed in the Inside Mortgage Finance 2015 list of the top 50 servicers. Quicken's MSA holdings are not publicly available because Quicken is a privately held company. For purposes of this calculation, Quicken's MSA holdings are imputed from its mortgage servicing book as reported in Inside Mortgage Finance data, and from the relationship that holds for other nonbank servicers between their MSA holdings and their servicing book.

Mortgage Servicing Assets Outside of the United States

The fact that MSAs are prominent in the United States reflects the U.S. approach to mortgage finance. Approximately 65 percent of first-lien mortgages in the United States are held in securities guaranteed by a GSE or Ginnie Mae.¹¹⁵ As discussed earlier in this report, the fact that the GSEs and Ginnie Mae do not service the mortgages in their securitized pools necessitates a separate market for MSAs.

Other countries, however, have adopted mortgage finance systems that do not create a considerable volume of MSAs.¹¹⁶ In particular, most non-U.S. coun-

tries use covered bonds rather than securitizations to support their mortgage finance system. Covered bonds are debt instruments primarily issued by banks and secured by dedicated collateral such as mortgages. With a covered bond, however, the pool of assets covering the bond remains on the issuer's balance sheet and the issuance of the bond does not create a separate MSA. In discussions with supervisory authorities from other countries, they noted that their supervised firms have negligible ratios of MSAs to CET1 capital. These supervisors noted that these amounts were likely attributable to the U.S. operations of their supervised banks, or were legacy amounts associated with acquisitions.

¹¹⁵Statistic calculated from table L.218 of the Financial Accounts of the United States as the sum of lines 18 and 19 (GSEs and Agency- and GSE-backed mortgage pools) divided by (line 1, total liabilities, minus line 23, home equity loans).

¹¹⁶The International Financial Reporting Standards, which are the accounting standards for the consolidated financial statements

of all companies whose securities trade in a regulated market in the European Union, accommodates the creation of an MSA.

Analyses on Impact of the Revised Capital Rule

As mentioned above, the federal banking agencies invited public comment on the proposed regulatory capital treatment of MSAs, and addressed comments on this approach in the final rule.

Under section 475 of the Federal Deposit Insurance Corporation Improvement Act of 1991, the amount of readily marketable purchased MSAs that a bank may include in regulatory capital cannot be more than 90 percent of their fair value.¹¹⁷ Section 475 provides the federal banking agencies with the authority to remove the 90 percent limitation on purchased MSAs, subject to a joint determination by the agencies that its removal would not have an adverse effect on the deposit insurance fund or the safety and soundness of insured depository institutions. The agencies evaluated the proposed treatment of MSAs and determined that based on the conservative treatment of MSAs under the revised capital rule, statutory factors were consistent with a determination that the 90 percent limitation could be removed.

In addition, the federal banking agencies considered whether the revised capital rule appropriately reflects the risks inherent in banking institutions' business models. Prior to issuing the revised capital rule, the federal banking agencies conducted a pro-forma economic impact analysis that showed that the vast majority of small banking institutions would meet the revised capital rule's minimum CET1 capital requirement of 4.5 percent plus the 2.5 percent capital conservation buffer on a fully phased-in basis, including the deduction approach for MSAs. As previously noted in the discussion of the regulatory capital treatment of MSAs, the agencies have long limited the inclusion of MSAs and other intangible assets in regulatory capital and believe the revised capital rule's treatment of MSAs contributes to the safety and soundness of banking institutions by mitigating against MSA market value fluctuations that may adversely affect banking institutions' regulatory

capital base, particularly during periods of economic distress.

Moreover, under the Regulatory Flexibility Act (RFA), regulators must analyze the impact of significant rules on small entities. Accordingly, the federal banking agencies each conducted and published an impact analysis. NCUA exempts credit unions with total assets less than \$100 million from the risk-based capital requirement and determined that its rule would not have a material impact on small credit unions, consequently NCUA did not perform such analysis.¹¹⁸

The impact analysis performed by the federal banking agencies depicted the aggregate effect on small institutions of complying with the revised capital rule. The economic impact analysis of the revised capital rule considered its effect in its entirety, which included the effect of changes to the MSA treatment as one of many changes. The analysis was conducted in a manner consistent with the RFA.

The OCC estimated that complying with the revised capital rule would cost \$55.4 million for OCC-supervised institutions with assets of \$500 million or less. The OCC estimated that 41 small OCC-supervised institutions would have a capital shortfall of \$163.6 million under the fully phased-in revised capital rule. To estimate the cost of this capital shortfall, the OCC calculated the approximate cost of raising this capital by considering the cost of losing tax

¹¹⁷Pub. L. No. 102-242, 105 Stat. 2236, 2386-87 (1991).

¹¹⁸NCUA risk-based capital requirements that will go into effect in 2019 will only apply to federally insured credit unions with total assets greater than \$100 million. NCUA Interpretative Ruling and Policy Statement 15-1 amended the definition of small credit unions to those with assets less than \$100 million. NCUA defined the investment in MSAs as a "small asset class." Before finalizing risk-based capital requirements, NCUA identified 432 federally insured credit unions with assets over \$100 million reporting MSAs ranging from less than 1 basis points to 132 basis points of total assets, with an average of 20 basis points of assets. In November 2015, NCUA provided a report to the House Financial Services Committee on the risk-based capital final rule containing further analysis of the rule. The report is available at www.ncua.gov/regulation-supervision/Documents/RBC/final-risk-based-capital-rule-report.pdf.

benefits when converting from debt to equity financing, which yielded a cost estimate of \$0.9 million per year for the full \$163.6 million shortfall.

The Federal Reserve estimated that complying with the revised capital rule would cost \$27.3 million for Federal Reserve-supervised institutions with assets of \$500 million or less. The Federal Reserve estimated that nine small Federal Reserve-supervised institutions would have a capital shortfall of \$11.3 million under the fully phased-in revised capital rule. To estimate the cost of this capital shortfall, the Federal Reserve calculated the approximate cost of raising this capital by considering the cost of losing tax benefits when converting from debt to equity financing, which yielded a cost estimate of \$6,391 per year for the full \$11.3 million shortfall.

In the RFA to the FDIC's revised capital rule, the FDIC estimated that complying with the revised capital rule would impact approximately 74 FDIC-supervised institutions with total assets of \$500 million or less (small FDIC-supervised institutions) that did not hold sufficient capital to satisfy the requirements of the revised final rule. Those institutions,

which represented approximately 3 percent of small FDIC-supervised institutions, collectively would need to raise approximately \$233 million in regulatory capital to meet the minimum capital requirements of the revised capital rule.¹¹⁹

The federal banking agencies published and invited public comment on the treatment of MSAs under the proposed revisions to the capital framework.¹²⁰ The federal banking agencies received numerous comments on the proposal, including comments from industry participants. The federal banking agencies considered all substantive comments received on the treatment of MSAs addressed in the preamble and final rule published by the OCC and Federal Reserve, and the interim final rule by the FDIC. NCUA's proposed and final rules reflect the analysis of each issue that was presented by commenters.¹²¹

¹¹⁹79 Fed. Reg. 20,757 (April 14, 2014).

¹²⁰77 Fed. Reg. 52,792, 52,823 (August 30, 2012); 79 Fed. Reg. 11,183 (February 27, 2014); and 80 Fed. Reg. 4339 (January 27, 2015).

¹²¹78 Fed. Reg. 62,018, 62,069–62,070 (October 11, 2013); and 80 Fed. Reg. 66,625 (October 29, 2015).

Recommendations for Legislative or Regulatory Actions

As reflected in the results of this study, MSA valuations are inherently subjective and subject to uncertainty, as they rely on assessments of future economic variables. This reliance can lead to variance in MSA valuations across firms and raises questions regarding the ability of banking institutions to generate value from MSAs under adverse financial conditions. These results support continued limitations on the inclusion of MSAs in the regulatory capital of banking institutions.

The current statutory framework provides sufficient supervisory and regulatory tools for the federal banking agencies and NCUA to address developments in the mortgage servicing market. Accordingly, the fed-

eral banking agencies and NCUA do not at this time have any recommendations for additional legislative or regulatory actions regarding the value of and ability to sell MSAs and the ability of banking institutions to hold MSAs.

The past several years demonstrate, however, that the mortgage servicing industry is evolving rapidly. The federal banking agencies and NCUA will continue to monitor developments in mortgage servicing industry standards and practices, and will exercise their regulatory and supervisory authorities, as appropriate, to pursue their respective statutory mandates to ensure the safety and soundness of depository institutions and the stability of the U.S. financial system.

Appendix

This table displays selected summary statistics from BHCs' forecasts of the changes in their MSA valuations in a variety of stress scenarios. The forecasts are based on the characteristics of the BHCs' servicing portfolios as of the end of 2015. In this calculation,

the first step is to calculate the percent change in each BHC's MSA valuation in each of the stress scenarios. The second step is to calculate the average, median, standard deviation, and interquartile range of these percent changes across BHCs.

Table A.1. Selected summary statistics of bank holding company forecasts of changes in their MSA valuations in stress scenarios

Stress scenario	Percent change (simple average)	Percent change (weighted by UPB of loans serviced)	Median	Standard deviation of percent change	Interquartile range
+100 basis point parallel move in yield curve	18.7	21.4	19.0	5.0	5.1
+50 basis point parallel move in yield curve	9.9	11.4	10.7	3.3	2.7
+25 basis point parallel move in yield curve	4.8	5.8	5.5	2.5	1.5
-25 basis point parallel move in yield curve	-6.8	-6.4	-6.5	1.9	2.2
-50 basis point parallel move in yield curve	-13.3	-12.8	-13.1	2.5	4.3
-100 basis point parallel move in yield curve	-26.8	-25.6	-26.8	4.2	5.7
+10% change in 3X10 Implied Swaption Volatility	-1.0	-0.1	-0.4	2.2	1.0
-10% change in 3X10 Implied Swaption Volatility	-0.2	-0.1	0.2	2.0	0.9
+100 basis point move in OAS/discount rate	-4.3	-4.2	-3.8	1.6	0.6
-100 basis point move in OAS/discount rate	1.8	4.1	3.9	7.2	0.7
+100 basis point change in CDR	-6.8	-12.5	-5.5	6.3	5.3
+500 basis point change in CDR	-30.4	-48.7	-27.8	23.7	28.9
+1000 basis point change in CDR	-56.4	-80.7	-54.9	37.7	54.4
+100 basis point change in CPR	-4.0	-4.3	-4.0	1.4	0.5
+500 basis point change in CPR	-16.8	-18.9	-17.6	4.6	1.7
+1000 basis point change in CPR	-28.8	-32.1	-30.0	7.6	3.1
3-month increase in foreclosure time frame	-1.0	-1.5	-0.9	1.1	1.7
\$1 per loan increase in normal servicing cost	-0.6	-0.3	-0.3	1.2	0.1
\$1 per loan increase in delinquency servicing cost	-0.4	-0.1	0.0	1.3	0.1
\$1 per loan increase in default/foreclosure servicing cost	-0.4	-0.1	0.0	1.3	0.0
\$1 per loan decline in ancillary income	-0.6	-0.3	-0.3	1.2	0.1
+100 basis point change in national unemployment rate	-0.6	-0.3	-0.5	0.8	1.4
+500 basis point change in national unemployment rate	-3.1	-2.2	-3.1	3.6	5.3
-500 basis point change in HPI (National Core Logic Index)	1.4	0.6	0.6	2.4	2.7
-1000 basis point change in HPI (National Core Logic Index)	2.9	0.9	1.0	5.2	7.1
-2000 basis point change in HPI (National Core Logic Index)	3.3	-0.2	2.0	8.3	14.3

Note: OAS = option-adjusted spread.

Source: Staff calculations from FR Y-14 data.



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National Credit Union Administration
www.ncua.gov