The Past, Present and Future of agency MBS Liquidity

Prepared for Ginnie Mae

Prepared by: State Street Global Advisors and Urban Institute's Housing Finance Policy Center

October 2016

RESEARCH REPORT[1]

The aftermath of the financial crisis has witnessed a curtailment of risk within the financial services industry. This is hardly surprising given the forceful regulatory, policy and legislative focus on reducing systemic risk. Higher capital requirements, limits on leverage and curbs on proprietary trading have drastically reduced profitability, especially for trading and market-making businesses, forcing broker-dealers to either pull back or pull out from these businesses. While increased regulation has certainly achieved the policy objective of reducing risk, one unintended consequence for the mortgage market is reduced liquidity of agency mortgage-backed securities (MBS).

To better understand what reduced liquidity means for investors, it is important to identify the underlying causes of this phenomenon. In particular, it is important to recognize that despite being the most commonly cited cause of declining liquidity; this paper finds that financial regulation is neither the only driver nor the most important one. Several factors have contributed to the drop, the most consequential one being the unprecedented ramp up in Fed's ownership of agency-MBS under its quantitative easing program. Despite these declines however, overall liquidity has only reverted to pre-crisis levels, with Ginnie Mae MBS recently exhibiting improving liquidity conditions. Although we don't expect a return to the bubble-era liquidity again, the recent improvement in Ginnie Mae MBS liquidity is likely to continue even as liquidity for Fannie Mae and Freddie Mac (the government-sponsored enterprises or "GSEs") MBS remains mostly flat.

[1] Authored by Karan Kaul, Research Associate at Urban Institute, Housing Finance Policy Center

What is liquidity and why is it important?

Agency MBS are issued by Ginnie Mae, Fannie Mae and Freddie Mac. Of these three entities, only Ginnie Mae's MBS are explicitly backed by the full faith and credit of the United States government. The vast majority of these securities are traded in the to-be-announced (TBA) market, which functions like a futures market where investors *commit* to buy or sell MBS that meet certain broad criteria. The specific securities delivered to the buyer are "announced" later, just before the settlement date, rather than at the time of trade.

The agency MBS market is huge, with approximately $5.9 trillion in securities outstanding as of the second quarter of 2016. Roughly 27 percent or $1.6 trillion of this total is Ginnie Mae securities[2]. The agency MBS market has been and continues to remain very liquid because participants are able to trade large volumes of securities relatively easily and quickly. As a result, plenty of potential buyers and sellers can transact without incurring large transaction costs or facing too much price volatility. Liquidity can be measured along four dimensions described below. The first two are quantifiable; the last two are mostly observed and are open to interpretation.

- **Transaction volume** measures total trading activity over a period of time. It is most commonly represented as the average daily trading volume, which reflects the dollar volume of agency MBS transacted in a given day. Higher transaction volume is generally a reflection of better liquidity.
- **Transaction cost**, also known as the bid-ask spread, is the difference between the price market-makers pay the seller of a security and the price at which they sell the security to another buyer. The spread compensates market-makers for the cost (risk of adverse price movements, capital cost, profit margins) of warehousing the security. When markets are liquid, dealers are less worried about finding buyers for warehoused securities and thus more willing to engage in market-making. This increases competition between dealers and narrows the bid-ask spread. But when volatility is high, dealers are more exposed to the risk of adverse price movement for warehoused assets because buyers may not be readily available. This reduces competition and increases transaction costs. High transaction costs generally indicate less liquidity.
- **Resilience** is the ability of markets to self-correct temporary price dislocations or mitigate volatility spikes so prices can return to normal quickly. Resiliency requires an active and heterogeneous investor base with diversified investment approaches and horizons.
- **Depth** refers to the ease of executing large trades. Dealers find it easier to warehouse smaller trades because of lower risk exposure and because buyers are more readily available. In contrast, large trades take longer because dealers have to work harder to find a buyer with a large appetite.

The entire foundation of the agency MBS market is built on the confidence MBS sellers have in their ability to deliver securities on the settlement date, but more importantly, on buyers' belief that sellers will make good on their commitment. And liquidity is the core mechanism that creates this trust. A decline in liquidity that makes trading difficult or expensive could therefore have serious negative

[2] Data Source: Securities Industry and Financial Markets Association

consequences for investors, borrowers, mortgage lenders and the mortgage market in general. Specifically, there are four downsides of low liquidity:

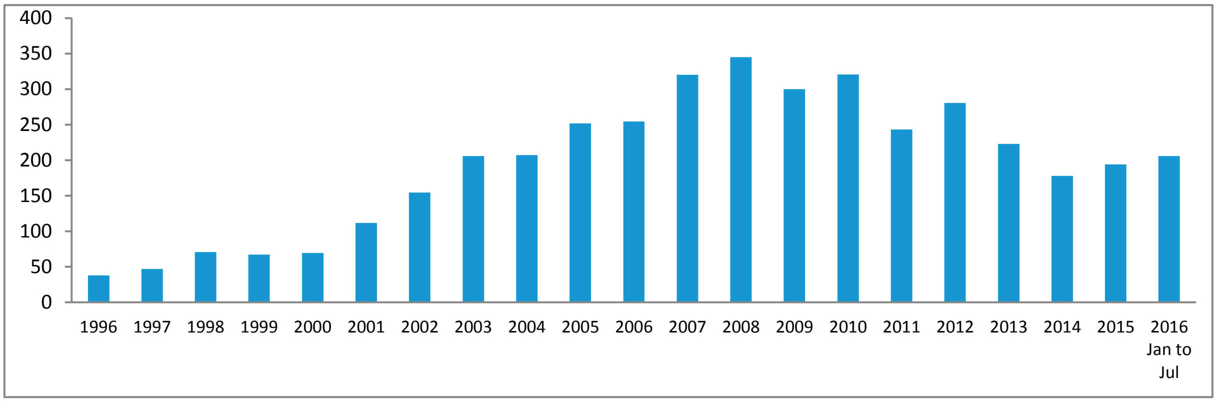
- **Higher transaction costs and lower profitability**: Any deterioration in the ease of trading could widen the bid-ask spread and immediately raise the cost of buying, selling or hedging MBS. This could ultimately eat into investor profitability. Higher rates could also price out some borrowers from the housing market and force others to take out smaller mortgages they can more easily afford.
- **Greater interest-rate risk**: Ample liquidity makes it possible for investors and lenders to short-sell MBS to hedge their interest rate risk. This ability to hedge risk is also what allows borrowers to lock in their rates prior to closing. A worrisome drop in liquidity would make both of these benefits difficult and more expensive to realize.
- **Higher price uncertainty**. When markets are liquid, any new developments and events – both favorable and unfavorable – are priced in almost instantaneously, creating smoother price movements and less volatility. A market that is less liquid is slow to price in new information, causing greater volatility when accumulated information is suddenly accounted for.
- **Lower prices for agency MBS**. The agency MBS market is able to attract abundant capital from investors across the world. Global investors are hungry for agency MBS because these securities can be sold and converted to cash quickly when needed. If liquidity were to deteriorate substantially, some investors would likely switch to alternatives, such as Treasury securities. This would reduce the demand for agency MBS, causing securities to lose value and mortgage rates to rise.

Recent trends in agency MBS liquidity

Transaction volume

The average daily trading volume for agency MBS declined substantially from 2008 to 2014 – generally an indicator of worsening liquidity. Daily trading volume peaked in 2008 at nearly $350 billion before falling to $180 billion a day by 2014. This decline however was preceded by a sustained run up in trading volume from 2000 to 2008 (Figure 1). Today's daily volume of just over $200 billion is an improvement from 2014 and closely mirrors the 2004 level, just before the euphoria began.

FIGURE 1: Agency MBS Average Daily Trading Volume has retreated to pre-crisis levels, $ billions

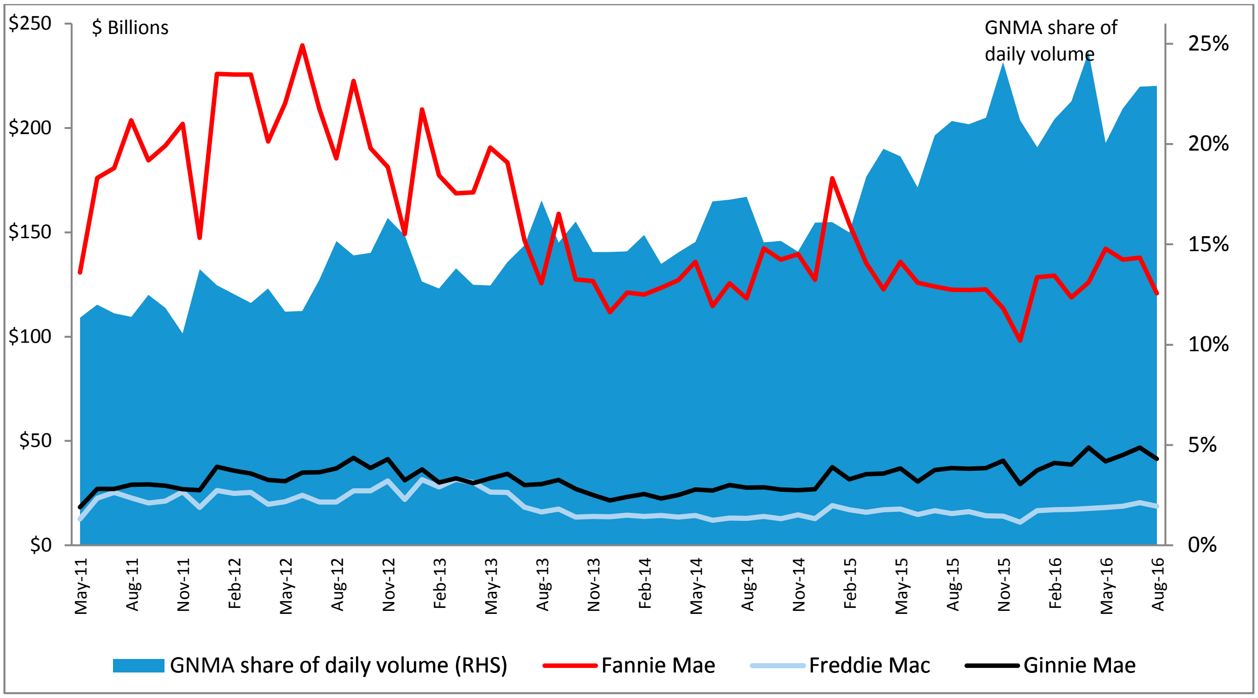


Source: Securities Industry and Financial Markets Association

These trends in the overall trading volume however mask some important differences in liquidity across Fannie Mae, Freddie Mac and Ginnie Mae MBS. Figure 2 shows the trading volume for each of these three agencies separately (left hand scale), and Ginnie Mae securities' trading volume as a percentage of total daily trading volume (shaded region, right hand scale) 2011 onwards. There are a couple of interesting takeaways from this chart.

- First, Ginnie Mae securities are more liquid than Freddie Mac securities, but the liquidity of Fannie Mae securities is orders of magnitude greater than that of either Freddie or Ginnie.
- Second, although daily trading volumes declined for all three agencies until 2014, Ginnie Mae MBS has staged the strongest comeback since then, nearly doubling from $21 billion in December 2013 to $41 billion in Aug 2016. This increase was driven largely by a strong Ginnie Mae issuance environment in contrast to declining issuances for GSEs (discussed later). It is also likely driven by the increase in popularity of Ginnie Mae II pools, which are large, homogenous, and hence more liquid. As a result, Ginnie Mae MBS now constitute a larger share of agency MBS traded on a daily basis (shaded area). Put differently, Ginnie Mae securities are contributing more to agency MBS trading volumes today than before even though overall trading volumes have declined.

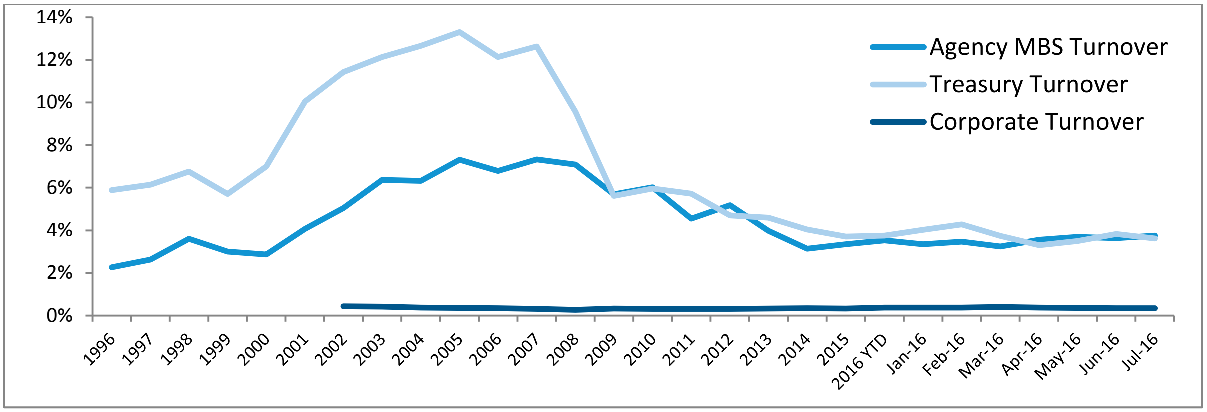
FIGURE 2: Average Daily Trading Volume by Agency (LHS) and Ginnie Mae Share of Daily Volume (RHS)



Source: Securities Industry and Financial Markets Association based on TRACE data.

While a reversion of trading volume to pre-crisis levels does not necessarily mean that current volume is at the right level, it does raise the question of whether liquidity was unsustainably high during the bubble. To answer that question, it is useful to evaluate daily trading volume as a percentage of MBS outstanding, also known as turnover. Figure 3 shows that turnover also has declined post-crisis, but once again to pre-crisis levels. More importantly, this decline in turnover was also preceded by a sustained run-up from 2000 to 2008, lending more credibility to the theory that there was too much liquidity previously. For comparison, figure 3 also shows the turnover for the US Treasury and the corporate bond markets. Note that Treasury turnover follows the same pattern as agency MBS turnover, falling sharply post-crisis. In fact, the drop in Treasuries has been steeper than in agency MBS. Although the run up in Treasury turnover was higher than in agency MBS, the two have converged now.

FIGURE 3: Turnover Has Declined to Pre-Crisis Levels for MBS and Other Fixed Income Markets

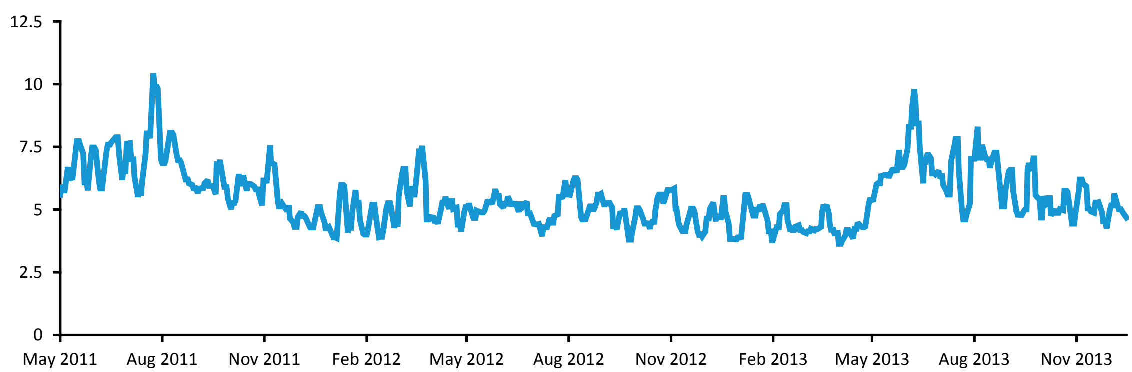


Source: Urban Institute calculations based on Securities Industry and Financial Markets Association data

Transaction costs

Research from staff members at the Federal Reserve Bank of New York[3] ("the Fed") shows that the bid-ask spread for 3.0, 3.5 and 4.0 percent coupon Fannie Mae MBS remained largely stable, 5 to 7 basis points, between 2011 and 2013 (Figure 4). Notable here are the regular intervals at which the bid-ask spread has widened. Though the Federal Reserve Board's analysis neither extends past the end of 2013 nor provides the bid-ask spread for Ginnie Mae MBS, anecdotal conversations with market participants indicate that Ginnie Mae's current bid-ask spread is still well within the 5 to 7 basis points range, suggesting no major deterioration, other than periodic spread volatility.

FIGURE 4: Bid-ask Spread for Agency MBS is Within Historical Bounds, basis points



Source: Sean Campbell, Canlin Li, and Jay Im, "Measuring Agency MBS Market Liquidity with Transaction Data," FEDS Notes, Board of Governors of the Federal Reserve, January 31, 2014,

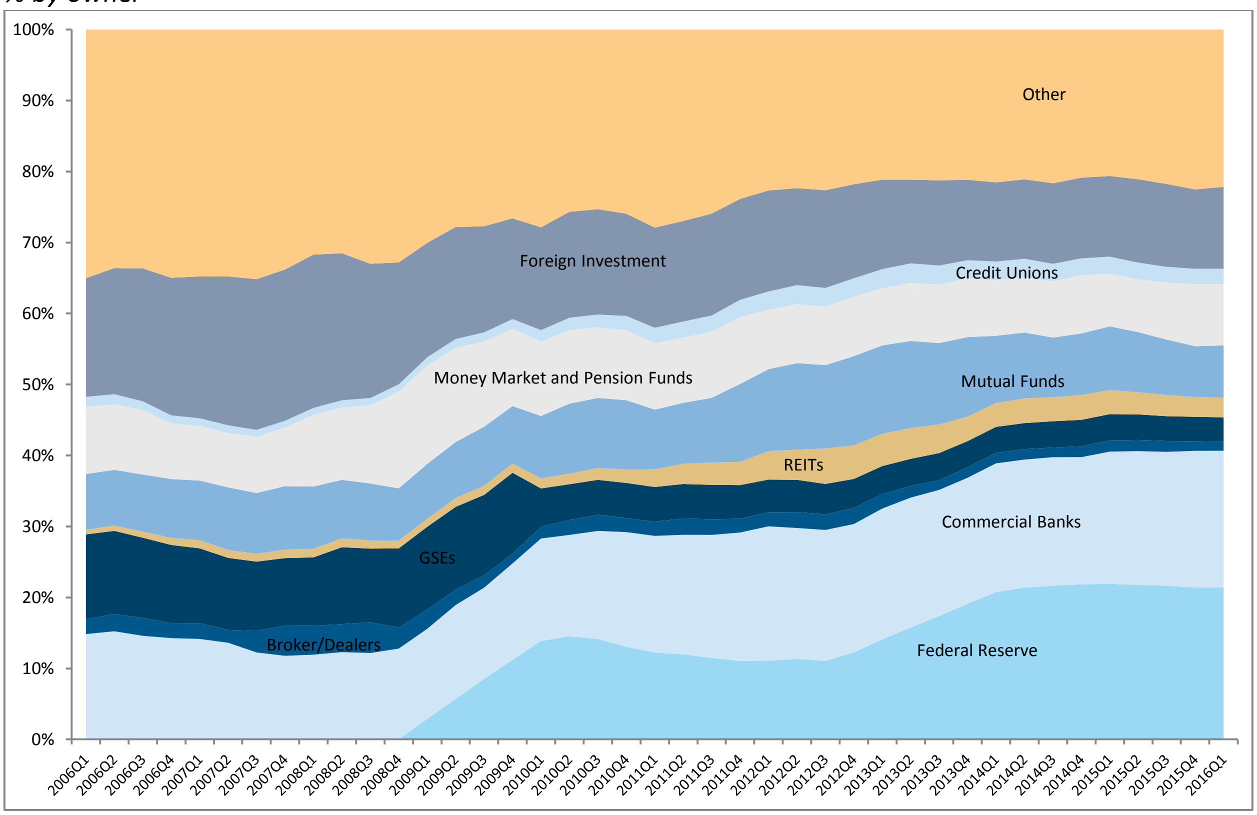
[3] Sean Campbell, Canlin Li, and Jay Im, "Measuring Agency MBS Market Liquidity with Transaction Data," FEDS Notes, Board of Governors of the Federal Reserve, January 31, 2014, http://www.federalreserve.gov/econresdata/notes/feds-notes/2014/measuring-agency-mbs-marketliquidity-with-transaction-data-20140131.html

To summarize, the average daily trading volume of agency MBS has clearly retreated since the housing crisis, but only to pre-bubble levels, supporting the excessive liquidity hypothesis. In addition, the Federal Reserve Board's study shows that transaction costs have remained relatively stable except for occasional volatility. These findings raise two new questions. Why is volatility up and why are trading volumes down?

Drivers of higher volatility

The primary driver of higher volatility is a major shift in MBS ownership from a large number of active traders to a smaller number of buy-and-hold investors post-crisis. This ownership shift has reduced both investor heterogeneity and the prevalence of contrarian trades, which diminishes the ability of markets to self-correct quickly, in turn causing more volatility. The data on agency securities ownership, plotted in Figure 5, reveal two important changes.

FIGURE 5: Who owns agency Securities?
% by owner



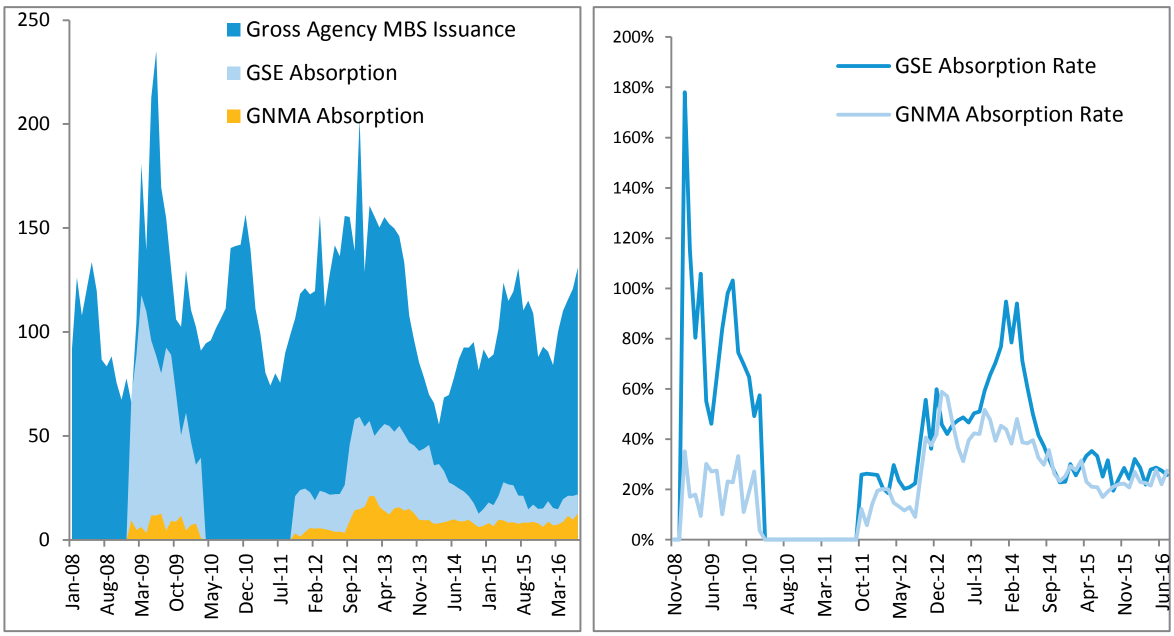
Source: Urban Institute calculations based on Federal Reserve Flow of funds, Fannie Mae, and Freddie Mac data.
Notes: GSEs = government-sponsored enterprises (Fannie Mae and Freddie Mac); REITs = real estate investment trusts. "Others" includes asset managers, hedge funds, life insurers, and foreign central banks.

- **Unprecedented increase in Fed's ownership of MBS:** As part of its efforts to stabilize the economy, the Federal Reserve began purchasing agency MBS in 2009 under its quantitative easing program.

As a result, the Fed now owns around $1.75 trillion in agency MBS, roughly a third of the total $5.9 trillion outstanding. Prior to 2009 the Fed owned no agency MBS[4]. The increase in Fed's ownership however has come more from GSEs than from Ginnie Mae securities. Figure 6 (left chart) shows gross monthly agency MBS issuances and the amount of MBS purchased by the Fed during the same month. As this figure shows, early on during the quantitative easing program, the vast majority of Fed's purchases were GSE MBS, with Ginnie Mae securities comprising very little. But in recent years, the Fed has significantly scaled down its absorption of GSE MBS while absorption of Ginnie MBS has remained more stable. The result is the absorption rates of GSE and Ginnie Mae MBS have nearly converged (Figure 6, right chart).

FIGURE 6: Fed's Absorption of Agency MBS

Total Issuance and Absorption volume ($ billions) *Absorption Rate (%)*



Sources: eMBS, Federal Reserve Bank of New York and Urban Institute

- **Commercial Bank agency MBS holdings are also up 50 percent:** Commercial banks held under $1 trillion in agency MBS in 2009. Today they own about $1.6 trillion[5]. A tight lending environment has left banks with ample customer deposits, which they have been investing in agency MBS instead.

The result of both these actions is that the Fed and commercial banks now own about $3.3 trillion in agency MBS, representing roughly 56 percent of the outstanding amount, versus just 26 percent in 2006[6]. Because both these entities are buy and hold investors, the tradable float—which is the amount of MBS potentially available for buying and selling on a given day – has declined sharply after peaking in 2008. This in turn affects ease of transacting because

[4] Source: Federal Reserve Flow of Funds data
[5] Data Source: Federal Reserve Flow of Funds data
[6] Data Source: Federal Reserve Flow of funds data

market-makers now have to work longer and harder to match buyers with sellers. The ease of transacting has also been affected by two structural changes post-crisis.

- **Loss of the GSEs as a market lubricant.** Historically, when markets were turbulent and spreads were wide, the GSEs were able to provide a bid – funding their purchases at lower borrowing costs because of an implicit guarantee – in order to profit from temporary price distortions. This intervention helped absorb volatility and brought prices closer to normal, effectively performing a market lubrication role. But the terms of their bailout – which require a 15 percent annual portfolio reduction– as well as the intense political scrutiny of the portfolios have greatly diminished Fannie's and Freddie's ability and the desire to lubricate the market. Total agency MBS held in the GSEs' portfolios has declined from $750 billion in 2006 to about $215 billion today, a reduction more than $500 billion[7]. This has disproportionately affected the liquidity of GSE MBS as a sizable share of securities held in Fannie Mae's (Freddie Mac's) portfolio were Fannie Mae (Freddie Mac) MBS.
- **Broker-dealer pull back:** Dealers perform the job of matching MBS buyers and sellers. Their effectiveness at this depends partly on the capital cost of holding MBS. Because of higher capital requirements, dealers now are more selective about which assets to own, how much to own, and how long to hold them, effectively diminishing their ability to warehouse MBS in excess of levels they don't consider profitable. Further compounding the problem is the inherently low profitability of the market-making business. Pre-crisis, dealers were able to amplify profitability through leverage, which has also come under increased regulatory scrutiny. This has limited their ability to make markets as freely as before. A third reason is reduced competition among dealers, a result of the failure of Lehman Brothers, the sales of Bear Stearns and Merrill Lynch to JP Morgan and Bank of America, as well as the exit of Nomura, HSBC, and Royal Bank of Scotland from the US agency MBS market[8]. According to New York Fed data on primary dealer market share, the top 5 dealers conducted about 55 percent of all agency MBS transaction volume in 2006. Today's top 5 dealers account for about 80 percent. Reduced competition allows dealers to have more discretion about which risks to take and which opportunities to pursue without fear of losing market share.

Because of the role broker-dealers and GSEs played in absorbing volatility, their pullback is felt the most during precisely such periods. The result is increased difficulty in executing large trades, more pronounced volatility and a longer duration before prices return to normal. This affects both market resiliency and depth.

[7] Data sources: Fannie Mae and Freddie Mac
[8] See Bloomberg News, "HSBC Exits Mortgage Securities," New York Times, November 9, 2007,
http://www.nytimes.com/2007/11/09/business/09hsbc.html
Ankush Sharma, "Royal Bank of Scotland to Exit U.S. Mortgage Business," Reuters, November 13, 2014,
http://www.reuters.com/article/2014/11/14/royalbank-scot-divestiture-idUSL3N0T400G20141114;
Nathan Layne and Emi Emoto, "Nomura to Exit U.S. Residential Mortgage Securities," Reuters, October 15, 2007,
http://www.reuters.com/article/2007/10/15/us-nomura-usa-idUST27041620071015
Jody Shenn, "Barclays to End Trading in $700 Billion of Mortgage Bonds," Bloomberg News, June 17, 2015,
http://www.bloomberg.com/news/articles/2015-06-17/barclays-to-end-trading-in-700-billion-of-u-smortgage-bonds.

Drivers of falling trading volumes

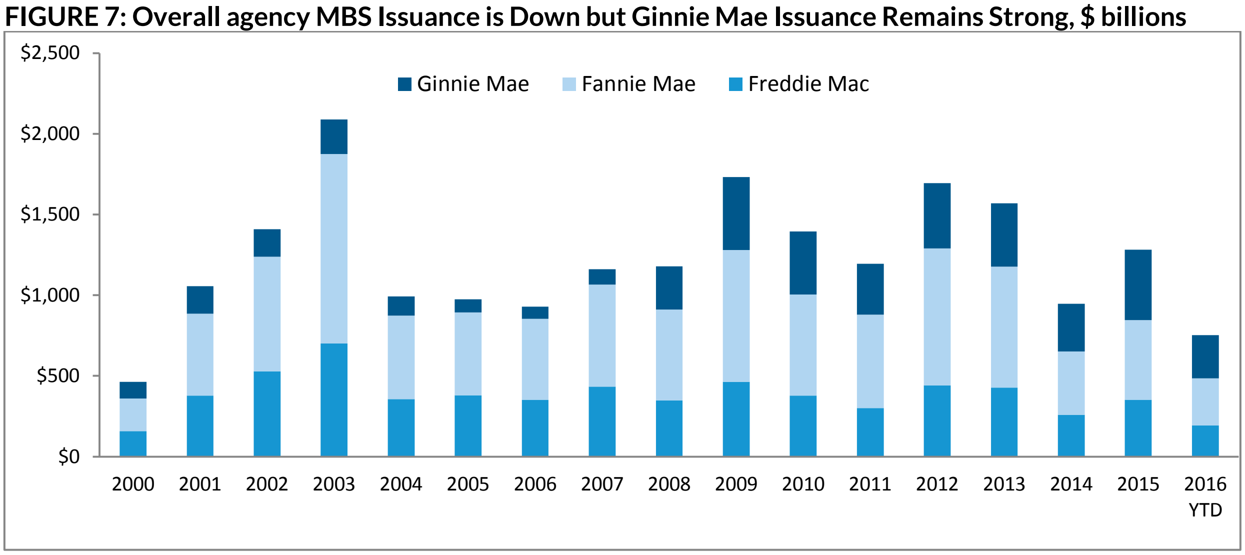
Trading volume tends to be positively correlated to new MBS issuance, which in turn is a function of mortgage originations. Strong issuance fuels more trading activity because a new security is typically bought and sold several times upon issuance, as short-term traders try to benefit from minor price imbalances before long-term investors step in and trading activity falls off.

Mortgage origination volumes have struggled in recent years. This is because the refinance boom that led to millions of borrowers refinancing their mortgages post-crisis is largely over. The vast majority of borrowers who were in the money and willing to refinance have already done so. Refinance originations comprised half of all Ginnie Mae's and over 80 percent of Fannie and Freddie's issuances and from 2009 to 2013. But an ever-shrinking pool of eligible, in-the-money borrowers has caused refinance originations to decline since 2013. Although events like the Federal Housing Authority's (FHA's) 50 basis points mortgage insurance premium cut in January 2015 and the decline in mortgage rates in the wake of "Brexit" led to an increase in the refinance share, the upticks were short lived.

In addition, the void left by falling refinances has not yet been filled by an increase in purchase origination volumes. Barriers such as tight credit standards, rapidly rising house prices in major metros and largely stagnant incomes have potentially prevented millions of borrowers from purchasing a home. The result is a relatively weak issuance environment for agency MBS (Figure 7).

Despite weakness in overall issuances, Ginnie Mae's issuances have stayed strong relative to the GSEs. This is in large part due to continued growth of loans guaranteed by the Department of Veteran Affairs (VA), which are securitized into Ginnie Mae MBS and to some extent by the 2015 FHA premium cut, which improved mortgage affordability. Stronger new issuance is one of main reasons why the daily trading volume of Ginnie Mae MBS (shown earlier in Figure 2) has increased even as GSE trading volumes have fallen or stagnated.

FIGURE 7: Overall agency MBS Issuance is Down but Ginnie Mae Issuance Remains Strong, $ billions



Source: eMBS and Urban Institute

What is the future of liquidity?

Even as capital markets have de-risked and stabilized during the last few years, the after-effects of the crisis continue to drive the bid-ask, volume and volatility trends described earlier. Although these trends have affected the GSE and Ginnie Mae MBS markets differently, for the overall agency MBS market, liquidity will likely remain at present levels. There are three reasons for this:

- First, the Fed's ownership share of outstanding agency MBS is unlikely to budge until the Fed changes course. Even though the quantitative easing program has ended, the Fed continues to reinvest principal pay downs. This means the Fed's holdings will remain constant at roughly $1.75 trillion as long as this policy stays in place.
- Second, the GSEs' bailout agreements require that the retained portfolios be downsized by 15 percent annually until they each hit $250 billion. This means Fannie Mae's current portfolio of $309 billion (which includes agency MBS, non-agency MBS and mortgage loans) needs to shrink an additional $59 billion, while Freddie's $320 billion portfolio needs to shrink another $70 billion. Although this will further diminish the role of two traditionally active market participants, any adverse impact to liquidity will likely be limited to Fannie Mae and Freddie Mac MBS because the GSEs own very little, if any, Ginnie Mae MBS.
- Lastly, there is no reason to expect any meaningful softening of the financial regulatory environment. Over the past several years, regulators have focused almost exclusively on reducing risks by placing curbs on proprietary trading, enhancing capital and leverage ratio requirements among others, and there are no signs of a reversal of that strategy.

Despite these headwinds, a healthier housing market with rising origination and issuance activity could give trading volumes and liquidity some boost. This is more likely to occur within the Ginnie Mae space because new issuance is strongly correlated with liquidity, and VA loan origination volumes have been rising sharply in recent years. Although VA loans still constitute a very small share of overall issuances, their continued growth will remain a key driver of improving liquidity of Ginnie Mae securities.

Conclusion

The euphoria in the run-up to the financial crisis, which was caused by ever-increasing house prices, investor complacency, inadequate oversight and unchecked leverage had artificially increased the demand for all asset classes, including agency MBS. The result was not only an asset price bubble but also a liquidity bubble which has since burst. Despite this drop however, overall liquidity remains at healthy pre-crisis levels with Ginnie Mae MBS exhibiting improving liquidity conditions.

About the Author

Karan Kaul is a research associate in the Housing Finance Policy Center at the Urban Institute. He researches topical housing finance issues to highlight the market impact of ongoing regulatory, industry, and related developments. He is also responsible for monitoring and reporting on mortgage market trends and current events weekly. Kaul came to Urban after five years at Freddie Mac, where he worked on various housing policy issues primarily related to the future of housing finance and the reform of the government-sponsored enterprises. Before Freddie Mac, Kaul worked as a research analyst covering financial institutions. He holds a bachelor's degree in electrical engineering and an MBA from the University of Maryland, College Park.

The statements and opinions expressed in this article are those of the author. State Street Global Advisors cannot guarantee the accuracy or completeness of any statements or data. Any such views are subject to change at any time based upon market or other conditions and State Street disclaims any responsibility to update such views. These views should not be relied on as investment advice, and because investment decisions are based on numerous factors, may not be relied on as an indication of trading intent on behalf of State Street. This document contains certain statements that may be deemed forward-looking statements. Please note that any such statements are not guarantees of any future performance and actual results or developments may differ materially from those projected.

Tracking Code: CLADM-0994