

TBA Markets Through Growing Interest Rates

An Exploration of TBA Markets During High Mortgage Demand and Increasing Interest Rates

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Background

Mortgage Backed Securities(MBS) are intrinsically tied to the forces of market demand and mortgage interest rates. Over the past year, we've seen the demand for new mortgages spike due to historically low mortgage rates, followed by the Federal Reserve's increasing of interest rates in response to high inflation. As a result of the quick transition from one extreme to another, we're in a good position to study the predicted behaviors of MBS in To-Be-Announced (TBA) markets.

Overview

In the US, most residential mortgages are pooled into traded securities, which are sold to investors. The MBS market was able to survive the 2008 Financial Crisis because the majority of securities carry a credit guarantee from the government. These protected MBS are classified as agency MBS, as they are guaranteed by three institutions or agencies, Freddie Mac, Fannie Mae, and Ginnie Mae. Freddie Mac and Fannie Mae are both government sponsored, having been taken under conservatorships in the wake of the 2008 Financial Crisis (Lockhart 2008).

Trading agency MBS primarily occurs in a liquid forward market, the TBA market, with over 90% of all trading volume (Vickery 2013). TBA trades are unique, in that the seller doesn't specify which securities they will deliver to the buyer at the time when the sale price is decided. There are several characteristics that are agreed upon instead; the coupon rate, the issuer, and the approximate face value of the bonds (Vickery 2013).

The prices set for the TBA market MBS are publically available, which guide pricing on other MBS products, which may not be eligible for TBA trading. Not all mortgages qualify to be packaged to

be sold on the TBA market, they must meet size and credit-worthiness parameters in order to be guaranteed under the protection of the agencies.

This selectiveness is a consequence of the structure of agency MBS. MBS investors pay monthly guarantee fees, and in return receive the mortgage principal and interest payments, even if the underlying mortgages stop being paid. The risk is therefor held by the guarantor, the agencies, backed by the government (Vickery 2013). The main risk held by the investors is whether or not the underlying mortgages are paid off ahead of their maturation date, reducing the amount of interest that is collected.

There are three important dates in the process of a TBA trade; trade day, forty-eight-hour day, and settlement day. On trade day, the buyer and seller establish the characteristics of the trade: Issuer, Maturity, Coupon, Price, Par Amount, and Settlement Date. On forty-eight-hour day or two days before settlement, the seller provides the buyer with the CUSIPs of the securities to be delivered on settlement day. Finally, on settlement day, the seller exchanges the securities for the agreed price (Vickery 2013).

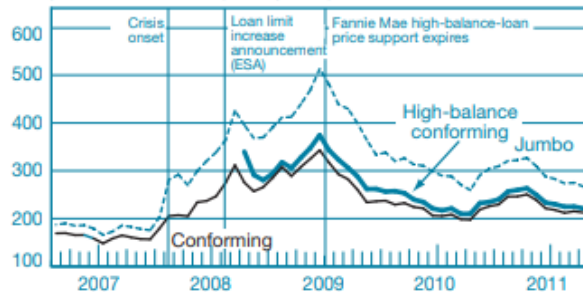
TBAs trade at cheapest to deliver pricing. Both the seller and buyer are motivated to drive the price as low as possible. The seller intends to sell the cheapest value securities that satisfy the agreed upon price. The buyer knows the seller will choose low value securities and has more time to accurately price the securities, so they offer a low price in exchange. This is balanced by the liquidity of TBAs. As the contents of the contracts are generally homogenous, and the limited information on the individual securities increases fungibility, leading to an increase in fluidity of the market for MBS pools. This offsets the drop in price from the TBA market (Huh 2021).

CHART 3

Mortgage Spreads on Jumbo, Super-Conforming, and Standard Conforming Loans

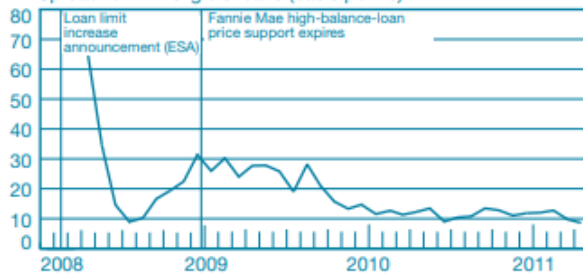
Panel A: Interest Rate Spreads on Jumbo, Super-Conforming, and Standard Conforming Mortgages

Spread to Treasuries (basis points)



Panel B: Interest Rate Differential between Super-Conforming and Standard Conforming Mortgages

Spread to TBA-eligible loans (basis points)



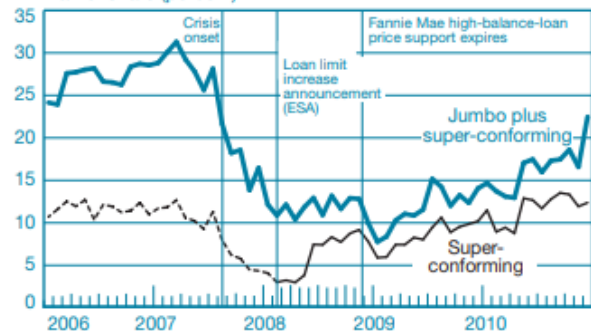
Source: HSH Associates.

Notes: Mortgage rates are expressed as a spread to the average of the five- and ten-year Treasury yield. ESA is the Economic Stimulus Act.

CHART 4

Share of Mortgage Originations in the Super-Conforming Segment

Market share (percent)



Source: Lender Processing Services.

Note: The chart plots the total value-weighted fraction of mortgage originations above \$417,000 (blue line) and the fraction of "super-conforming" mortgage originations between \$417,000 and the temporary loan limits established under the Economic Stimulus Act (black line). Recall that under the Act, conforming loan limits in high-housing-cost areas were increased to as much as \$729,750. The dashed segment of the black line represents the fraction of loans that fell between \$417,000 and the high-balance limits in the period before passage of the Act.

(Wright 2013)

The Vickery and Wright paper, *TBA Trading and Liquidity in the Agency MBS Market*, explores the effects liquidity in the agency MBS market has on the price and availability of mortgages to home buyers. The charts seen above illustrate that by adding more types of mortgages eligible for agency securitization, the market for these securities grew. This drove an increased supply in mortgage credit, which allowed more loans to be written at lower mortgage interest rates. (Vickery 2013)

Starting in 2016, the Single Security Initiative and Common Securitization Platform was enacted by the Federal Housing Finance Agency (FHFA 2019). The purpose of this was to create fungibility and reduce the liquidity gap between agency MBS issued by Freddie Mac and Fannie Mae.

Traditionally, Fannie Mae had a size advantage over Freddie Mac, as it bought more mortgages and historically relied less on securitization for funding. As a result of this, historically, Freddie Mac has offered a discount on its guarantee fees to offset its disadvantages as compared to Fannie Mae. The Liu, Song, and Vickery paper, *Defragmenting Markets: Evidence from Agency MBS*, studies the effects of the Single Security Initiative and Common Securitization Platform. They studied the TBA trading volume, agency MBS issuance, price, and guarantee fees of Freddie Mac and Fannie Mae issued MBS to measure the impact of the FHFA's changes. They used Ginnie Mae issued securities as a control, as they are also government backed, but weren't subject to the Single Security Initiative. They found that as a result of the Single Security Initiative, the liquidity of Freddie Mac and Fannie Mae converged. This effect began to take place before the Single Security Initiative was fully implemented, implying that the market was reacting to future liquidity conditions (Haoyang Liu 2021).

Data

To test the conclusions of the two papers, I used several sources of data. First, I pulled all the transactions on the TBA market from September 2021 through November 2022 (Wharton Research Data Services 2022). This covers the period of time where mortgage rates hit historic lows in December 2021 (Graham 2022) through the effects of the Federal Reserve increasing the federal funds rate in response to inflation. I also pulled the data for the same time period for 15-year and 30-year fixed rate mortgages from the Federal Reserve Bank of St. Louis's FRED database (FRED Economic Data 2022). The 15-year fixed rate mortgages offer a slightly lower interest rate than 30-year fixed rate mortgages, but otherwise the two mortgages act in parallel.

This data allows me to compare the relative prices of Freddie Mac, Fannie Mae, and Ginnie Mae securities against the mortgage interest rates and see what impact a sudden increase in interest rates has on the market for agency MBS. Like the Liu, Song, and Vickery paper, Ginnie Mae acts as a control for the converged liquidity of Freddie Mac and Fannie Mae in response to the Single Security Initiative and Common Securitization Platform.

As a form of alternative data, I used construction data on new private homes being built per month (FRED Economic Data 2022). Demand for new construction is a component of the demand for residential mortgages, so it should reflect liquidity in the MBS market. There is a lag in changes in the construction rate vs changes to the mortgage rates. Builders start gathering permits and purchasing materials prior to the start of construction, in anticipation of predicted demand from low mortgage rates. Once the mortgage rates start increasing, the demand for new construction homes dips, but houses already in progress will still be finished, though new ones won't be started (Mohtashami 2022).

Hypothesis

Part of the reason for high demand for mortgages was the historically low mortgage interest rates, which made purchasing a home or refinancing an existing mortgage very attractive to consumers. This led to high liquidity in the MBS market, driving high prices. I expect that when the mortgage interest rates started to climb in 2022, this would reduce liquidity, and correspondingly reduce the prices of agency MBS.

As a result of the Single Security Initiative and Common Securitization Platform, I would expect Freddie Mac and Fannie Mae prices to stay close together, while trending downward in response

to the changes in liquidity discussed above. Since Ginnie Mae is similarly government backed, but not artificially tethered like the other two agencies, I would expect Ginnie Mae to also drop in response to a fall in MBS liquidity.

For the alternative data, the rise in interest rates should reduce the demand for new construction houses. Because there is a lag in the construction of new housing stock, I would expect the price of agency MBS to start dropping before there is a slowdown in construction.

Outcomes

The first thing I looked at was the overall effect of the MBS market against the weekly average mortgage interest rates. I wanted to see what the impact of increasing mortgage rates from a historic low of 2.68% to a high of 7.08% (FRED Economic Data 2022).

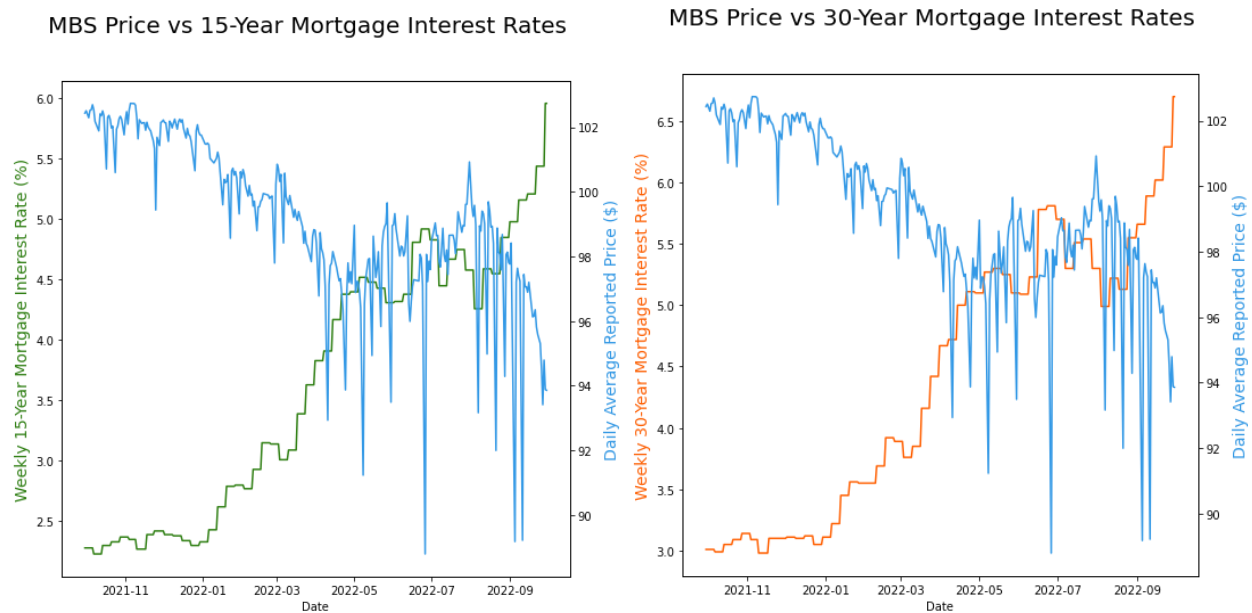


Chart 1

The predictions made by Vickery and Wright hold up. As the mortgage interest rates grew (Chart 1), the number of loans taken reduced. With fewer loans entering the TBA market, liquidity fell, reducing prices for MBS. Increasing interest rates also mean that borrowers became incentivized to make larger payments against their mortgage or to be more receptive to refinancing should the federal funds rate fall in the future, bringing down mortgage rates. This caused a greater prepayment risk for agency MBS, reducing their prices.

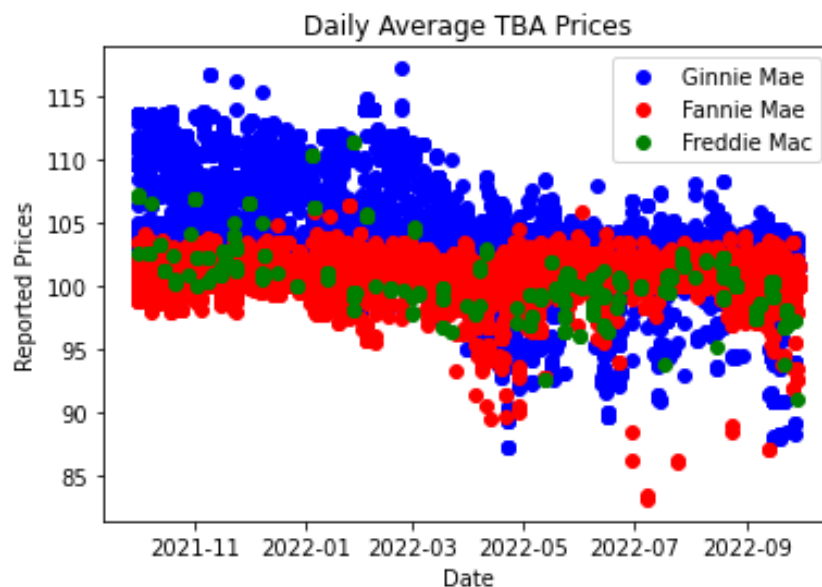
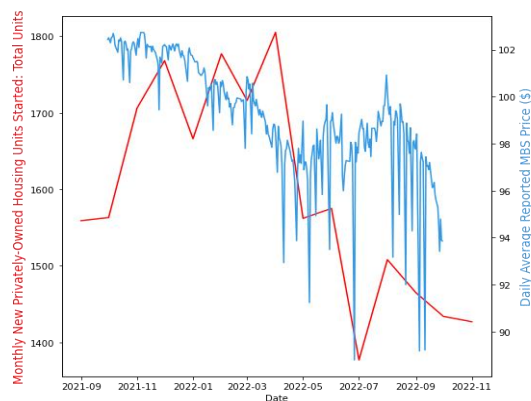


Chart 2

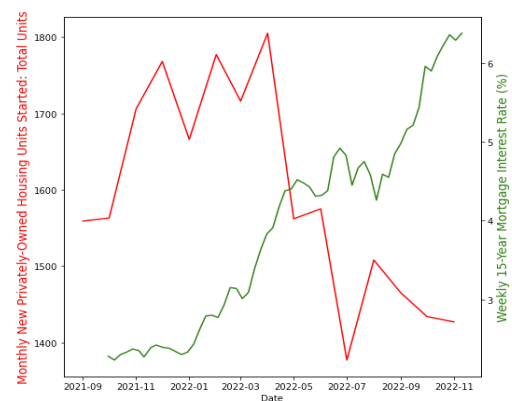
Looking at the markets for Ginnie Mae, Fannie Mae, and Freddie Mac agency MBS (Chart2), I see that Fannie Mae and Freddie Mac tend to be clustered together, though all three have a downward trend. This reflects the findings of Liu, Song, and Vickery, because Freddie Mac and Fannie Mae went through defragmentation due to the Single Security Initiative and Common Securitization Platform, reducing the liquidity gap between the two agencies (Haoyang Liu 2021).

This is seen as the Freddie Mac prices cluster around the midline of the Fannie Mae prices. The traditionally larger Fannie Mae market share is reflected, as there a lot more trades of Fannie Mae seen. Ginnie Mae follows a similar trend, but as it wasn't subject to the Single Security Initiative, it experiences liquidity differently than Freddie Mac and Fannie Mae, this is reflected by its generally higher prices in response to low interest rates than the other two agency MBS. Ginnie Mae's prices converge to Freddie Mac's and Fannie Mae's prices once the interest rates rise and liquidity drops. The differences in liquidity are also seen in the slope of the trends, Fannie Mae and Freddie Mac lost relatively little in average price, Ginnie Mae had a steeper drop in value.

New Privately-Owned Housing vs Daily Average Reported MBS Price



New Privately-Owned Housing vs 15-Year Mortgage Interest Rates



New Privately-Owned Housing vs 30-Year Mortgage Interest Rate

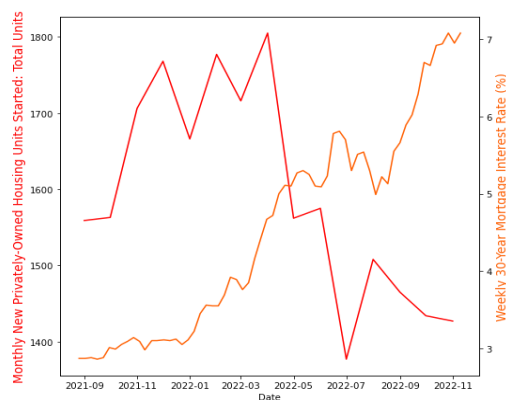


Chart 3

As expected, there is a lag in response to the rising interest rates from the construction of new housing started. Chart 3 shows us That as interest rates grew from 3% to 4% for both the 15-year and 30-year fixed rate mortgages, the number of new construction homes beginning to be built rose from 1700 to 1800 new private home begun being built per month. Only as the interest rates jumped from 4% to 5% did the construction industry lurch to a stop, dropping from 1800 new projects being started to just under 1400. By comparison, the MBS market started losing liquidity and seeing prices drop in near real time as interest rates grew.

Conclusion

Vickery and Wright observed that in response to high liquidity in the TBA MBS market, mortgage rates decline to drive more mortgages onto the market to be securitized. The reverse holds in our observed data, an increase in residential mortgage interest rates decreases liquidity in the TBA MBS market, causing prices of MBS to fall.

In the Liu, Song, and Vickery paper, they studied the effects of the Single Security Initiative and Common Securitization Platform on Freddie Mac, Fannie Mae, and Ginnie Mae. They found that the differences in liquidity between Freddie Mac and Fannie Mae were reduced as a result of defragmentation of the market. They also found that there was no deterioration in demand for Freddie Mac and Fannie Mae in relation to Ginnie Mae either. During the past year, the agency MBS have behaved as predicted, with Freddie Mac and Fannie Mae moving in unison, and Ginnie Mae behaving similarly to the other two.

I used the supply of new residential houses starting to be built as a proxy for the demand for mortgages, and by extension for liquidity of the TBA MBS market. Because there is more inertia

on the builder's side to begin construction once the process of obtaining permits, securing funding, and finding contractors and materials, there is a lag in response to a drop in demand due to increased mortgage rates. We saw that more construction was started after interest rates began climbing, until interest rates passed 4%. Only then did the number of building projects being started drop precipitously. Ultimately this alternative data did reflect the behavior of the TBA MBS market, but because of the lag and the aggressive drop in new home supply, I wouldn't use it as a predictor of MBS market behavior.

This past year was a very volatile one for the housing market due to the speed and extremes with which the Federal Reserve increased the interest rates. This made for an interesting test case to validate the conclusions of several academic papers. Overall, the findings of the reviewed papers were reflected by the data.

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