United States

The Mortgage Analyst

Credit Strategy Research

The correlation structure of agency MBS returns

Year-over-year returns on MBS have been strong

2013 was a painful year for fixed income investors, and mortgage backed securities (MBS) experienced negative returns for the full year for the first time since 1994. The past twelve months (June 2013 to June 2014), however, have been better, with the MBS index returning 5.3% in nominal terms. After adjusting for low current funding costs, this represents a better than average (70th percentile) twelve-month return experience.

Correlations of returns across TBA cohorts have increased

Prior to the mortgage crisis period, realized returns across different TBA cohorts were typically highly correlated, broadly moving together on macro-market forces like rising/falling rates or rising/falling volatilities. However, during the crisis period, correlations of returns across TBAs declined. Targeted Federal Reserve purchases of selected MBS cohorts, HARP policy changes affecting only a subset of products and coupons, and spikes in delinquent loan buyouts were among the events which introduced idiosyncratic risks, causing the TBA cohorts to de-correlate. The decline in correlations made risk-management for MBS portfolios difficult during the crisis period, as typical hedge relationships failed to hold. However, evidence suggests that tighter correlations across TBA cohorts have recently been re-established. In 2013Q1, typical correlations in returns were below 45%, but over the past year correlations exceeded 80%.

Over next 12-months, expect high correlations, low returns

We expect the factors generating idiosyncratic price moves during 2011-2013 – including monetary policy effects, HARP policy changes, and delinquent loan buyouts – to have relatively smaller impacts going forward, meaning correlations across cohorts will remain high. However, we expect the negative returns seen in 2013 to return over the next year, on rate moves up. To shorten duration, we like up-in-coupon for 30-year conventionals rather than moving down into 15-year TBAs.

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MBS returns have been strong over past twelve months

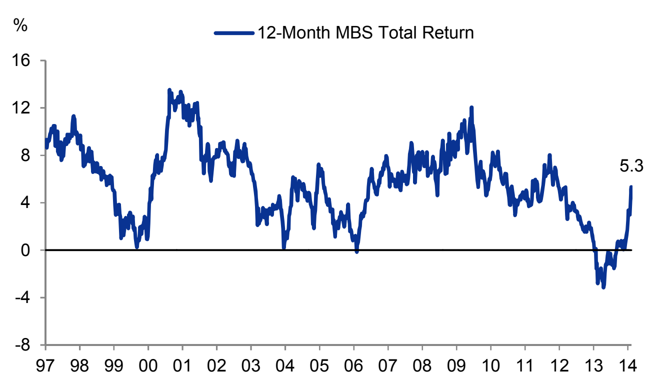
The fixed income market in general and the mortgage backed securities (MBS) market in particular experienced a painful 2013, with MBS earning negative returns on the full year. But over the past twelve months (June 2013-June 2014), returns have been more benign. Exhibit 1 shows that the lagging twelve-month return on the MBS index has been 5.3%: just slightly below long-run average and a 43rd percentile return over history.

This recent mortgage performance looks even more impressive when measured as an excess return: MBS returns minus the Fed Funds rate. This excess return can be thought of as the return net of funding costs. Exhibit 2 shows that the year-over-year excess return is 5.2%, corresponding to a 70th percentile result over the 1997-2014 period.

These exhibits show the total returns for the broad MBS index (including 30-year and 15-year GNMA, FNMA and FHLMC pass-throughs, on a balance weighted basis), with total return capturing price changes, interest, and scheduled and unscheduled principal cash-flows. Of the 5.3% total return, 3.9% came from interest coupons, 1.1% from price appreciation, and the residual from principal amortization and prepayments.

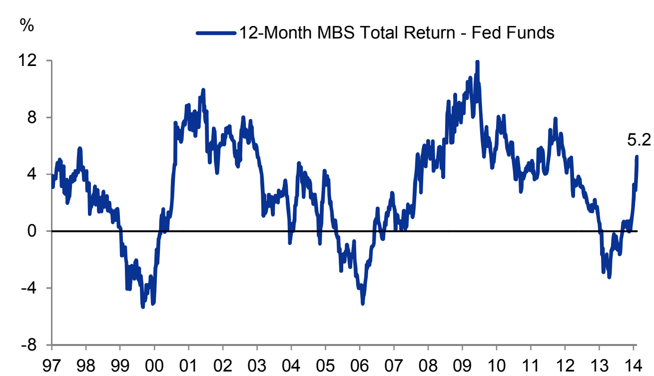
Exhibits 1 and 2 suggest that MBS returns have "returned to normal", after an unusually weak 2013H1. In the following sections, we look under the surface at the correlations across pairs of TBA cohorts (e.g., FNM30 3% vs. FNM30 5%, or FNM30 3% vs. GNM30 3%). We find that in that sense as well returns have re-normalized, with tight correlations in returns seen over the past year. We then ask whether we expect the normalized MBS performance to persist into the future. Our answer to the latter question is mixed: we expect the tight correlations across cohorts to persist, but, given our bearish view on rates we anticipate negative MBS returns to occur again over the next twelve months.

Exhibit 1: Lagging year-over-year return on the MBS index is now positive
12-month agency MBS index total return



Source: Haver and Goldman Sachs Global Investment Research

Exhibit 2: MBS excess returns (return net of Fed Funds) has been above average over past twelve month horizon
12-month agency MBS index total return – Fed Funds rate



Source: Haver and Goldman Sachs Global Investment Research

MBS return correlations have risen on lower idiosyncratic risks

MBS returns de-correlated in 2013, but correlations have returned

Exhibit 1 shows that 2013 was a trying time in aggregate for the MBS market, but in addition to the aggregate return volatility, there was increased turbulence under the surface of the market index. In most periods the different actively traded TBA cohorts have returns which are fairly tightly correlated with one another, with the returns all strongly driven by common risk factors such as rising/falling rates or increasing/declining volatilities. However during 2011-2013, correlations of returns across TBAs declined. Targeted Federal Reserve purchases of selected MBS cohorts, HARP policy changes affecting only a subset of products and coupons, and spikes in delinquent loan buyouts were among the events which introduced idiosyncratic risks, causing the TBA cohorts to de-correlate.

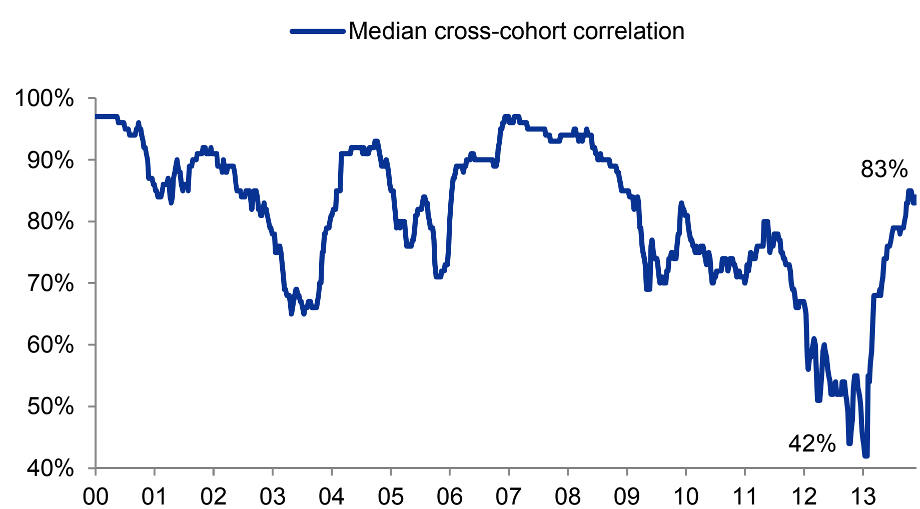
The decline in correlations made risk-management for MBS portfolios challenging during the 2011-2013 period, as typical hedge relationships failed to hold. However, evidence suggests that correlations across assets have more recently been re-established. Exhibit 3 shows the median cross-correlation across the 18 largest Fannie Mae 30-year, Fannie Mae 15-year, and Ginnie Mae 30-year cohorts over time. At each point in time, the pairwise correlations in returns over the subsequent year are calculated across all pairs of cohorts, and the median is used to summarize the typical correlation across all the pairs.

During the 2000-2007 period the typical pairwise correlation was 89%, indicating that hedging or relative value trading strategies involving being long one cohort and short another had relatively limited basis risk. During 2011-2013 correlations declined and by 2013 the typical correlation across pairs of TBA cohorts was only 42%. However, correlations have reemerged, and over the past 12 months the correlation in returns across cohorts was 83%, close to pre-crisis average levels.

As one example of this change in correlation structure, Exhibit 4 shows the weekly returns over the April 2012-April 2013 period for the FNM30 3.5% and 5.0% cohorts; the R^2 was 20%. Over the past year (June 2013-June 2014), the same pair of cohorts had a 62% R^2 (Exhibit 5).

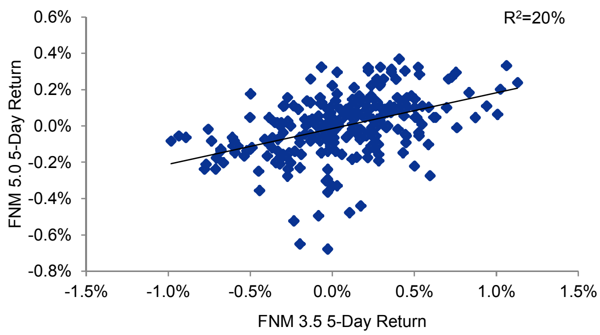
Exhibit 3: TBA cohorts de-correlated during 2011-2013, but correlations have since returned to normal levels

Median cross-correlation in returns across 18 largest TBA cohorts



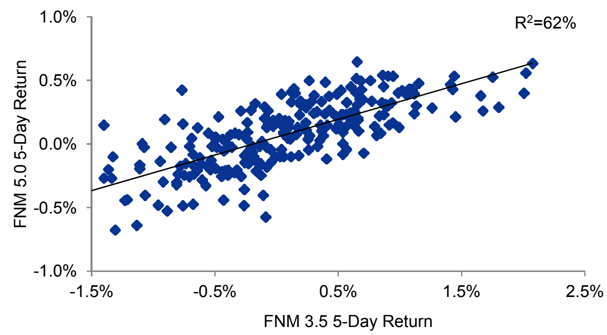
Source: Yield Book and Goldman Sachs Global Investment Research

Exhibit 4: Correlations in returns across TBA cohorts was weak during 2011-2013…
5-day returns, FNM30 3.5 vs. FNM30 5.0, Apr 2012-Apr 2013



Source: Goldman Sachs Global Investment Research

Exhibit 5: … but correlations have increased over the past year.
5-day returns, FNM30 3.5 vs. FNM30 5.0, Jun 2013-Jun 2014

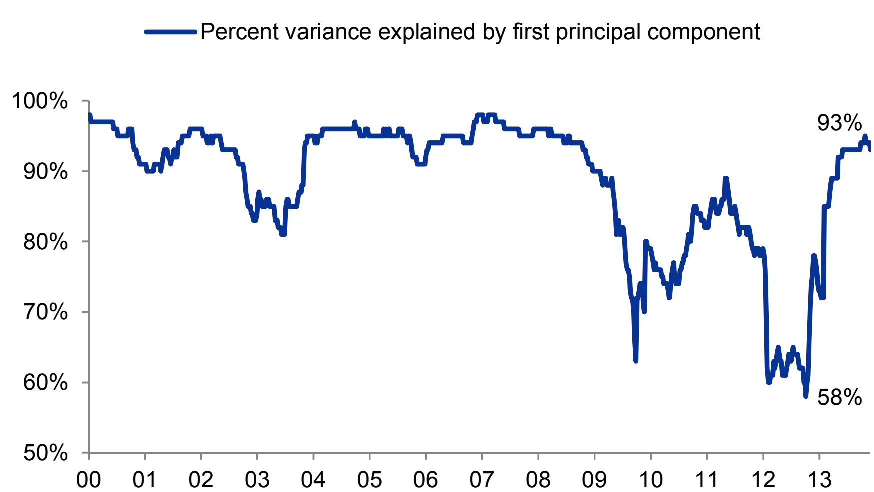


Source: Goldman Sachs Global Investment Research

Principal component analysis confirms correlations restored in 2014

A similar conclusion to the one described above – that correlations declined in 2011-2013, but have since returned to more normal levels – is obtained if the cross-section of TBA cohort returns is analyzed by a rolling 52-week principal components analysis. Exhibit 4 shows that the first principal component across the FNM30/FNM15/GNM30 TBA cohorts typically explains >90% of variance. In 2013 the percentage fell below 60%, but it has since returned to 93%. This large percentage of MBS return variance explained by a single factor is high compared to results seen when decomposing returns across global equity or global CDS indices, where the first principal factor explains 60%-75% of variance (see "The role of common risk factors across uncommon asset markets", G*lobal Economics Weekly*, April 9, 2014). Not surprisingly, the first principal component of MBS returns is highly correlated with interest rates; as of June 2014, the correlation between 10-year Treasury yields and the first principal component was 95%.

Exhibit 6: The first principal component of MBS returns explains 93% of recent cross-cohort covariance, vs. 58% in 2013
Percentage variance explained by first principal component of returns on18 largest TBA cohorts



Source: Yield Book and Goldman Sachs Global Investment Research

Recent returns show strong performance up-in-coupon

The statement that returns across TBA cohorts have again become correlated does not imply that returns on all cohorts are equal, only that the returns generally move in consistent directions in most periods. Exhibit 7 shows recent historical returns across different product and coupon cohorts. Over the past twelve months, returns were positive across all cohorts, but lower for 15-year than for 30-year MBS. Over the past one month horizon, high coupon cohorts out-performed lower coupon cohorts, as the 5-year Treasury rate sold off by 10-15 bp over the month. The out-performance of higher coupon cohorts on an unhedged basis was, in a sense, predictable given the rate movements. This greater predictability of relative returns allows for cleaner hedging and relative value trading strategies than was possible to achieve during 2011-2013.

Exhibit 7: Over the past month returns were highest in the high coupon 30-year cohorts
Year-over-year and month-over-month total unhedged returns, agency MBS, as of 6/24/2014

		Total Return	
Product	Coupon	YoY	MoM
FNMA15	2.0	4.7%	-0.1%
FNMA15	2.5	4.5%	0.0%
FNMA15	3.0	3.9%	-0.1%
FNMA15	3.5	4.4%	0.2%
FNMA15	4.0	2.7%	-0.1%
FNMA15	4.5	1.6%	-0.1%
FNMA15	5.0	0.6%	0.3%
FNMA15	5.5	2.4%	0.5%
FNMA30	2.5	6.2%	0.0%
FNMA30	3.0	5.4%	0.0%
FNMA30	3.5	5.7%	0.0%
FNMA30	4.0	5.4%	0.3%
FNMA30	4.5	5.0%	0.3%
FNMA30	5.0	5.4%	0.6%
FNMA30	5.5	4.9%	0.6%
FNMA30	6.0	5.0%	0.6%
GNMA30	2.5	5.4%	-0.1%
GNMA30	3.0	6.7%	0.3%
GNMA30	3.5	6.1%	0.0%
GNMA30	4.0	6.0%	0.2%
GNMA30	4.5	5.8%	0.2%
GNMA30	5.0	4.7%	0.1%
GNMA30	5.5	4.5%	0.4%

Source: Yield Book and Goldman Sachs Global Investment Research

Expect high correlations to remain, but for returns to turn negative

Lower idiosyncratic risk, high common risk

The exhibits above suggest that in 2013 MBS returns were atypical of long-run history, but in 2014 MBS performance returned toward the long-run average. 2013 was atypical in at least two respects: aggregate index returns were abnormally low, and the correlations across TBA cohorts were also low. Should we expect these trends seen in 2014H1 to persist into the future? Our response to this question is mixed: we expect the correlations across TBA cohorts to remain high, but we also expect returns over the next twelve months to turn negative again.

The abnormally low correlations across cohorts seen during the 2011-2013 period were driven by events and market forces that disproportionately impacted a limited number of cohorts. For example, the tightening of mortgage spreads around the inception of QE3 and the subsequent widening that occurred during the taper tantrum period affected all cohorts, but impacted the current coupon 30-year cohorts more than the more off-the-run portions of the coupon stack. Our models suggest that much – though not all – of the impact of the QE program has already been unwound, so that mortgage spreads look close to what they looked like pre-QE after controlling for factors like rate volatility and swap spreads (see "MBS basis tightening consistent with declining rate volatility", *The Mortgage Analyst*, May 16, 2014). Our central scenario calls for modest spread widening over a medium-term horizon as QE tapering continues, but do not expect the adjustment to generate large discontinuous price changes to a small number of cohorts.

Similarly, we do not expect policy changes to dramatically change the prepayment landscape over the next twelve months. A change to loan level pricing adjustments is expected, and that would have disproportionate impacts on certain selected cohorts. Our research suggests, for example, that the change to LLPAs proposed by former FHFA Director DeMarco in December 2013 – a change which was subsequently postponed by in-coming Director Watt – would have the largest impact on spreads of the FNM30 5.0 coupon, vs. other portions of the coupon stack (see "Loan-Level Price Adjustments: FHFA's next move", *The Mortgage Analyst*, June 12, 2014). However, we estimate that the pricing impact will be smaller than that which was seen with earlier policy changes such as introduction of the HARP 2.0 program.

The potential impact of policy changes has been diminished by the prepayment burnout of seasoned pools. The most responsive borrowers already prepaid in 2013, so it would require a relatively large change to mortgage rates and points to induce a significant shock to realized prepayments in 2014. The impact of a given policy change on prepayments will decline over time given our expectation of rising rates going forward.

However, while we see future idiosyncratic risk to TBAs as lower than was experienced during the 2011-2013 period, our expectation of rising rates creates common risk for the entire MBS complex. Our interest rates strategists have recommended a short position in 3-year US Treasuries, viewing the risk premium there as underpriced relative to our central expectation of robust economic growth. On this yield curve forecast, 10-year Treasuries would be negative over a twelve-month horizon (see "Sustained growth and policy easing: OW equities and UW bonds", *GOAL: Asset Allocation Update*, June 23, 2014).

The duration of the MBS index is shorter than the duration of 10-year Treasuries, and the coupon of MBS is higher, and these factors would lead to higher returns for mortgages. On the other hand, mortgages are negatively convex, and we anticipate spread widening over the next twelve months, and these considerations would hurt mortgage returns. All in, our unhedged total return expectation for the mortgage index over the next twelve months is negative.

Shorten duration by moving up-in-coupon, not down-in-maturity

If interest rates move as we project, all mortgage bonds would be affected but shorter-duration assets would be impacted less. We have written in the past that 15-year MBS represents an expensive strategy for shortening duration (see "Risks and returns of 15-year vs. 30-year MBS", *The Mortgage Analyst*, April 4, 2014, and "15-year mortgages: rich to 30-year?", *The Mortgage Analyst*, September 20, 2013). 15-year mortgages have cheapened some vs. 30-year but we still view new 15-year TBA as expensive on an option-adjusted basis. Alternative expressions of a short-duration positioning that appear cheaper than 15-year TBA include up-in-coupon 30-year conventionals (e.g., 4.5% coupon), seasoned 15-year collateral, or structured product.

Marty Young

Disclosure Appendix

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