

# VANDERBILT *Ave.* ASSET MANAGEMENT

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## Trading The Mortgage / Agency Basis

Recent studies have provided anecdotal evidence to support the effectiveness of capturing excess returns in a fixed income portfolio by trading the mortgage/agency basis. Simply stated, the mortgage/agency basis represents the option-adjusted spread (“OAS”) difference between mortgage-backed securities and agency debentures. The mortgage/agency basis measures the near term relative attractiveness of the mortgage sector.

The mortgage/agency basis calculation provides investors with insight into the investing motivation of the two largest mortgage underwriting agencies, Fannie Mae and Freddie Mac. These two government sponsored entities (“GSEs”) combined represent the largest single buyer of mortgages in the institutional marketplace today. As such, their trading activity can materially impact the value of the mortgage sectors over short periods of time.

The GSEs’ primary function is to ensure the overall liquidity of the U.S. real estate market by making and purchasing mortgage loans. Depending on the prevailing costs of financing in the debt markets, the GSEs will either hold mortgage loans in their own portfolio and issue agency debt to fund future loan purchases, or they will securitize those mortgage loans as mortgage backed pools and sell them in the institutional bond markets. The Agencies will tend to underwrite mortgage-backed securities when they are trading at historically rich levels. Likewise, the Agencies prefer to hold the mortgages in their portfolio and fund their balance sheet through debenture issuance when mortgage obligations are trading relatively cheap.

The mortgage/agency basis (“The Basis”) has been defined in many different ways. At , we use the option-adjusted spread to LIBOR (“LOAS”) of the current coupon 30- year agency mortgage pass-through minus the LOAS of the “on the run” ten year agency reference note. We use LOAS to take into account the GSEs’ cost of funding a new issue transaction in the swap market.

$$\text{The Basis} = (\text{CC MTG LOAS} - \text{OTR 10YR LOAS})$$

In order to identify the statistical significance of The Basis, we calculate the Z-Score of the basis relationship. The Z-Score is calculated by dividing The Basis by the standard deviation of the rolling 20 day historical average of the mortgage/agency relationship.

$$\text{Z- Score} = \frac{(\text{CC MTG LOAS} - \text{OTR 10YR LOAS})}{\sigma \text{ of 20 Day Rolling Ave}}$$

One of the key considerations in basis trading is the ability of the investor to move in and out of a position in an efficient manner. We set tight trading boundaries in order to ensure that we are only implementing a basis trade strategy when there is a high degree of likelihood of making a profit net of all transaction costs.

For example, we monitor LOAS of mortgages to agencies on a rolling historical 20-day basis, in order to capture the rich/cheapness of the mortgage sector. First, we use the Z-scores to consider the statistical significance of the trading anomaly in historical terms. We consider entering into a mortgage/agency basis trade only when The Basis is at least 1.5 standard deviations away from their historical averages, giving us a high degree of confidence of the eventual reversion of the mortgage/agency basis relationship to its historical mean.

Secondly, we determine the appropriate entry levels for mortgage versus agency debt trades. A study conducted by Salomon Brothers in January 2001 showed that the basis generally moves about 70% of the way toward its trailing 20-day average over a period of 7 to 10 trading days. We use this 70% ratio to determine appropriate entry levels for the strategy. For example, we assume it will cost 1.2 basis points to execute a basis trade (.60bp bid/offer spread each for the agency and mortgage components). If our goal is to make a 3 basis point net profit on the transaction, we will only enter into a basis strategy if the basis is currently trading at least 6 basis points away from its 20 day average. The required entry point is calculated as:

<b>Expected profit</b>	<b>3.0 bp</b>
<b>Transaction cost</b>	<b><u>+ 1.2</u></b>
<b>Gross profit needed</b>	<b>4.2</b>
<b>70 % entry level</b>	<b><u>÷ .7</u></b>
<b>Required Basis</b>	<b>6.0 bp</b>

In addition to setting the entry target, we utilize the TBA market to implement the basis trade in order to isolate the basis without taking on prepayment risk. The TBA market is highly efficient, and trades with a very tight bid/ask spread, second only to the US Treasury market. By using the trading discipline outlined above coupled with the use of the highly liquid TBA market, we maximize the opportunity to capture hidden value in the mortgage sector.

For example, let's consider a basis trade where mortgages are trading cheap. In order to execute a modest 20% basis trade in your portfolio, we purchase a 5.0 % weighting of the TBA FHLMC gold 7.5% and sell a duration neutral combination of two and 10-year FHLMC reference notes with hedge ratios of .43 and .40. While we prefer to sell a blend of agency bullets in order to hedge against curve risk on the basis trade, we could also have sold 10-years only with a hedge ratio of .51.

One of the most important aspects of the basis trade is carefully establishing an exit strategy at the time the initial investment is made. Therefore, we simultaneously establish a sales target trigger point at 3-4 bp of tightening on the basis. We monitor the trade in the market using live screens in order to track the progress of the trade over the next 14 days. By continuously monitoring the trade we are able to unwind the trade as soon as it has captured a significant proportion of potential excess return, and has reverted to a fair value relationship. Although the

exit trigger amount will vary from trade to trade, depending on market technical and economic conditions, it can add significant excess returns to your portfolio over the course of a year.

The Salomon research study concluded that the mortgage/agency basis has generated trading profit opportunities over the past two years. And while the basis adjusted more quickly in 2000 than it did in 1999, due to the growing number of investors actively trading the mortgage/agency basis, ample opportunities still exist for the agile investor. The chart below shows the change in the mortgage/agency basis in the week and month following a significant Z-score event (A significant Z-score is greater than + 2.0 or less than -2.0).

Year	# of Events	Average Z Score	Beginning Basis	Change over next week	Change over next month	Ave Annual Profit
1999	9	1.8	19.2	-3.5	-8.1	32 bp
2000	5	1.5	17.2	-3.0	-1.7	15 bp
Diff	4	3	2.0	-0.5	-6.4	17 bp

Source: Salomon Brothers January 2001

When the fitted regression line is plotted in a chart of mortgage/agency basis observations, it has a significant negative slope. In other words, when the basis is wider than its 20-day average, mortgages tend to richen versus agency debt over the next week. Conversely, mortgages tend to cheapen relative to agency debt when the basis is tighter than its one-month average. The slope t-statistics are significant at -3.3 for 2000 and -4.0 for 1999, providing further evidence that investors can capture excess returns through mortgage/agency basis strategies.

At we continuously monitor the mortgage/agency basis as a technical gauge of the rich/cheap relationship between mortgages and agency paper. We use this analysis to anticipate the supply/demand technicals that may drive spreads wider or tighter in the mortgage market, and as a way to take advantage of short term mis-pricings within the sector. The mortgage/agency basis trading strategy is one way that can add value to your fixed income portfolio in these volatile times.

Vanderbilt Research Team