

Fixed Income Research

MORTGAGES

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Mortgage Market Comment

- We are announcing a new release of the Goldman Sachs mortgage prepayment model. The enhancements to the model take into consideration two important structural trends:
 1. the decreasing cost of origination, which is leading to more-efficient refinancing, and
 2. the increasing diversity of collateral, which is leading to less-uniform prepayment behavior.

We feel that these enhancements significantly improve the valuation of both TBA and seasoned mortgage securities.

- Relative value implications from the updated model include:
 1. TBA GNMA and conventional 7.5s and 8s are cheap relative to higher and lower coupons. We slightly favor GNMA 8s over conventional 8s.
 2. 1994–95 origination 8s and 8.5s are cheap relative to both 1996 TBAs and 1991–93 originations.
 3. TBA conventional 8.5s and above are expensive and should be swapped for seasoned paper.
 4. 1986–87 GNMA 9s stand out as cheap among earlier vintages.

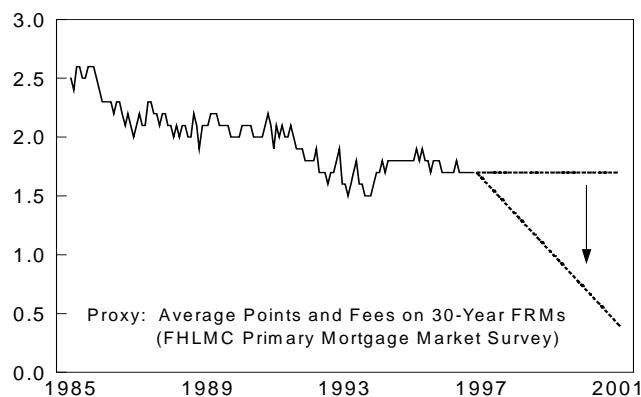
Prepayment Model Update

The Goldman Sachs mortgage prepayment model, first released in 1994, provides a consistent framework for explaining the dramatic range of prepayment behavior since the 1970s. It has served as a valuable tool for MBS analysis throughout the significant market swings of the past three years. The model faithfully reflects the real dollar incentives that drive homeowner prepayment decisions (including loan size, home equity, and transaction costs) and the change in a mortgage pool's refinanceability over time (by tracking the distribution of "Ready, Willing, and Able" homeowners as the most sensitive refinancers exit the pool). Nevertheless, two recent trends in mortgage origination pose growing challenges to existing prepayment models:

- (1) The increasing *efficiency* of mortgage origination is making prepayment behavior less uniform *over time*.
- (2) The increasing *diversity* of mortgage origination is making prepayment behavior less uniform *across collateral*.

The following discussion briefly summarizes these trends and the steps we've taken to incorporate them into the Goldman Sachs prepayment model (effective immediately). A more detailed presentation about the updated model will be available shortly.

Challenge 1: Falling Origination Costs . . . Leading to More-Efficient Refinancing

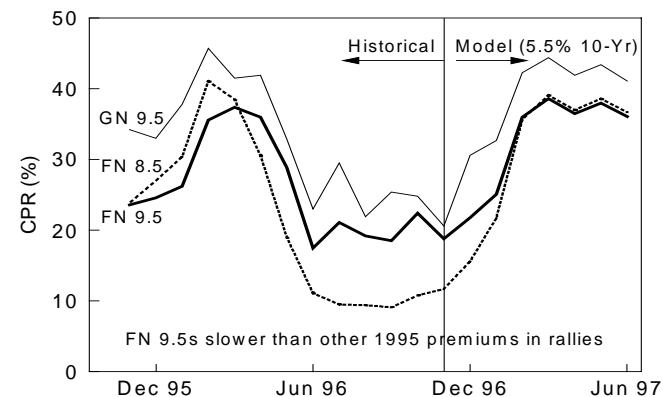


The economics of the mortgage origination industry are undergoing profound changes, and in the 1995–96 market rally, these changes began causing significant shifts in MBS prepayment patterns. The indus-

try is continuing its dramatic consolidation toward a lower cost structure in which only the most efficient originators and servicers survive. Meanwhile, major improvements in underwriting technology are becoming increasingly widespread. Together, these forces will extend and accelerate the 10-year trend toward lower mortgage origination costs. The result is that refinancing will continue to become faster and more efficient for any given level of interest rates. What has always been a "risk" for mortgage investors should now be considered a likelihood.

Since 1994, the Goldman Sachs prepayment model has included a measure of average origination costs in our estimate of the dollar incentive for homeowners to refinance. (Exact statistics are not available, but origination points and fees serve as a reasonable proxy.) In the updated version of the model, we take the further step of *projecting explicit declines in average origination costs*: (1) over time, as automation and consolidation trends continue; (2) in rally scenarios, as high refinancing volumes foster originator economies of scale and aggressive competition for market share; (3) for refinancing brand new mortgages, as fresh borrower documentation facilitates almost effortless transactions; and (4) for GNMAAs relative to conventionals — temporarily — as mortgage banker consolidation has a head start in the GNMA market. Our model thus captures the faster refinancing patterns arising in all four of these cases.

Challenge 2: Less-Uniform Collateral . . . Leading to Less-'Generic' Prepayment Behavior



As mortgage originators and agencies strive to distinguish themselves competitively, many variations on traditional underwriting practices have found their way into the MBS market. Examples of recent

innovations abound: no-cash refinancing mailers, changing mortgage insurance practices, various “affordable housing” initiatives, countless FRM-ARM hybrids, and so forth, allowing mortgagor self-selection among an ever-broadening array of alternatives. The result is that many different coupons and origination years have started showing anomalous prepayment behavior, as the vintage reflects one or another of these many distinctions in collateral and borrower choices. Even more importantly, the prepayment effects resulting from collateral distinctions tend to persist for some time; they don’t just disappear randomly after a month or two. Prominent examples of these anomalies include the slow-refinancing FNMA 9.5s issued in early 1995, the fast-turnover GNMA 6.5s–7.5s of 1993–94, and other cases too numerous to detail this week. Indeed, the increasing heterogeneity of mortgage collateral has been widely recognized, and the resulting trend toward more-diverse MBS prepayment patterns is almost certain to continue.

Our strategy for incorporating these patterns (without having access to the hidden variables that account for them) is to analyze automatically the relevant historical prepayment data to determine whether the aberrations are statistically significant, and therefore whether they’re random or nonrandom. *If the pattern of prepayment deviation is non-random, we project that a portion of the deviation will persist for a period of time*, which can vary from several months to several years.

Determining statistical significance involves four considerations: (1) the magnitude of the prepayment deviations; (2) the recency of the deviations; (3) the consistency of the deviations; and (4) the number of loans reporting the deviations. If a prepayment anomaly is large enough, current enough, and has persisted for a long enough time period on a broad enough set of mortgages, then the anomaly is statistically significant, and there’s a good chance it’s based on something fundamental in the underlying mortgages, not just random. When this happens, we automatically adjust the relocation rate, the cuspiness, or the overall refinanceability of our projections to be more consistent with the prepayment histories of specific coupons, vintages, CMOs, and pools — both short-term *and* longer-term.

Magnitude of Changes

For most premiums, relative to the previous version of the model, the trend toward more-efficient refinancing results in higher projected CPRs, lower OASs, and shorter OADs. These effects tend to be largest for the cusp coupons — typically +5% CPR, –15 bp OAS, and –0.5 year OAD. On the other hand, slow-refinancing premiums, like FNMA 9.5s, can end up with exactly the opposite changes, and different vintages can often be affected differently. For seasoned premiums, while many models project excessively fast short-term speeds in a 5.5% 10-year Treasury scenario, the updated Goldman Sachs model “adjusts itself” to project speeds that are more consistent with last winter’s peaks.

For most TBA coupons, historical trading patterns still follow an OAS “smile” pattern, where OASs widen in either rate extreme as structural prepayment risk becomes dominant (faster refinancing or slower relocation). The updated OASs, however, are less directional in rallies than in the previous version, and more consistent over time and across securities. Overall, these updates should succeed in making the model incrementally more realistic, both for scenario prepayment vectors and for the MBS valuation and risk measures that depend on these vectors.

Quantifying Prepayment Intuition

The increasing efficiency and diversity of mortgage originations are definitely making life easier for homeowners — but considerably more difficult for MBS investors and analysts. The two major challenges are intuitively clear and well recognized: (1) Refinancing will trend significantly faster over the next few years. (2) Many issues will prepay significantly faster or slower than “normal.” Translating these facts into valuation conclusions is difficult, however, since so many of the key prepayment differences now arise from variables that are unavailable to investors. While this situation is far from ideal from an analytical perspective, it’s likely to be with us for some time to come. In the meantime, the updated Goldman Sachs prepayment model provides a unique, realistic, systematic way of quantifying these developments, which are becoming more and more critical for reliably identifying mortgage market opportunities.