Analyzing MBS Backed by HECM Reverse Mortgages

The reverse mortgage market is dominated by the HECM (Home Equity Conversion Mortgage) program, where the Federal Housing Administration (FHA) provides a guarantee against default. The program has been in existence for 20 years, with Fannie Mae traditionally purchasing most of the production for their portfolio. In 2007 Ginnie Mae started the Home Equity Conversion Mortgage-Backed Security (HMBS) program for HECM loans. This program eventually replaced the Fannie purchases and nowadays absorbs almost all the HECM originations.

The HECM program has almost $100b mortgages outstanding, while HMBS securitizations have surpassed $40b. Even as the HECM program suffered a slowdown during the financial crisis, production seems to have stabilized since 2012 at about $750mm per month. Production has also changed from the floating rate loans that were prevalent before 2009, to mostly fixed rate loans.

FIGURE 1: HECM AND HMBS LOANS

Source: HUD (HECM data through September 2012), Ginnie Mae (HMBS data through March 2013), PIMCO
Note: The first year of reported issuance for HECM is 1990, but there is very limited origination initially. All data is reported for HUD fiscal years (October through September). The 2013 HMBS data covers seven months, not annualized.
What is a reverse mortgage?
A reverse mortgage is a product targeted to older homeowners. No payments are due on the mortgage until the borrower ceases to have the house as his or her primary residence (typically due to the death of the borrower or a sale of the house). The interest that accrues in the meantime is added to the balance of the mortgage. This is very similar to a HELOC (home equity line of credit), except that the lender here takes the longevity risk. Note that even if no payment is due on the mortgage, the borrowers still has to maintain the house and keep current on the tax and insurance payments; because of this, borrowers can and do default even in a reverse mortgage.

The initial loan-to-value (LTV) on a reverse mortgage is capped at typically 60% – 70% (depending on the age of the borrower and the mortgage rate), to allow room for the balance to grow with the unpaid interest. Given the target population, reverse mortgages are often structured as a line of credit, allowing the borrower to tap the line as needed.

In some cases, the line of credit is disbursed in monthly payments to the borrower, resembling an annuity. In other cases, the reverse mortgage can actually be used to purchase a home, where the borrower puts a large down payment, but owes no subsequent payment on the mortgage. Finally, reverse mortgages can possibly be refinanced for better terms or larger amounts if home prices increase.

The HECM program and HMBS
The FHA supports the reverse mortgage market through the HECM loan program. HECM is by far the largest reverse mortgage program. In return for a mortgage insurance premium (MIP) FHA guarantees the HECM credit. Loans have to be underwritten to FHA guidelines, mainly requiring that the borrower(s) must be at least 62 years old and occupy the property as primary residence. FHA further establishes the maximum amount that can be borrowed as a function of the age of the borrower and the rate on the mortgage. The program has been very successful (Figure 1), and has almost $100b of active loans.

In 2007, Ginnie Mae launched the HMBS program, aimed at increasing liquidity of the HECM loan program by creating a standard securitization channel. In doing so, Ginnie Mae had to face the peculiar challenges posed by the reverse mortgage product. The main features are as follows:

- **HMBS are accrual securities.** Similarly to the underlying loans, at the end of every month, the interest they accrue is added to the principal of the HMBS.
- **HMBS are a pool of “Participations” in HECM loans.** Several HECM loans are structured as a line of credit, allowing the borrower to tap their line over time. A participation in a HECM loan is a pro-rata share of the loan that is securitized in a HMBS. If the borrower draws additional funds the participation balance does not change, it simply becomes a smaller pro-rata share of the loan. If the borrower pays off a portion of the HECM, the payment is applied pro-rata to all participations regardless of when their funds were drawn.
- **In addition to the HECM prepayments and terminations, HMBS participations have a mandatory re-purchase clause.** The lender has to buy back all the participations of a HECM loan when the loan’s LTV reaches 98%.
- **Finally, CMOs created out of HMBS are referred to as HREMIC securities.**

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1. The Consumer Finance Protection Board (CFPB) has been criticizing the industry as an increasing numbers of seniors take the full amount of the mortgage upfront (70% in 2011 vs. 30% in 2003), partly defeating the retirement income purpose of the product. Their 230 page report provides a lot of information and statistics on the product: http://files.consumerfinance.gov/a/assets/documents/201206_cfpb_Reverse_Mortgage_Report.pdf.
2. Lenders are guaranteed that they will be repaid in full when the home is sold, regardless of the loan balance or home value at repayment. The loans are non-recourse, so borrowers or their estates are not liable for loan balances that exceed the value of the home at repayment. MIP is 125 bps annually, with 200 bps upfront for the “standard” program (see below) and 1 bps upfront for the “saver” program.
3. Borrowers can choose a “saver” program with a lower upfront cost and a “standard” program with a higher borrowed amount.
4. LTV is actually measured relative to the “maximum claim amount.” This is established at the origination of the loan as the lowest of (a) the appraised value, (b) the (recent) sale price of the house, or (c) the FHA’s mortgage limit.
Evolution of the market

The HECM loan market was traditionally an ARM market, with Fannie Mae purchasing about 90% of the production until early 2009. Fannie abruptly scaled back its presence in 2009, down to 10% of new production in early 2010. At that point, most of the HECM loan production got diverted to the HMBS market. The product mix also changed quite abruptly. While the virtual totality of the HECM loans pre-2009 were ARMs, starting with the second half of 2009 close to 70% of the new loans are fixed-rate. This is likely because fixed-rate HECM loans require borrowers to take the full amount upfront instead of using the loan as a line of credit, which makes the HMBS securitization easier. While the HMBS market size ballooned from a little over $1b in early 2009 to over $40b now, the overall HECM loan origination dropped in 2010, with the slide continuing to date and an increasing number of large originators leaving the market (Wells Fargo and Bank of America left in 2011).

HECM performance

HUD publishes loan level HECM performance on approximately an annual base, with the latest published data being up to November 2011. While the data series is long, it unfortunately covers only a small period after the changes made in 2010. Below we initially discuss performance for the whole HECM program, and eventually focus on the changes with the more recent products.

Mortality

Reverse mortgages being a retirement product for seniors, their prepayments are primarily driven by borrower mortality. Typical mortality rates by age are shown in Figure 2.\(^5\) About 40% of the HECM loans are in the name of one female borrower, 20% in the name of one male borrower, and the remaining 40% are given to couples. Since the conditions for the mortgage to be due are for the last borrower ceasing to have the property as primary residence, mortgages to couples have longer average

\(^5\)We use mortality rates published by the CDC. Most recent data is for 2008. For couples, we compute mortality refers for the second person assuming the female is older. Note that in general mortality rates have been improving over the years, with some pause in 2007–2008.
tenures. For couples the age differential and the age at which the mortgage was taken are also very relevant.  

Besides mortality, there are two main drivers of HECM prepayments: home price appreciation (HPA) and loan age.

**Loan age**

Similarly to regular mortgages, borrowers are less likely to prepay the mortgage soon after they have taken it (Figure 3). In the case of a reverse mortgage, this means that the prepayments in the first year after the mortgage was taken are even lower than the typical mortality rate for that borrower age.

**Home price appreciation**

As in many other mortgage products, HECM prepayments have also been much higher in periods of high home price appreciation and have substantially declined now (Figure 4). This is clearly been driven by home prices.

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**FIGURE 3: SEASONING CURVES FOR VARIOUS HPA RATES**

![Seasoning curves for various HPA rates](image)

Source: HECM data as of September 2012, CDC mortality table for 2008, CoreLogic, PIMCO

Note: Conditional prepayment rate (CPR) is the annualized rate at which borrowers prepay. Annualized state HPA since origination.

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**FIGURE 4: PREPAYMENTS ON HECM LOANS 21–108 MONTHS SEASONED**

![Prepayments on HECM loans 21–108 months seasoned](image)

Source: HECM data as of September 2012, CDC mortality table for 2008, PIMCO

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6 The larger the age differential the more the mortality will resemble that of the youngest borrower. The older the age at which the mortgage was taken the lower the mortality. Note that FHA does not lower the initial LTV limit on mortgages given to couples. Sadly, some couples do not realize this and only one party is listed as borrower on the mortgage, so that the other may be forced to pay back the mortgage if the borrower leaves the house.
As we show in Figure 5, though, once we control for home price appreciation, prepayments have not declined in past few years. Loans with high HPA still have double digit prepayments.

A related question is how HPA affects prepayments. Looking at annualized HPA (as we do above) means that cumulative HPA differences grow with age. In practice (Figure 6), the effect of annualized HPA does not change much by loan age. This could be due to a reduced propensity to cash out for older borrowers.

**FIGURE 5: PREPAYMENTS BY HPA OVER TIME (LEFT) AND FOR 2009–2011 COMBINED (RIGHT)**

![Figure 5: Prepayments by HPA over time and for 2009–2011 combined](image)

Source: HECM data as of September 2012, CDC mortality table for 2008, Corelogic, PIMCO

Note: HPA in both charts is annualized state HPA since origination. Loans 21–108 month seasoned.

**FIGURE 6: PREPAYMENTS BY HPA FOR DIFFERENT LOAN AGE RANGES**

![Figure 6: Prepayments by HPA for different loan age ranges](image)

Source: HECM data as of September 2012, CDC mortality table for 2008, Corelogic, PIMCO.
Recent vintages and fixed-rate loans

While the main drivers of performance seem reasonably clear and consistent over time from the above charts, we know that the HECM program went through a sizeable shift in 2009 with fixed-rate mortgages becoming the main product and HMBS becoming the main exit strategy. The obvious question is how different the post-2009 cohorts are, but this is actually hard to answer with the available data. The preliminary evidence we have (Figure 7) points to the new fixed-rate product being slightly slower than the ARMs. Most if not all of that is justified by demographics, though. The fixed-rate product borrowers have a lower projected mortality, having a lower share of older people.

In general (Figure 8) prepayments are higher for loans where the borrower draws more of the credit line in the first year. The fixed-rate product is not a line of credit and will likely tend to attract the high draw borrowers. Correspondingly, the median first year draw for ARMs has collapsed since 2009 from around 80% down to the mid 30s. We would therefore argue that the small difference we observe for fixed vs. ARM borrowers over the past few years is likely due to the ARM product attracting a tail of slightly faster borrowers, more than by the fixed rate borrowers being slower what historically ARMs were.
Pricing

At PIMCO we have been investing in both HMBS and HREMIC bonds. While fixed-rate HMBSs constitute most of the market, we traditionally mostly invest in floating rate HMBS and HREMIC. Floating rate HMBSs and HREMICs have minimal credit and very little interest rate risk, but can provide an attractive pickup over swaps. This is because of their accrual nature and of their limited liquidity.

Fixed-rate HMBS are the majority of the market. Even if the optionality seems small (borrowers’ prepayments do not depend on rates, though the amount that can be borrowed does), those bonds do have interest rate risk, which is amplified by the accrual nature of the bonds. Since they trade at substantial premiums, they also have a sizeable prepayment risk. Given the discussion above, they are negatively impacted by an increase in HPA. We use the results of the previous section to put together a simple loan level HECM model, with the following features:

- Baseline projection is based on mortality, accounting for the number of borrowers and their gender and age
  - This is then multiplied by a loan age seasoning curve, so that it takes 18 months for the baseline loan prepayments to reach the average mortality
- On top of that we add an HPA effect adding up to 15 CPR (i.e., assume 15% more borrowers pre-pay every year) in a high HPA environment

We apply this approach to a few sample securities. The cashflows for two of these securities are shown in Figure 9. Depending on seasoning, the cashflows are for the first months purely driven by the prepayment assumption. Subsequently prepayments are also driven by the mandatory 98 LTV buyouts.

**FIGURE 9: HMBS AND HREMIC CASHFLOW PROJECTIONS UNDER DIFFERENT SCENARIOS**

Source: PIMCO, as of March 2013  
Note: Annualized cashflows as a percentage of original balance. Loan level assumptions explained in the text.  
*Hypothetical example for illustrative purposes only.*
**Spreads at the system prices are in Figure 10.** The results from the simple loan model projections are between those at 5 and 10 CPR. The resulting spreads are 50–70 bps. This is similar to the floaters, giving little compensation for the additional complexity of the prepayment/housing risk.

**FIGURE 10: SAMPLE HMBS AND HREMIC SPREADS UNDER DIFFERENT SCENARIOS**

<table>
<thead>
<tr>
<th>Loan level</th>
<th>0 CPR</th>
<th>5 CPR</th>
<th>10 CPR</th>
<th>15 CPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-spread (bps)</td>
<td>-20</td>
<td>40</td>
<td>80</td>
<td>140</td>
</tr>
</tbody>
</table>

Note: Loan level assumptions explained in the text. E-spreads are spreads to the eurodollar curve.

Hypothetical example for illustrative purposes only.