Reverse Mortgages—Repayment & Drawdown Behavior

For elderly homeowners, reverse mortgages provide an alternative to home equity loans as a way to monetize the equity in their homes. As the oldest of the baby boomer generation enter their retirement age and the consumer debt burden continues its upward trend - - senior citizens will increasingly turn to their homes, likely their most valuable assets, to provide supplemental cash flow in their golden years. Originations of reverse mortgages have increased dramatically in recent years, and are expected to continue to grow thanks to a favorable demographic trend.

In an article published last month ("Reverse Mortgage", *Mortgage Strategist* 6/6/2006), we explained how reverse mortgages work and reviewed the 3 types of programs:

(1) HECM (Home Equity Conversion Mortgages), insured by FHA

(2) FMHK (Fannie Mae Home Keeper Program)

(3) Proprietary reverse mortgage programs (lender-specific products).

Interested readers should refer to our previous article for the detailed mechanics of reverse mortgages. Of the three programs, HECM is by far the most dominant reverse mortgage product on the market at present, with >90% of total origination to date. *Since all HECM mortgages are FHA-insured, there is virtually no credit risk to speak of*. In the mortgage market, investors are paid to take on two types of risks: *credit risk* and *cash flow uncertainty* risk (the latter is commonly known as *prepayment risk*). With FHA absorbing the credit risk, an investor in HECM-backed deals needs to focus solely on the cash flow patterns of reverse mortgages.

In this article, we look at the cash flow patterns of reverse mortgages, specifically HECM products, at portfolio level. Of course, a reverse mortgage is fundamentally different from ordinary mortgages, since no payment is required of borrowers until the payoff date. We will need to come up with our own terminologies to define various aspects of draw/repayment behavior. We then look into various characteristics of reverse mortgages, and analyze their impact on the resultant cash flows.

HECM Program—Ins & Outs

To understand the cash flow of reverse mortgage in general and home equity conversion mortgages in particular, we need to look into both ends of the transaction, namely, *takeout* and *payback*. A reverse mortgage is different from ordinary mortgages in the sense that it is not dependent upon the borrower's ability to pay, but rather, is backed by the value of a house. That's a key difference between a HELOC and a reverse mortgage! Borrowers need to demonstrate that they can qualify for a HELOC and have the income to make monthly payments. By contrast, no payments are required of a reverse mortgage borrower until the payoff date (which is triggered either by the borrower's moving out, or death). In addition, the reverse mortgage is a no-recourse loan, meaning that the lender cannot go after the borrower/estate for deficiency payments if the sale price of the home is less than the outstanding loan balance.

HECM mortgages take the following forms:

- *Tenure* - Equal monthly payments, as long as at least 1 borrower is alive and continues to occupy the property as a principal residence.
- *Term* - Equal monthly payments for the fixed number of months selected.
- *Line of Credit* - Unscheduled payments or monthly payments, drawn down at times and in amounts of the borrower's choosing, until the line is exhausted (this line will grow over time).

- *Modified Tenure* - Combination of line of credit *and* monthly payments for as long as the borrower remains in the home.
- *Modified Term* - Combination of a line of credit *and* monthly payments for a fixed period.

Table 1 (at right) provides the market share of HECMs by product and borrower age, and shows that line of credit is by far the most popular choice (with 81% of the HECM market).

Table 1. HECM Distribution by Payment Plan and Borrower Age

Age Group	Line of Credit	Modified Tenure	Modified Term	Tenure	Term	Total
62-65	88%	2%	3%	7%	1%	9%
65-70	86%	3%	2%	8%	1%	20%
70-75	82%	4%	4%	8%	2%	25%
75-80	79%	6%	5%	8%	2%	23%
80-85	74%	8%	7%	8%	3%	14%
85-90	74%	9%	8%	7%	2%	6%
90-95	70%	8%	13%	7%	3%	2%
95-100	69%	10%	15%	5%	1%	1%
100+	59%	11%	19%	11%	0%	0%
Total	81%	5%	5%	8%	2%	100%

Source: UBS.

To be eligible for an HECM loan, the minimum borrower age is 62. If there are two borrowers, the younger of the two is used for the purpose of HECM qualification. The borrower age in Table 1 is therefore the minimum age (in the case of two co-borrowers). We note that about one-half of the borrowers are in the 70-80 age group and more than 80% are in the 65-85 age group. While most of the borrowers choose the line of credit option, the % choosing other products rises as age increases. In particular, older borrowers (those in their 80s and 90s) are more likely to choose the modified tenure and modified term products.

There are essentially two ways to pay off the loan as far as borrowers are concerned. The *first* is when the borrower (or both borrowers, in the case of co-borrowers) die. The *other* is when the borrower(s) chooses to move, selling the house, and for instance, moving into a nursing home or moving in with their children. These reasons for paying off the loan are sometimes called "Mortality & Mobility"; "M&M" for short. Refinancing into another reverse mortgage is also an option. However, that is not often used because of the high origination cost.

Age not only is an important factor in determining who can take out reverse mortgages - - it is also important in how the loans are paid off. Table 2 (immediate right) breaks down the payoffs by the types of events that triggers the payments. First of all, the older the borrower(s) are, the higher the odds of payoff. For example, borrowers in the 70-75 age group comprise 20% of the HECM portfolio, but only 17% of the payoffs. On the other hand, the 90-95 age group makes up of 2% of the portfolio, but 4% of total payoffs.

Table 2. HECM Mortgage Payoff Types by Borrower Age

Age	Orig %	Payoff %	Mobility	Mortality
62-65	9%	7%	89%	11%
65-70	20%	17%	89%	11%
70-75	25%	22%	86%	14%
75-80	23%	23%	80%	20%
80-85	14%	17%	71%	29%
85-90	6%	8%	58%	42%
90-95	2%	4%	46%	54%
95-100	1%	1%	42%	58%
100+	0%	0%	33%	67%
Total	100%	100%		

Source: UBS.

Borrower age not only affects the odds of payoffs, it also influences the type of payoffs. For relatively younger borrowers (those in their 60s and 70s), less than 20% of the payoffs are related to mortalities. For borrowers over 90 years old (at time of origination), mortality accounts for more than half of the payoffs. In short, at more advanced borrower ages, mortality increasingly becomes the dominant type of payoff, while younger borrowers are more likely to pay off their reverse mortgages because of mobility.

We have thus far looked at the takeout and payback patterns of HECM by age group. Some of our readers might wonder—*What about gender?* Given that female life expectancy is significantly higher

than that of males, one would expect that a borrower's gender might have some impact, as well. It turns out that a *female is either a borrower or co-borrower of 80% of HECM loans*. Thus—since mortality events are triggered only when *both* borrowers are deceased - - the overall mortality pattern should be mostly decided by the *female* borrower (who is more likely to live longer).

Draws & Repayments

While there is a great deal of variation across different types of reverse mortgage programs, we need only focus on a small subset - - *since 90% of reverse mortgages are HECM and 80% of HECM are line of credit.* Therefore >70% of reverse mortgages are HECM with the borrower taking out a line of credit. Accordingly, that is the product we will focus on throughout this article. So unless otherwise noted - - "cash flow analysis" in the rest of this article refers to the line of credit product in the HECM program.

A line of credit HECM works just like a HELOC; the borrower can make an initial draw of funds from the reverse mortgage, then draw on the unused portion of the line as needed. In HECM, there are two types of loan limits:

1) The maximum claim amount (MCA), which is the lesser of the house appraisal value or the county lending limit (the latter is determined by HUD/FHA).

2) The original loan limit (Olimit), which is a function of MCA and the borrower's age (or the lower of the two co-borrowers' ages). A younger borrower will be given a lower Olimit, thus allowing for a longer life expectancy, since the loan balances will increase as interest costs are capitalized.

For example, an 85 year-old borrower and a 65 year-old borrower with identical home valuations ($250,000) and the same county limits ($200,160) will have the same MCA (set to the lower of home price and county limit, which is $200,160 in this case). However the 85 year-old borrower will be given a original loan limit (Olimit) of $170,000; while a 65 year-old will be given an Olimit of $116,000, because the younger borrower is likely to live longer and a lower Olimit allows more room for the balance to grow.

Table 3 (at right) shows the % of loan amount (at origination and current) versus the loan limits. At origination, younger and older borrowers seem to initially draw down a comparable % of the funds versus the MCA and appraisal value, and the ratios Orig. Bal/MCA and LTV at origination (OLTV) seems to be stable across age groups. After the initial draw, older borrowers subsequently took out a more sizeable amount of additional funds, as Curr. Bal/MCA and current LTV (CLTV) are higher for older borrowers. The difference can be explained by the last column in Table 3 - - Orig. Bal/Olimit, which measures the amount taken out by borrowers against their loan limit at origination (Olimit). Using the same example as in our previous paragraph, the 85 year-old borrower takes out 58% of his Olimit, which is $98,600 (=$170,000*58%), while 65 year-old borrowers take out 69% of their Olimit, which is $80,40(=$116,000*69). In summary—*the older borrowers initially draw down a smaller % of allowed loan limits at origination, then increase the draw subsequently*.

Table 3. Line of Credit Utilization Rates of HECM

Age	Orig Bal /MCA	Curr Bal /MCA	OLTV	CLTV	Orig Bal /Olimit
62-65	43%	57%	37%	49%	71%
65-70	44%	58%	38%	50%	69%
70-75	45%	60%	39%	51%	66%
75-80	46%	62%	39%	53%	63%
80-85	47%	65%	41%	56%	61%
85-90	47%	68%	40%	58%	58%
90-95	45%	70%	38%	58%	53%
95-100	41%	69%	36%	60%	46%
100+	48%	76%	40%	64%	53%

In analyzing HELOC prepayments, we typically study the draw and prepayments separately, then add the two components to arrive at aggregate prepayment speeds. For amortization mortgages, Constant Prepayment Rate (CPR) is calculated from SMM (Single Month Mortality). SMM is defined as:

SMM = *prepayments/scheduled principal balance*

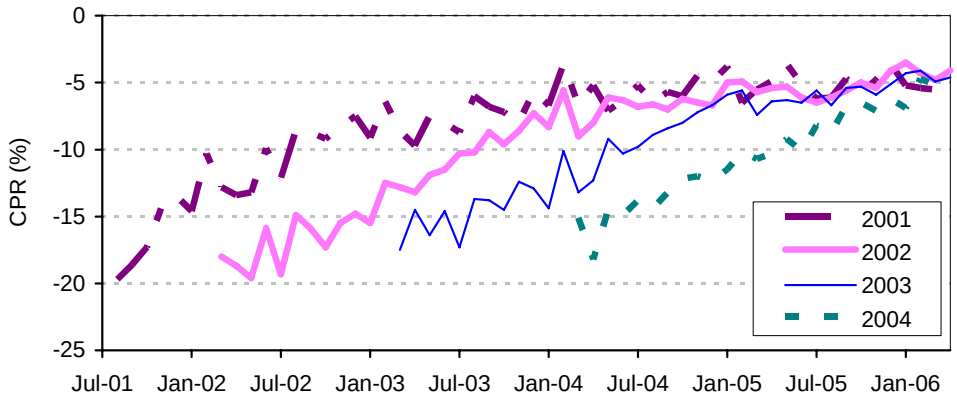
Prepayment is defined as payments received ahead of the amortization schedule. For line of credit HECMs, there is no amortization schedule; hence SMM is not defined (all we have are principal repayments). For that reason, we define *Constant Principal Repayment* rate (CPR) to measure the speeds of principal repayments. While the definition is different, the calculation is similar, in that we treat all the principal repayments as prepayment. Because the principal balance could rise (negative amortization) or decline - - the scheduled balance is not well defined, and tends to be volatile. To deal with that, we choose to use balance at origination (Orig. Bal) instead of scheduled principal balance.

In the following section, we look at the cash flow patterns of HECM product originated in recent years across a wide range of interest rate environments. The performance data is provided by a major reverse mortgage lender. In each case, we present the payment speeds from two separate points of view. The first is based on payment date. Fixed-rate amortizing mortgage are known to prepay faster in a rate rally and slower in a sell-off. If reverse mortgages are rate-sensitive, we should be able to identify the spikes of repayment in a rate rally. The cash flow patterns are also presented in a seasoning curve, which is used to capture the impact of borrower attributes.

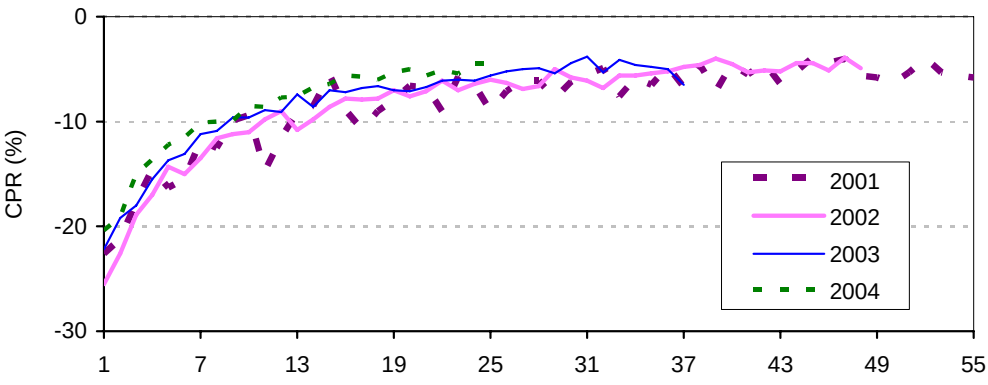
Figures 4a and 4b (at right) show the draw rates by vintage for the 2001-2004 vintage line of credit HECMs. The draw rate measures the speeds of draw downs *after the initial lump-sum takeout*. Despite changing market conditions, we note that the draw curves are closely aligned. Monthly draw started at ~20% CPR (the CPRs are all negative because it is a draw, which is the opposite of a prepayment) and then stabilized at ~5% CPR after 2 years. During the past 6 years, we experienced the biggest refi wave in history, as well as a dramatic increase in interest rates since 2003. Nevertheless, it would be difficult to discern that from the curves in Figure 4a, where the draw rates are parallel to each other.

Figure 4. Draw Rates

a. By Date



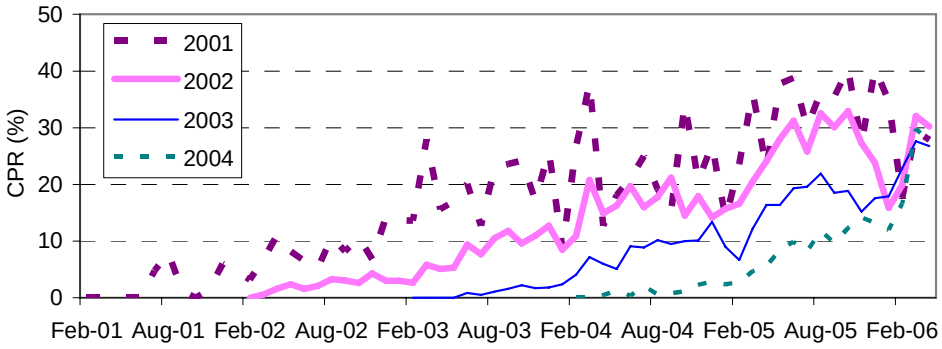
b. By Seasoning



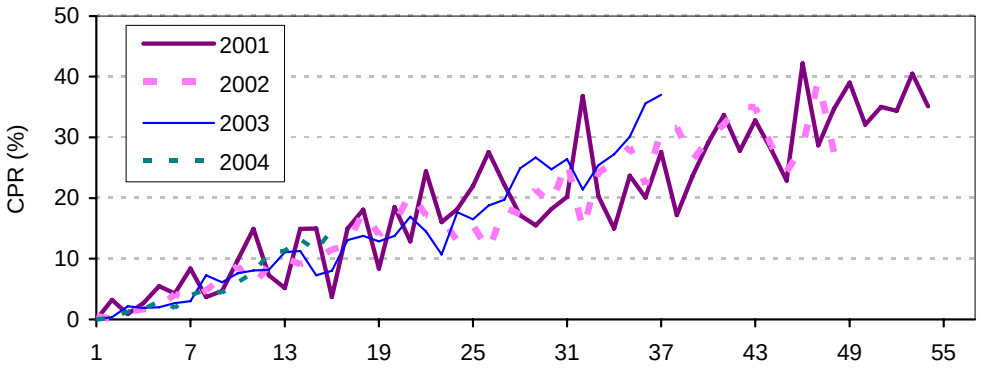
We next look at repayment patterns. Figures 5a and 5b (at right) show principal repayment speeds by vintages. Again, we note that repayments seem to have little to do with interest rate environments. The sharp ups and downs of repayment speeds of the 2001 vintage reflect mostly the low volumes (hence sporadic payment spikes) rather than any systematic response to macroeconomic conditions. By seasoning, the monthly Constant Principal Repayment (CPR) is similarly aligned across vintages. Given the relatively high cost of a HECM loan ([2% of MCA at origination + 50 bps/annum], in addition to the interest rate [Treasury + 150 bps]), one would expect that repayment should be relatively slow. And that's exactly we found in Figure 5b. Repayments started from zero, slowly ramped up, taking 3 years for repayment speeds to stabilize at ~30 CPR.

Figure 5. Constant Principal Repayment Rates

a. By Date



b. By Seasoning



Figures 6a and 6b (top and middle, next page) show net repayment rates (defined as [net principal repayment - draws]). Unsurprisingly, the net repayment rate shows very limited interest rate sensitivity, and similar seasoning patterns across vintages. The general patterns of repayments can be summarized in the following overview: Net payments started at negative 20% CPR and then hit zero in 12 months. After that point, repayments start to take over and the monthly principal repayment rate gradually ramps up to 25% CPR in 24 months, then stabilizes at that range.

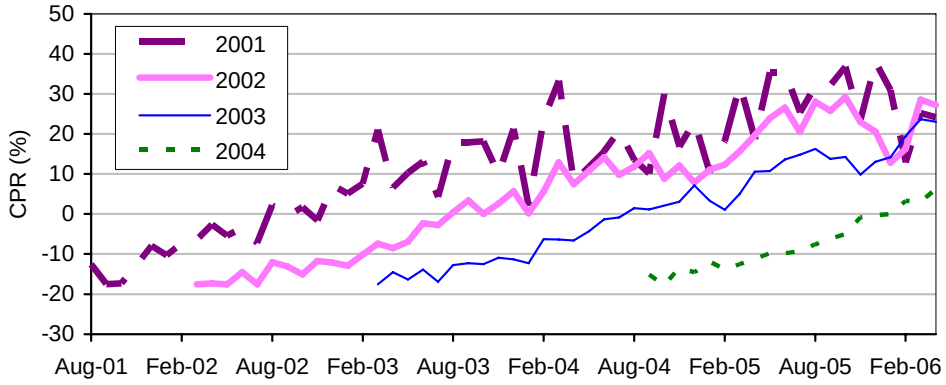
Another way to look at the HECM cash flows is simply via pool factors. Other than draws, there is another reason that pool balances will increase - - capitalized interest. Since the borrowers are not required to make any principal or interest payments, the accrued interest is added to the balance of the loans. Therefore, pool factors could still rise, even after principal repayments exceed draws. As shown in Figure 7 (bottom, next page), pool factors peaked around Month 18, then started to decline gradually. The outstanding balance does not drop below origination balance until after 3 years.

Repayment Drivers

In the previous section, we summarized repayment patterns on line of credit HECM products, and showed that reverse mortgages are *not* rate sensitive; they display a consistent seasoning ramp across different economic environments. In this section, we'll look at a few collateral attributes that drive repayments.

Figure 6. Net Principal Repayment Rates

a. By Date



b. By Seasoning

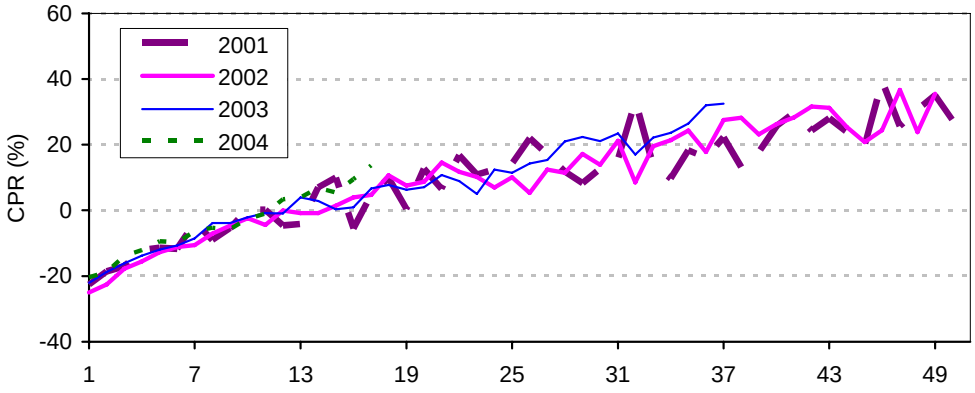
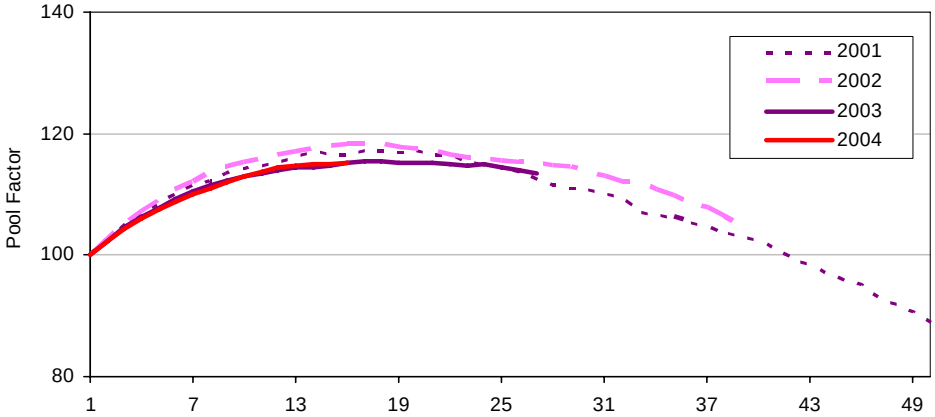
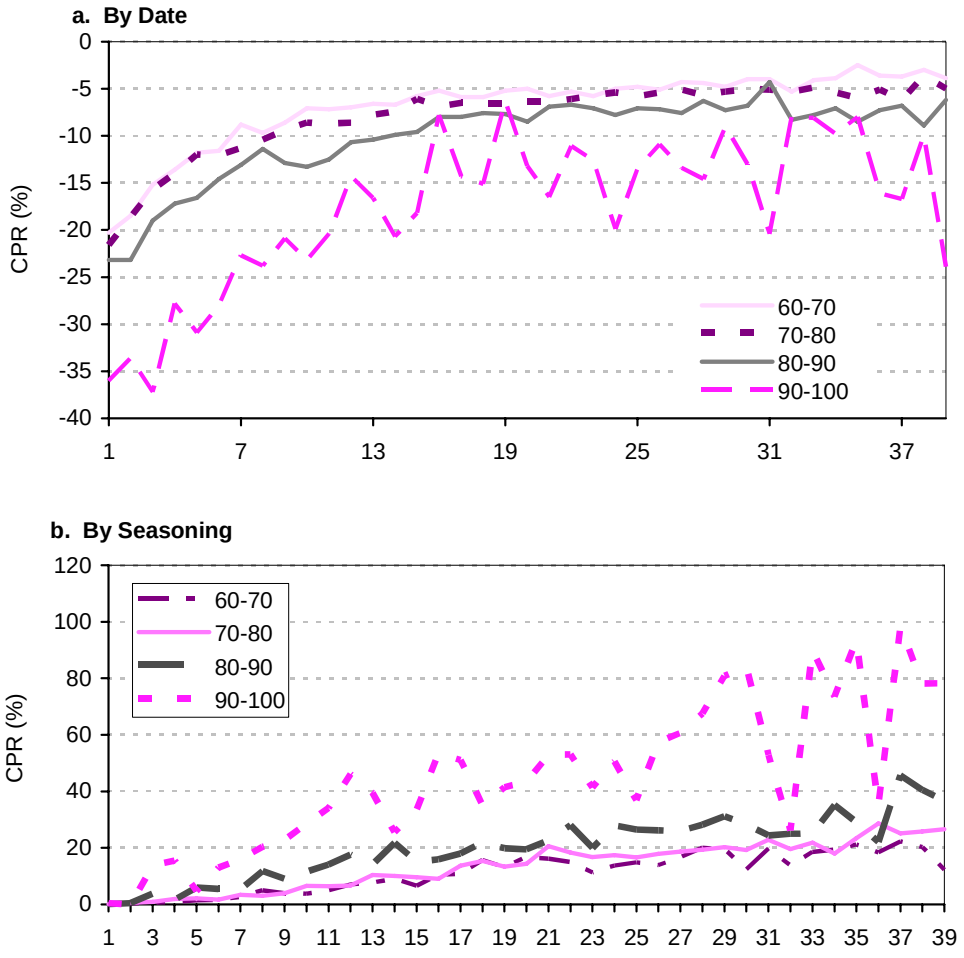


Figure 7. Pool Factors of HECM Mortgages



Since a reverse mortgage is specifically designed for senior citizens, borrower age comes to mind first. We look at draw and repayment rates across age groups, as shown in Figures 8a and 8b (at right). Figure 8a shows that older borrowers tend to have significantly higher draw rates, and Figure 8b shows that these older borrowers also have faster repayment rates. The faster repayment rates are easy to understand, since life expectancy is shorter at more advanced ages, hence mortality and mobility tend to happen sooner for older borrowers. The last column of Table 3 shows that older borrower took out a smaller % of original loan limit; presumably, because they get higher loan limits (older borrowers get higher loan limits, everything else being equal). Therefore, older borrowers have a larger amount to draw upon; and Figure 8a shows that they do take advantage of that.

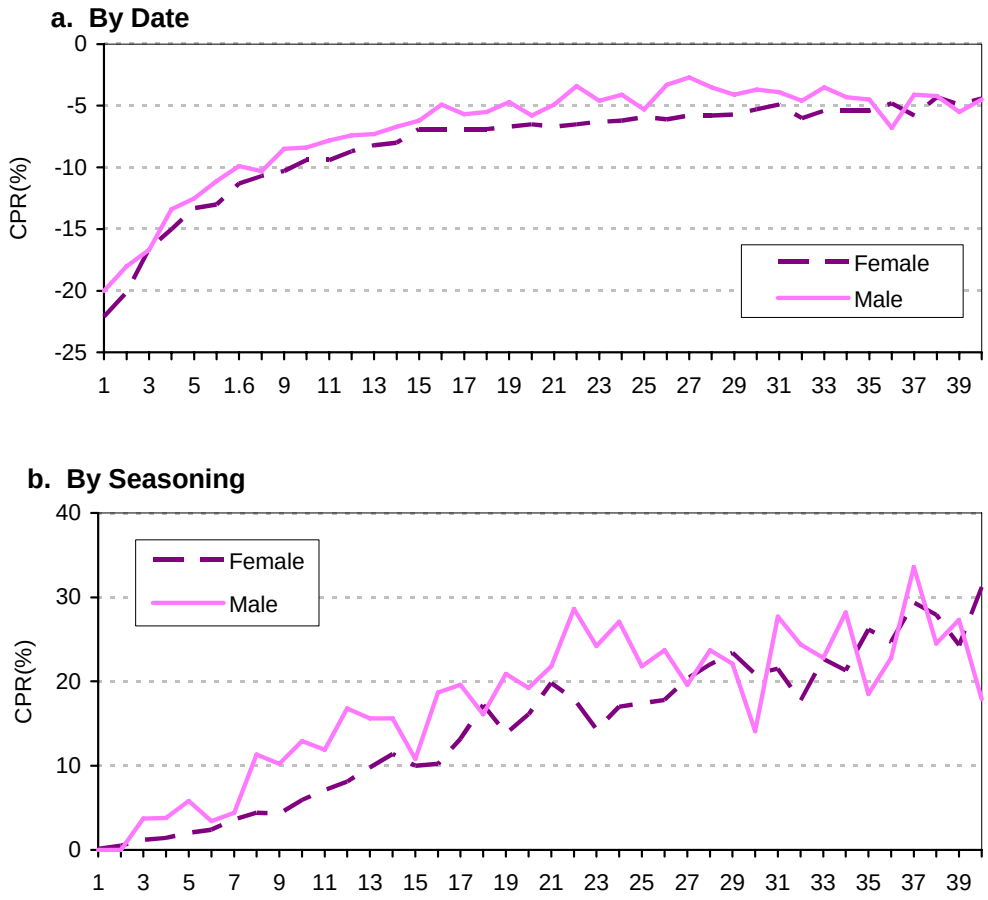
Figure 8. Draw Rates by Age Group



In reverse mortgages, borrower age is determined by the younger of the two co-borrowers, and principal payment is due on the death of the second of the two co-borrowers. Since female life expectancy is significantly longer than that of a man, the mortality event is more likely triggered by the death of the female borrower. We therefore classify the "two borrower" group as "female". Male-only borrowers make up about 20% of the market.

Based on the longer female life expectancy, one would expect that female borrowers would have slower repayment rates. Figure 9b (middle right, next page) shows that female repayment rates are 5% CPR lower than male repayments at comparable seasoning. Figure 9a (top right, next page) shows that female draw rates are slightly higher (or more negative) than male draw rates (but that difference is only ~1% CPR).

Figure 9. Draw Rates by Gender



Conclusion

In summary, we present the cash flow patterns of reverse mortgages, specifically, HECM products. We find that reverse mortgages are not sensitive to changes in interest rates and have a rather stable seasoning ramp of draw rates and repayment rates. The stable repayment rates are mostly driven by mobility and mortality events. A number of factors (including draws and capitalizing interest) determined that the HECM balance should rise for the first few years before a gradual decline. We also find that age is an important driver of draws and repayments, while gender has a more limited impact. ♦