ADVISOR PERSPECTIVES

The Hidden Value of a Reverse Mortgage Standby Line of Credit

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by Wade Pfau

Several recent research articles published in the *Journal of Financial Planning* have investigated how opening a standby line of credit through a reverse mortgage and strategically spending from this line of credit can help improve the sustainability of retirement income strategies. In this article, I show that the benefits of opening a home-equity conversion mortgage (HECM) line of credit extend beyond meeting spending needs.

With the current HECM rules, those living in their homes long enough could reap a large windfall when the line of credit exceeds the home's value. This potential windfall is amplified by today's low interest rates. Even if the value of the home declines, the line of credit will continue to grow without regard for the home's subsequent value.

Combining this with the fact that a HECM is a non-recourse loan means that the HECM provides a very valuable hedging property for home prices.

The home equity conversion mortgage (HECM)

Reverse mortgages have a relatively short history in the United States. The first was offered by a bank in Maine in 1961. In 1989, the federal government systematized reverse mortgages through the Home Equity Conversion Mortgage (HECM) Program under the auspices of HUD. In recent years, HUD frequently updated the administration of the HECM program to help ensure that any problems are corrected and reverse mortgages are used responsibly, and descriptions of the program can become quickly outdated. Most recently in September 2013, the government streamlined the program to offer a single HECM option, eliminating what had previously been two options: the HECM Standard and HECM Saver.

I will summarize how the current HECM program works. For a more detailed explanation of the program, I recommend financial planner Tom Davison's post, "Reverse Mortgages: How Large Will A Line of Credit Be?" at his *Tools for Retirement Planning* blog. There are many other great educational resources about reverse mortgages on the Internet, but anything published prior to September 2013 will not be describing the system as it exists today.

The important factors for determining how much credit is available through the HECM include the appraised home value, the age of the younger spouse (for joint owners and one spouse must be at least 62), a lender's margin (Tom Davison estimates these values are usually between 2.25% and 3%), and the 10-year LIBOR swap rate. Together, the lender's margin and 10-year swap rate sum to

the “expected rate.” This is used with the age of the younger spouse to determine the principal limit factor (PLF), or the percentage of the home’s value that may be borrowed.

If the home’s value exceeds $625,000, the borrowing amount is based on a $625,000 maximum. For homes worth more than this, the potential benefits described below will be more limited, as it will be easier for the home value to keep pace with a relatively more limited line of credit.

When the line of credit is opened, fees include a 0.5% upfront mortgage insurance premium payment (which ensures that the lender will be repaid in whole), origination fees, and other settlement costs. These fees can be paid in cash, or they can be borrowed from the line of credit. These fees do represent the costs associated with this strategy, which, in turn, provide a way to create liquidity for the home value to build a more efficient retirement income strategy and/or to otherwise hedge the home’s value and potentially receive a large payoff later in life.

Once determined through the PLF, the initial line of credit grows automatically at a variable rate equal to the lender’s margin, a 1.25% mortgage insurance premium (MIP) and subsequent values of 1-month LIBOR rates. These LIBOR rates are the only variable part for future growth, as the lender’s margin and MIP are fixed at the beginning. Somewhat counterintuitively, someone seeking to maximize the gains from using the line of credit as a hedge for the home’s value would actually prefer to pay a higher lender margin. This will help the line of credit to grow more rapidly to surpass the value of the home. A key feature of the HECM, again, is that it is a non-recourse loan. No matter how much is borrowed, the amount due cannot exceed the home’s value at the time of repayment.

Monte Carlo simulations

I seek to investigate the following research question: What is the probability that the value of a standby line of credit will grow to exceed the home value? Naturally, this sort of calculation depends on assumptions. With the assumptions described in the appendix, I simulate the subsequent value of the home as well as the subsequent value of the growing line of credit. With each of these values projected over time, we can determine how frequently a line of credit may exceed the value of the home across a large number of simulated futures.

Robert Shiller has collected data on market returns and home prices since 1890. This data is freely available on his website and serves as the basis for my analysis. Table A1 in the appendix summarizes this data. Since 1890, inflation has averaged 2.9% and average (arithmetic mean) home price growth is 3.3%. On a compounding basis, aggregate home prices have grown at 0.2% above inflation.

A case study relevant for today

This analysis was conducted using the interest rates on November 26, 2014. On that date, the 10-year Treasury rate was 2.24%, the 10-year LIBOR swap rate was 2.36% and the one-month LIBOR rate was 0.154%. These numbers are all well below their historical averages, allowing for a larger initial line of credit. The PLF is based on a present value calculation and so has a higher value when

interest rates are low.

Assuming a lender's margin of 3%, the expected rate is 5.36%. For a 62-year old couple, and rounding up to 5.375%, the PLF is 0.475. For a $500,000 home, the initial line of credit is 47.5% of this amount, or $237,500. This cannot be accessed completely in the first year, as reforms for the HECM program have been designed to help make sure that HECMs are used responsibly, but immediate access is not the point; it is how this line of credit grows relative to the home price.

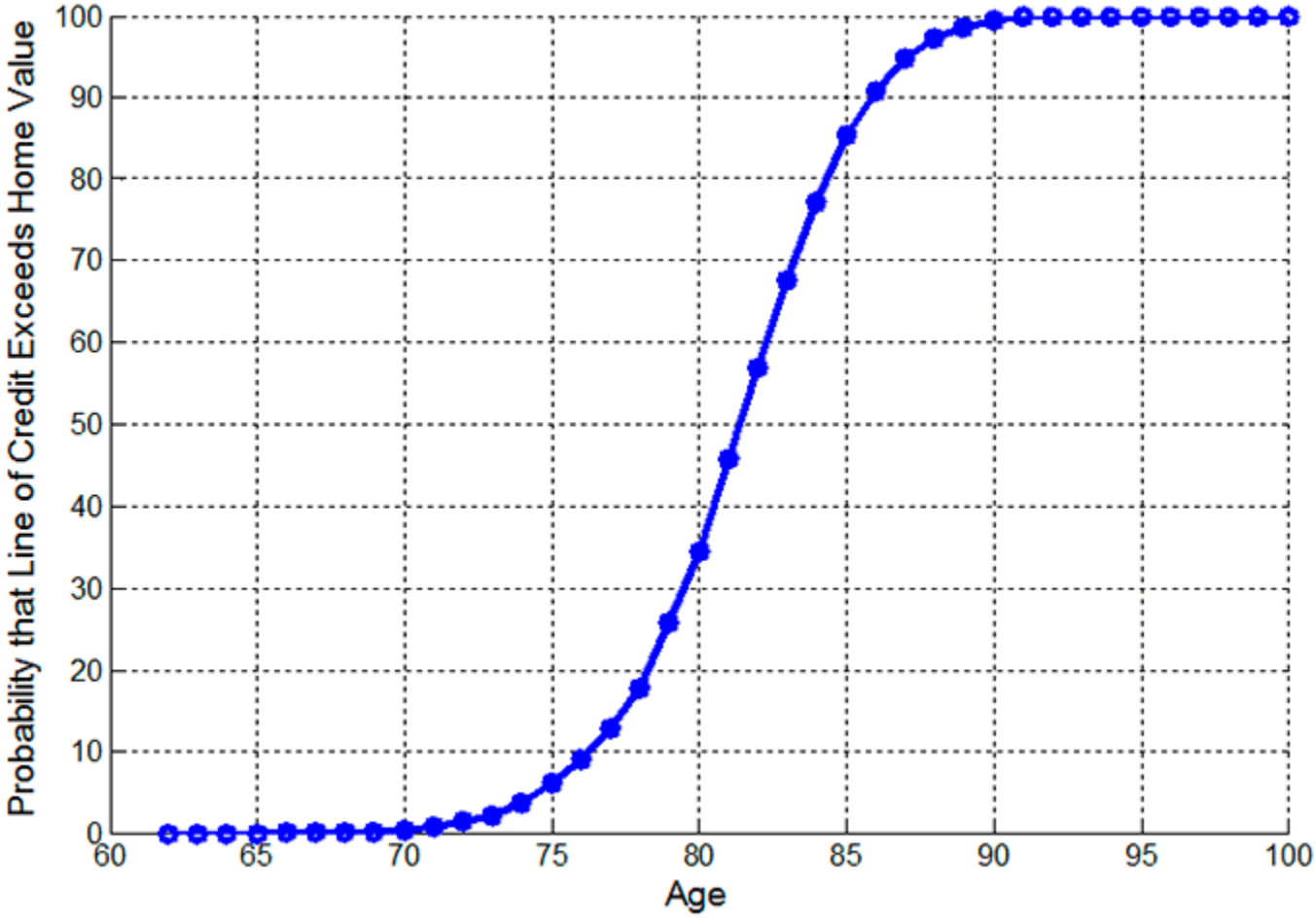
For the Monte Carlo simulations, home prices grow at a compounding rate of 3% on average. Meanwhile, the line of credit grows at a rate equal to the lender's margin, plus a 1.25% MIP, plus the 1-month LIBOR rate. With a 3% lender's margin and today's 1-month LIBOR, this initial growth rate is 4.4%.

If interest rates never rose, it would take far too long for a 1.4% spread in the growth rate (4.4% less 3%) to allow the line of credit, which is initially 47.5% of the home value, to grow and surpass the home value. But, if we forecast one-month LIBOR rates to gradually increase in the future, in the way illustrated by appendix Figure A1, the increased variable rates for the HECM line of credit make the odds quite attractive for seeing the line of credit eventually exceed the home price.

We now consider the probability that a line of credit could grow to be worth more than the value of the home. The probabilities exceed 50% by age 82 and 90% by age 86. Using the Society of Actuaries simple life expectancy calculator, with the 2012 annuitant's mortality tables and built-in mortality improvements over time, a 62-year old female has a life expectancy of 89.7. It is 87.6 for males, and 93.4 for at least one spouse of a 62-year old couple. These life expectancies are higher than found in the aggregate Social Security administration data, but they better reflect the situation for your clients, who will generally be more educated and wealthier than the typical person and should plan to live longer as well.

These numbers suggest that the average 62-year old client will live long enough to have a 90% chance that the line of credit is worth more than their home. Any excess is the payoff from this strategy, and it also serves as a good protection from housing price declines.

Figure 1
Probability that the HECM Line of Credit Will Exceed the Home Value for a 62-Year Old



Other considerations

An individual's home is like a single stock. The price will surely be more volatile than a diversified index of homes or stocks. In this regard, I might actually be underestimating the potential benefits of the strategy. Individual homes will be more at risk of experiencing substantive price declines that would be hedged by the line of credit. Meanwhile, if home prices do grow very rapidly, the line of credit may not be able keep pace. That's okay since the client receives an unexpected windfall from the rapid growth of their home value. The line of credit becomes very valuable in cases when the home price falls. It is essentially a put option on the value of the home.

This strategy could be even more beneficial for couples with a large age difference between spouses. Once one spouse reaches 62, the younger the other spouse is, the more time remains to allow the line of credit to grow and surpass the home value by a greater amount.

I must mention one final consideration for this strategy: the importance of timing the decision of when to access the line of credit. The longer clients wait, the more they can benefit from receiving a larger pot of funds. The line of credit does continue to grow even when accessed earlier, but this

subsequent growth would reflect the growing interest due, rather than growing access to new funds. But if one waits too long and suddenly dies, it's too late and the line of credit is no longer available. This is a shame for heirs if the line of credit is worth more than the home.

The bottom line

The HECM program provides a way to create liquidity for the home, which is otherwise an illiquid asset. Removing the constraint about how home equity can be used affords a more efficient retirement-income strategy.

Even if that line of credit does not end up being used to meet income needs, its growth could provide a way to leave a larger legacy at death. The HECM is non-recourse, and mortgage insurance premiums are paid so that the lender does not lose after having paid more to the borrower than the home is worth. In this sense, the mortgage insurance premiums can be viewed as insurance against a fall in home prices if one lives sufficiently long.

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Appendix

Table A1 provides summary statistics for the historical data, which guides the 5,000 Monte Carlo simulations. A Cholesky decomposition is performed on a matrix of the normalized values for the risk premium, bond yields, home prices, bills and inflation. A Monte Carlo simulation is then used to create error terms for these variables, which preserve their contemporaneous correlations with one another. Then the variables are simulated with these errors using models that preserve key characteristics about serial correlation. Though stock and bond returns are not used in this analysis, I present the complete model as I plan to also use those variables in subsequent research as well.

Table A1										
Summary Statistics for U.S. Returns and Inflation Data, 1890-2013										
				Correlation Coefficients						
	Arithmetic Means	Geometric Means	Standard Deviations	Stocks Returns	Risk Premium	Bond Yields	Bond Returns	Home Prices	Bills	Inflation
Stock Returns	10.7%	9.1%	18.3%	1	0.99	0.04	0.06	0.17	-0.09	0.06
Risk Premium	6.1%	4.4%	18.3%	0.99	1	-0.09	-0.01	0.15	-0.20	0.03
Bond Yields	4.7%	---	2.4%	0.04	-0.09	1	0.52	0.12	0.85	0.22
Bond Returns	4.9%	4.7%	6.7%	0.06	-0.01	0.52	1	-0.06	0.33	-0.09
Home Prices	3.3%	3.0%	7.4%	0.17	0.15	0.12	-0.06	1	0.03	0.37
Bills	4.5%	---	3.0%	-0.09	-0.20	0.85	0.33	0.03	1	0.14
Inflation	2.9%	2.8%	5.4%	0.06	0.03	0.22	-0.09	0.37	0.14	1

Source: Data from Robert Shiller's webpage. The U.S. S&P 500 index represents the stock market, 10-year Treasuries represent the bond index, the Shiller-Case home price index for homes, 6-month Treasuries for bills, and the Consumer Price Index for inflation.

With the correlated error terms, inflation is modeled as a first order autoregressive process starting from 1.58% inflation in 2013 and trending toward its historical average over time with the historical volatility. Bond yields are similarly modeled with a first order autoregression with an initial seed value of 2.24%. Next, home prices and the risk premium are both modeled as random walks around their historical averages and with their historical volatilities. The one-month LIBOR rates are modeled with the error terms for bills used as proxies, since historical data for the one-month LIBOR is only available since 1986. But a first-order autoregressive model is estimated using the historical LIBOR

data, with an initial value of 0.154%. As the simulated LIBOR values are a key variable for this analysis, Figure A1 illustrates the median and 90% confidence interval for their simulated values, starting from the initially low value but gradually increased to a value of about 3.4% at the median. This is still somewhat conservative and below the long-term historical average for bills. The 90% confidence interval stabilizes at a range from the currently low values near zero to almost 9%. These simulations are used to guide the horse race between home prices and the line-of-credit growth to see if and when the line-of-credit may be worth more than the value of the home.

Figure A1