

Requirements to Make the Housing Asset a Viable Retirement Asset

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Abstract

A study published in June 2007 performed jointly by the Canadian Institute of Actuaries and the University of Waterloo, entitled *Planning for Retirement: Are Canadians Saving Enough?*, concluded that: two thirds of Canadian households planning to retire in 2030 are not saving adequately to meet necessary living expenses in retirement; and home ownership will help to narrow the gap in savings, but by itself, won't be enough. This study referred to a report by Statistics Canada that showed that in 2005, 69.2 percent of Canadians aged 65 or older owned a home and 88 percent did not have a mortgage. The median value of equity in the principal residence for Canadians aged 65 and older was \$163,400. From the foregoing, I conclude that:

- many Canadians approaching retirement own a home,
- the home and its value are an important part of retirement savings for many Canadians, and
- over their period of retirement many Canadians will need to convert their home equity into retirement income at the same time determining where and how they will be domiciled.

An ideal arrangement would be for home owners to be able to access the equity in their homes to provide retirement income, that the retirement income would be guaranteed to continue for as long as the home owner and the owner's spouse lived, and that the housing asset could be sold or exchanged at any time during the retirement period to accommodate the individuals' changing requirements. In theory, a reverse mortgage could be written to offer these features. However, in practice, the reverse mortgage permits only a fraction of the house's appraised value to be borrowed and is priced in a manner that is unattractive to borrowers. Furthermore, there is no institution that seems particularly well structured to provide the ideal product.

This paper examines the characteristics of an ideal product and the type of institution or institutions that would be well positioned to offer the ideal product. The characteristics of the ideal product include the market mechanisms necessary to permit protection against longevity risk, and risk spreading among financial institutions. The paper argues that a government agency should provide the no negative equity guarantee. With this risk removed from the private sector, pension plans that seek real estate investments could be part of the solution.

In view of the recent bailout of Fannie Mae and Freddie Mac in the United States, any proposal to create real estate-backed investments will be controversial. This paper shows that the proposed investment structure avoids some of the weaknesses that contributed to the need to bail out certain financial organizations. Although the proposed structure is specifically designed for the Canadian economic and regulatory environment, it is anticipated that the characteristics of the ideal product will have global application and the characteristics of the facilitating institutions identified will be helpful to foreign researchers in considering the design of an institution structure that would be appropriate to deliver an attractive reverse mortgage product in their country.

Introduction

There is considerable variation in the reverse mortgage markets in Canada, the United States and the United Kingdom. The Canadian market is quite small with only private sector firms offering the product. The U.S. market is disproportionately larger with many private lenders but with a government agency providing insurance. The U.K. market had been growing rapidly until 2008, with a wide variety of equity release products offered by private sector lenders, most of whom participated in a trade association that established standards. This paper identifies reasons related to product design to explain why the Canadian market in reverse mortgages is so small and proposes a solution. It draws on the experience in both the United States and the United Kingdom where the products and institutions are more numerous.

There is debate in the literature regarding why reverse mortgages have not become more popular (see, for example, Merrill, et al., 1994). There are a number of different designs of reverse mortgages, which are described briefly in the following two paragraphs. For a more detailed description of the designs see are AARP (2008).

In exchange for a loan collateralized by the borrower's home, the borrower may receive:

- a single lump sum cash payment;
- a regular monthly cash advance;
- a "creditline" account that may be drawn on as required up to specified limits; or
- a combination of these payment methods.

The loan may be for a specified term, but typically it is for "tenure," which means that it is not repayable until the house is sold or the borrowers cease to reside in the house, whichever occurs first. The borrower does not make any payments against the loan balance, so the loan will accrue in accordance with some established interest rate arrangement. Because the value of the equity in the house may increase at a lesser rate than the interest accrual rate of the loan, it is possible that the outstanding loan will exceed the value of the house equity when the house is sold at the end of the loan, i.e., there will be negative home equity on sale. Consequently, it is typical that these loans are written as "non recourse" so that the lender does not have access to any other assets of the borrowers in respect of the loan and that the loan agreements contain a non negative equity guarantee (NNEG), which limits the loan repayable to the net value of the house received on sale regardless of the amount to which the loan has accrued with interest.

In the United States, the Federal Housing Administration (FHA) charges an initial premium of 2 percent of the appraised value (subject to a maximum loan amount) and annual insurance premiums of 0.5 percent of the outstanding loan balance, to provide for the NNEG on Home Equity Conversion Mortgages (HECM). As well as insurance premiums (in the United States.), the borrower incurs a number of other costs to originate the loan, including origination fees and third-party closing costs for items such as appraisal, title search, credit checks.

Typically the loan will also carry servicing fees to cover the expenses associated with issuance of account statements, payment of property taxes, etc. At origination of the loan, the borrower will only be able to borrow a fraction of the current equity in the house, subject to certain limits set for insurance purposes. These limits vary depending on the age of the borrowers, current interest loan rates and location of the house.

In their discussion of risks associated with pricing the reverse mortgage product, Wang, et al., (2008), state that longevity risk has become the most important factor. I disagree with this assertion from both the perspective of the lender and the borrower.

Although longevity is continuing to increase in most developed countries, the absolute increase is moderate and the rate of increase has a relatively small variance. Hence, even though this risk is not diversifiable, inclusion of an appropriate contingency margin in the pricing basis can provide adequate protection to the lender. From the lender's perspective, the greater risks are that house values will only increase at a modest rate (compared to the rate of growth of the outstanding loan balance) or that house values will experience a sharp drop. Since the bursting of the housing bubble in 2008, the popular press regularly contains anecdotal evidence of house price declines. For example, Chart of the Day (2009) reports that from the peak of the market in 2005 to the end of 2008, the median price of a single-family home in the United States has declined by 33 percent. Such a decline can have a significant and prolonged impact on housing price increases and therefore on the likelihood that the NNEG will be called. In a national, or even worse a global, recession, diversification by geography and number of portfolio holdings is unlikely to have the effects stated by Wang et al. (ibid). Moreover, housing price levels are less predictable and have a greater variance than life expectancy does, which increases the extent of the risk.

From the borrower's perspective, it is the high rates of interest charged on reverse mortgage loans, not unexpected longevity, that poses the greatest risk that home equity will decline. To illustrate, assume that 5 percent per annum is a "reasonable rate" to charge for a reverse mortgage loan and that life expectancy at loan origination is 25 years. Suppose that the total original loan including expenses is \$40,000, based on an appraised house value of \$100,000 at inception, and that the house value is assumed to appreciate at an annual rate of 3 percent. The following table shows the impact on the house equity at termination, assuming the lender charges 1- or 2-percent more than the reasonable rate each year and compares this to the impact of the lender charging the reasonable rate but the borrower living two, five or 10 years longer than anticipated.

Impact of Interest Rate and Longevity Changes on Home Equity

Situation	Home Equity at Termination (minimum \$0) \$	Decrease in Home Equity Compared To Situation A \$
A: 5% at 25 years	73,924	0
B: 6% at 25 years	37,703	36,221
C: 7% at 25 years	0	73,924
D: 5% at 27 years	72,791	1,133
E: 5% at 30 years	69,849	4,075
F: 5% at 35 years	60,746	13,178

A change in interest rate has a far greater impact on home equity than does a change in longevity. Within 25 years, for any interest rate that is greater than the reasonable rate by 2 percent or more, any residual home equity has been subsumed by the loan balance. Even if the interest rate is only 1 percent greater than the reasonable rate, after 25 years home equity is only approximately one half of what it would have been otherwise. Whereas, for longer life expectancy than anticipated and provided the loan is calculated at the reasonable rate, home equity continues to be substantially similar to what was expected after 25 years. In the extreme example where the loan is calculated at the reasonable rate but life expectancy is 10 years longer than expected, a 40 percent increase, home equity only declines by 18 percent from what was expected at 25 years.

It is my contention that because the reverse mortgage product is structured with high loan rate spreads over assumed house price appreciation and low loan amounts compared to house price appraised value, the loans are unattractive to retirees. Moreover, as currently structured the reverse mortgage product has a range of features that does not match with the liabilities that financial institutions hold; hence, it is not a desired hedging instrument. This paper discusses how the product might be restructured to rectify, at least in part, these deficiencies.

The next section describes the characteristics that a retiree would wish to obtain in order for the house to be a viable retirement asset. The third section describes the characteristics of a reverse mortgage and shows that institutions are unlikely to have liabilities for which a reverse mortgage would be a useful hedging instrument. It discusses the pricing of the NNEG and argues that the state is the appropriate institution to provide the NNEG. The fourth section proposes a possible solution for Canada, which would serve the retirees and could be attractive to some pension plans. The final section summarizes the conclusions and identifies areas for further research.

Desirable Characteristics of Retirement Assets

A study published in June 2007 performed jointly by the Canadian Institute of Actuaries and the University of Waterloo, entitled “Planning for Retirement: Are Canadians Saving Enough?” concluded that:

- two-thirds of Canadian households planning to retire in 2030 are not saving adequately to meet necessary living expenses in retirement; and
- home ownership will help to narrow the gap in savings, but by itself, won’t be enough.

This study (CIA 2007) referred to a report by the Pensions and Wealth Surveys Section of Statistics Canada entitled “The Wealth of Canadians: An Overview of the Results of the Survey of Financial Security 2005” that showed that in 2005, 69.2 percent of Canadians aged 65 or older owned a home and 88 percent did not have a mortgage. The median value of equity in the principal residence for Canadians aged 65 and older was \$163,400. From the foregoing, I conclude that:

- many Canadians approaching retirement own a home,
- the home and its value is an important part of retirement savings for many Canadians, and
- over their period of retirement many Canadians will need to convert their home equity into retirement income at the same time determining where and how they will be domiciled.

The CIA (2007) study assumed that the full value of home equity would be available to provide for retirement expenses and that home values would increase in line with the rate of price inflation. Moreover, the methodology of that study was to assume that at retirement age, all assets, other than those which already provided a life income, were converted to an annuity indexed to inflation. Hence, housing costs were part of the necessary expenses of retirees. Although I have no dispute with this methodology, it is worth investigating how consistent the reverse mortgage product is with this methodology, since reverse mortgages are one of the financial products available for retirement planning. This section investigates this and provides a list of characteristics desirable for a viable retirement asset.

As currently offered, the reverse mortgage product is not consistent with the methodology of the CIA (2007) study, in a number of ways. First, as noted in the previous section, there are various expenses that may be viewed as increasing the loan or reducing the home equity, without resulting in any income to the borrowers. Second, the full value of home equity is not available to provide the income. Depending on limits set by lenders and insurers, the prevailing interest rates, the location of the home and the amount of home equity, the reverse mortgage loan is likely to be capped at approximately 40 percent of the home equity. Should the borrowers’ stay in the home for at least 25 years, based on current pricing assumptions, it is

likely that there will be little or no home equity remaining at the time of sale of the home. Hence, although only 40 percent of home equity is used at loan origination, over the course of the loan, all the home equity is dissipated, without any increase in income to the borrowers. Third, home equity loans are seldom ever taken to provide a stream of life income, which is indexed to inflation; although, such a product could be provided. Finally, in the pricing of some reverse mortgage products, the rate of house price appreciation may be assumed to be less than the rate of inflation. Accordingly, as currently priced and written, the reverse mortgage product is not consistent with the methodology of the CIA study.

Moreover, is the CIA study's methodology consistent with how retirees would wish to dispose of the house asset? MacDonald, et al., (2009), citing Clark, state that in 2001, 93 percent of Canadians age 65 or older lived in private households and older Canadians are far less likely, statistically, to move homes than are younger Canadians. In other words, the pattern of Canadians is to "age in place." Aging in place may also be desired by governments concerned about the supply and cost of institutional care for an aging population. Given this preference to age in place, the reverse mortgage product is one which should have appeal to retirees, because:

- a large percentage of seniors own their home mortgage-free,
- an even larger percentage of seniors show a preference to age in place, and
- the reverse mortgage provides a vehicle to use home equity to provide income while remaining in the home for as long as the borrowers wish or are able.

For the housing asset to be a viable retirement asset, what properties should it possess ideally? First, close to the full value of home equity should be able to be realized, either in a lump sum or in an income stream or some combination of the two, within a reasonably short period of making a demand. Second, when an income stream has been selected, the income stream should be adjusted periodically to take account of inflation and the erosion effect that inflation has on purchasing power. Third, the retirees should be able to remain in the home for as long as they are willing or able. The reverse mortgage product as it is offered currently addresses the third point, could be modified to address the second point, but does not satisfy the first point. From the perspective of financial adequacy of the housing asset as a retirement asset, the first point is the most significant one.

Which Institutions Should Write Reverse Mortgages?

Product and Institutional Characteristics

Two common reasons for a financial institution to purchase an asset are to achieve an especially attractive rate of return or to use the asset as a hedge against some other liabilities. The opportunity to achieve an especially attractive rate of return will not be available if the recommendation of this paper, which is that reverse mortgages are priced at reasonable rates, is adopted. In this section, the summary characteristics of various products and institutions are described for the purpose of identifying the type of institution that might find it desirable or attractive to hold reverse mortgages as assets to match other liability cash flows, assuming that the loans have been calculated at reasonable rates. The section begins with the summary characteristics of a reverse mortgage, life insurance and a life annuity, because all of these products have mortality dependencies.

- **Reverse Mortgage** — It provides for a payment of cash at inception and may provide for further payments of cash throughout the term of the contract. At inception, the lender receives collateral. The term of the contract is not typically of fixed length but tends to be related to the life expectancy of a single borrower or to the life expectancy of the last survivor of joint borrowers. During the term of the contract, the liability is likely to increase in value at a greater rate than the increase in value of the collateral. The lender is dependent on the borrower to maintain the house, which is the collateral, i.e., potential for moral hazard. At contract termination, the house is sold and the lender receives the lesser of the outstanding loan balance and the net sale value of the house. *The key risk factors are:* longevity longer than expected, collateral appreciation less than expected, illiquidity of the collateral at time of contract termination.
- **Life Insurance** — The issuer receives either a single premium at the beginning of the contract or a stream of periodic payments. In a pure life insurance contract the term of the contract is not of fixed length but is related to the life expectancy of a single insured life or to the life expectancy of joint insured lives, ending with either the first or the last death. Underwriting may be performed on the lives to be insured but there is no collateral; however, reserves accumulate over the term of the contract. During the term of the contract, the liability is likely to increase in value at a lesser rate than the increase in value of the reserves. The issuer is dependent on the insured lives to maintain their health, i.e., potential for moral hazard. At contract termination, the insurer pays the face amount of the policy and releases (to itself) the reserves. *The key risk factors are:* longevity shorter than expected, reserve accumulation less than expected, sudden need for liquidity at time of contract termination.
- **Life Annuity** — The issuer receives a single premium at the beginning of the contract. In a life annuity contract the term of the contract is not of fixed length but is related to the life expectancy of a single annuitant or to the life expectancy of joint annuitants, ending with the last death. Because the full premium is paid at

contract inception, there is full collateral. The issuer makes regular cash payments to the annuitants throughout the term of the contract. During the earlier years of the contract, the liability is likely to decrease in value relative to the accumulation of the premium received; however, if the contract runs longer than expected, the liability is likely to increase more than the accumulation of premiums. The issuer's liability is dependent on the lifespan of the annuitants. If the annuitants make life style choices which increase their longevity, this action represents a moral hazard for the issuer. At contract termination, there are no payments, but the issuer releases (to itself) the balance of any reserves. *The key risk factors are:* longevity longer than expected, investment returns on premiums less than expected.

From the foregoing, we can see that the characteristics of a reverse mortgage contract have some elements in common with both life insurance and annuity contracts. However, they do not appear to be an ideal investment to hedge risk for either life insurance or annuity contracts, where an ideal investment would be one with cash flow patterns and contract terms that meet the requirements of the life insurance or annuity contract.

Reverse mortgages are a type of real estate investment. A number of institutions are interested in and are looking to make real estate investments. These investments can be broadly categorized as conventional (forward) residential mortgages, commercial real estate and infrastructure investments. The following paragraphs summarize the main characteristics of these real estate investments.

- **Conventional Residential Mortgages** — A conventional residential mortgage is a type of collateralized loan, typically of fixed term but with the provision for interest rate adjustments at various intervals throughout the term. At loan inception, the loan may be a high percentage of the collateral value, which is the house's appraised value, e.g., in Canada, first mortgages are typically limited to 75 percent of the appraised value of the house, but practices vary by country, so, for example, in the United Kingdom a first mortgage loan might be 125 percent of appraised value. Over the course of the loan, as the loan is repaid and as the real estate appreciates, the outstanding loan becomes more securely collateralized. Loans are frequently repaid before the end of the term, sometimes to borrow against the equity developing in the house, or because of sale of the property, but also because of changes in interest rates that make new loans more attractive than maintaining existing loans. *The key risk factors are:* default by the borrower, illiquidity of collateral in the event of default, prepayments, which reduce the anticipated returns.
- **Commercial Real Estate** — Commercial real estate investments may be open or closed, depending on whether new investors are able to participate during the term of the investment. Commercial real estate is normally income producing using fixed term leases or mortgages. Institutional investors find commercial real estate to be a desirable investment because there is collateral backing the loan, the loan provides a regular income stream and offers an opportunity for capital

appreciation. The capital appreciation component is considered to be an inflation hedge. Moreover, over longer periods, commercial real estate returns are not strongly correlated with either equity or bonds returns; hence, the inclusion of commercial real estate in an investment portfolio can provide diversification advantages. *The key risk factors are:* maintaining the income stream throughout the term of the investment, appreciation of the real estate at lower rates than expected, illiquidity of real estate investments.

- **Infrastructure Investments** — Infrastructure investments are very long term investments, usually requiring significant financing, that are often considered a real return asset because they keep pace or outstrip inflation. As well as capital appreciation and income opportunities, investors may be able to obtain additional real returns through effective management of the investment, thereby reaping productivity gains. *The key risk factors are:* environmental, regulatory, economic and labor factors that may delay completion or increase the costs of completion and of operation, appreciation of real estate at lower rates than expected, illiquidity.

From the foregoing, we can see that reverse mortgages do not contain the income feature sought by most real estate investors. Moreover, the loan balance compared to the available collateral is increasing in a reverse mortgage, but is decreasing in traditional real estate investments. Finally, the term of a real estate investment is typically fixed, although prepayments may occur, whereas with the reverse mortgage the term is typically dependent on lifespan and prepayments are less common.

Many larger pension plans purport to be interested in real estate investments; albeit very large plans seem to be most interested in infrastructure investments. Few plans have shown interest in residential real estate; and to this author's knowledge, none have shown interest in reverse mortgages. (See for example CPPIB 2008 or OMERS 2007). If we consider a pension plan that has not reached maturity, i.e., contribution income exceeds pension and expense outflows, a reverse mortgage might have some attraction because it provides for a lump sum payment in the distant future. Pension plans are often seeking very long-term investments with long duration, because their liabilities are very long term. In this regard an investment in a reverse mortgage might be of interest, because the point in time at which the investment is liquidated is likely to move further into the future as the lifespan of the borrowers increases with increasing longevity. Furthermore, the likelihood of prepayment is low, so the investment is truly long term. The reverse mortgage has similarities to a zero-coupon bond that contains retractable (in the event of prepayment) and extendible (in the case of increased longevity) provisions.

In summary, the reverse mortgage does not have cash flow characteristics that might be used for full hedging of institutional cash flows. However, the reverse mortgage is a long-term investment with long duration, which might have some interest for pension plan investors. A feature of the reverse mortgage that is essential from the borrower's perspective is the NNEG. There are relatively few papers on pricing the NNEG. The next subsection reviews the literature regarding the pricing of the NNEG.

Pricing the No Negative Equity Guarantee

In what was in 1991 a ground-breaking paper, DiVenti and Herzog (1991) modeled the HECM, and provided a good checklist of the types of assumptions required to determine the monthly income payable on a reverse mortgage containing NNEG insurance. However, there was no attempt to price directly the value of the NNEG feature. Instead, the standard rates used by the FHA on a HECM of 2 percent of the appraised value of the property at origination plus an annual fee equal to 0.5 percent of the actual outstanding loan balance are used.

A significant challenge faced in pricing the NNEG is to predict the appreciation of the specific house backing the reverse mortgage. A specific house may appreciate more or less than other comparable houses due to factors beyond the lender's control. From a pricing and modeling perspective, one develops a model of general house price appreciation and then may make an arbitrary adjustment for the risk that the specific house will appreciate less than general house prices. To model future general house price appreciation, DiVenti and Herzog (ibid) construct a two-stage simulation model. In the first stage, they use national appreciation data compiled by the National Association of Realtors based on the mean annual increase in sales price between December 1981 and December 1988, which was 4.26 percent, to simulate the posterior distribution of appreciation rates of HECM houses. (They also run the model using annual average appreciation rates of 3 percent, 2 percent and 0 percent to provide a range of results.) In the second stage they use a separate univariate normal distribution whose mean is the corresponding result of the first stage model.

DiVenti and Herzog (ibid) make other assumptions regarding mortality, move-out rates and fees, which appear reasonable for the time at which they were writing. They also make assumptions regarding interest rates, which although they have the appearance of reasonability in the historical context, dominate the results. For interest rates they use a rate charged on the loan which is 1.5 percent higher than the rate assumed by the insurer (which is providing the NNEG) on its cost of capital. In my assessment, the insurer's cost of capital includes significant margins, so the lender's loan rates that are 1.5 percent higher than the insurer's cost of capital are exorbitant, although possibly in line with typical practice. The loan rates considered are 8.5 percent, 10.0 percent and 11.5 percent. When used in conjunction with the house appreciation rates, relatively low monthly income payments are available. This is not surprising given the spread between the low interest rates and the rates of assumed house appreciation.

In a 2007 paper produced for the Institute of Actuaries, Hosty, et al., (2007), provide a thoughtful discussion of how to develop a consistent set of assumptions to use for pricing in the equity release market. With respect to the assumption for house price inflation, they examine OECD data for 17 countries for the period 1970 to 2005. They conclude that for the majority of countries real house price growth has been between 1 percent and 2 percent per annum. Given the significant increase in U.K. house prices over the observation period, they think that U.K. house price growth in the future is more likely to be in the range of CPI + 1 percent to GDP-growth. They also observe regional variation in house prices ranging approximately between the mean minus 1 percent to the mean plus 1 percent. Their analysis suggests that RPI is the absolute minimum assumption for house price inflation (HPI). For modeling purposes and assuming RPI of 2.5 percent per annum, they propose a pricing basis of 4.5 percent HPI per annum with 8

percent (Nationwide House Price) Index volatility but loaded by an additional 3 percent to cover the shift from the Index to individual properties, for a total volatility of 11 percent (Hosty, et al., 2007).

Their choice of funds rate seems to be derived in a more reasonable manner (from this author's and a potential borrower's perspective). Hosty et al. (2007) develop the annualized funding costs as the sum of the following items:

- Average swap rate
- Funder's margin over LIBOR
- Redemption profile insurance and risk premium
- Cost of solvency capital
- No negative equity guarantee

With respect to the NNEG, they consider two pricing approaches: an option-pricing market consistent basis using Black-Scholes style modeling and real-world assumptions using a log normal model. The real-world model produces a range for the NNEG of 10 to 13 basis points per annum. The market consistent basis would add an additional 10 to 15 basis points to these figures. For pricing the NNEG, Hosty et al. (2007) suggest using 12 basis points per annum. Note that on the pricing basis suggested by Hosty et al. (2007), the spread between the annualized funding costs including expenses and the mean HPI is 1.74 percent.

In a forthcoming paper, Li, et al., (2009), carefully analyze the U.K. Nationwide House Price Index for the period 1954 Q1 to 2008 Q1 and find statistically significant evidence that house price returns show strong serial correlation and volatility that is time-varying. As such, they conclude that the Geometric Brownian Motion assumption underlying the Black-Scholes model is not valid for modelling the house price appreciation in pricing the NNEG. Li, et al., (2009), fit an ARMA-EGARCH model and use it to price the NNEG. They find that the cost of the guarantee ranges between 1.1 percent to 7.4 percent of the cash advanced or expressed as an annual yield cost, between 10- to 29-basis points.

The cost of the NNEG is dependent on age at inception and gender of the borrowers. Taking these two factors into account, the results of the real world model of Hosty, et al., are very similar to the results of Li, et al., (2009). The 10- to 13-basis points annually of Hosty, et al., (2007), are in respect of single and joint lives at ages 65 and 70. For ages 60 to 70, for single lives only, Li, et al., (2009), have a range of 10- to 19-basis points for the NNEG.

It is worth noting that the calculations of both groups of authors produce prices for the NNEG considerably less than the 50 basis point annual charges of FHA for HECM. It is also worth noting that Li, et al., calculated a lump sum charge of 1.1 percent to 7.4 percent of the cash advanced, whereas FHA charges 2 percent of appraised value on HECM and the lender may advance approximately 40 percent of the appraised value as cash. In other words, using the

pricing basis of Li, et al., (2009), the 2 percent of appraised value upfront charge should be sufficient for the NNEG without subsequent annual charges. The insurance premium rates charged by the FHA on HECM have remained unchanged for many years. I was unable to find any financial reports concerning the adequacy of these rates; however, in the absence of such reports and given that the insurance premiums have remained unchanged, I conclude that the insurance premiums are at least adequate to cover the risk. This conclusion is further supported by the work of Hosty, et al., (2007), and Li, et al., (2009).

Wang, et al., (2008), also provide some examples of pricing for reverse mortgages. They assume a cash loan to house price appraisal ratio of 50 percent, an annual risk-adjusted interest rate of 8 percent, and a rate of house price appreciation of 3 percent per annum. They consider the expected loss of an investor who provides the NNEG through participation in two types of survivor bonds and in one type of survivor swap. They conclude that even with significant mortality improvements the investors' expected loss in respect of the NNEG is approximately 3.7 to 3.8 percent of total expected coupons. I would like to see them prepare calculations using a much tighter spread between the loan rate and the house price appreciation, which would reduce the investors' expected loss, and assuming a much higher loan to appraised house value, which would increase the investors' expected loss. Both of these changes would make the reverse mortgage product more attractive for prospective borrowers.

Role of the State

Writing with respect to old age pensions, Barr (2004), claims that there is an efficiency argument for state intervention to assist private pension schemes with the costs of unanticipated inflation once pensions are in payment. He states that inflation is an uninsurable risk for the private sector because the probability distribution of different future levels of inflation is unknown and because inflation is a common shock faced by all pensioners, i.e., the probability of pensioner A experiencing a given rate of inflation is not independent of that for pensioner B. A further issue which makes it difficult to predict future levels of inflation is that the rate of inflation can be affected to a certain extent by the actions of the state or its agents, e.g., through tightening or easing money supply, expanding or cutting spending, trade policies and current account deficits.

I would make similar arguments regarding HPI. The probability distribution of different future levels of HPI is unknown. For homeowners in a similar region, HPI is a common shock. HPI in general and by region can be affected by the actions of the state, e.g., by the setting of rent controls, rezoning of particular areas, tax policy, interest rate action, declarations regarding acceptable building materials. Hence, I would argue that HPI is not insurable by the private sector and there are efficiency arguments for state intervention. The appropriate party to provide NNEG is the state.

It is interesting that in the United States, the FHA, a federal government agency, which is part of the Department of Housing and Urban Development, has offered insurance for HECM. The United States is renowned for its preference for private sector approaches, rather than government approaches; yet, it has had a government agency provide insurance in respect of the NNEG for many years. This suggests that either the risk of NNEG are of such broad

consequence that a government solution is required or that the type of risk is such that there is not a private sector organization willing to take such a risk.

The FHA has offered insurance for HECM at adequate rates that have remained unchanged for years. If a government agency is providing insurance for the NNEG then the reverse mortgage lender has little, if any risk. It is making a loan with collateral that is insured by a government agency, and it is able to charge all of its expenses. Accordingly, the reverse mortgage lender should be willing to lend an amount that is closer to the appraised value, using risk-free rates adjusted for expenses.

A Possible Solution for Canada

For Canada, I propose that the Canada Mortgage and Housing Corporation (CMHC), which is a government-owned corporation that provides mortgage insurance and other products, provide the NNEG for reverse mortgages. With this risk removed from private lenders, lenders should be able to make loans close to the appraised value of the house at rates competitive with fully secured loans that include an adequate, but not an excessive, allowance for expenses. As a national corporation, CMHC should be in a better position than most private lenders to conduct periodic inspections to see that homes carrying a reverse mortgage continue to be maintained. Failure to maintain a property increases the risk that the NNEG will be called. An innovative approach might be to set an initial loan limit such as 60 percent of appraised value, but make additional funds available if the property passed an annual maintenance inspection, i.e., a form of incentive to the borrower not to engage in morally hazardous behavior.

As discussed previously, financial institutions have few, if any, liabilities that might be hedged by reverse mortgage loans, which makes reverse mortgages unattractive to institutions. The institutions which seem to have the greatest affinity to make such a loan would be pension funds that wish to have real estate exposure. As discussed, few, if any, pension funds are seeking residential real estate exposure. However, if the reverse mortgages were packaged with commercial real estate and infrastructure, a desirable product might emerge. Large pension plans such as the Canada Pension Plan Investment Board (CPPIB), the Ontario Teachers Pension Plan (OTPP) or the Ontario Municipal Employees Retirement System (OMERS) might take the lead role. For example, in a related vein, it has been reported that the CPPIB, which is an independent crown corporation established to invest the funds of the Canada Pension Plan, is considering issuing bonds to support its investment activities (BPM 2009). Canadian pension legislation limits the direct ownership that a pension plan may have in a single piece of real estate. By packaging and reselling to other investors, the real estate investments would not be as likely to be constrained by the legislation.

As we are still in the midst of a global financial crisis attributable in part to the creation of collateralized debt obligations backed by residential mortgages, now may not be the opportune time to proceed with this proposal. However, most pension plans will continue to exist and invest after the financial crisis has subsided. At that time, there should be a place for the combination of insurance against the NNEG offered by the CMHC, reverse mortgage loans written by major pension plans, and a repackaged real estate investment product offered by the major pension plans to smaller pension plans wishing to increase their real estate exposure. This combination could provide a desirable product for retirees, permitting them to use the equity in their homes while aging in place.

As well, if the repackaged security is appropriately structured, it could be an attractive investment vehicle for pension plans, whether as the direct writer of the reverse mortgages or as the investors. Elements of an appropriate structure for direct writers would include additional fees that could be earned through packaging and an increased flow of funds that would enable additional real estate investments. Infrastructure investments are sizable ventures, e.g., the purchase of Gatwick airport, and the participation of a number of pension plans would make such investments more doable. For the investor pension plans, the structure should ensure that

the direct writing pension plans retain a share of any riskier tranches that are created, and that there is a significant portion of the investment that is commercial real estate or infrastructure investments.

Some of the characteristics of the mortgage backed securities that contributed to the current financial crisis were the following: institutions wrote mortgages for the purpose of selling them to other institutions without retaining any interest in the mortgage; mortgages were written on homes with too little collateral and borrowers with too little means to pay; government organizations such as Fannie Mae and Freddie Mac were administering their plans loosely which enabled many Americans to obtain housing. The proposed investment vehicles to be offered by pension plans do not include these risk factors.

Pension plans are arms-length trusts with a fiduciary obligation to the plan participants, not bodies that might be used to serve a social objective. Reverse mortgages with insurance for the NNEG are fully secure. The investment structures would be created for investment purposes, both for the creators and the other investors, and the success of the investments would be dependent on placing satisfactory reverse mortgages.

Conclusions and Areas for Further Research

A high percentage of Canadians age 65 or older own a home without a mortgage. For many Canadians, the value of the home is a substantial part of their retirement savings. Canadians show a preference to age in place. In theory, a reverse mortgage would appear to be an appropriate vehicle to enable Canadians to receive cash in retirement while continuing to live in their homes. The reverse mortgage market in Canada is small. I believe this is because of unattractive pricing of the reverse mortgage product, rather than because the reverse mortgage product is inappropriate to meet the needs of retirees. The current reverse mortgage product provides a limited amount of the appraised value of the house as a loan, approximately 40 percent; however, many Canadians will need to receive closer to 100 percent of the appraised value to meet their retirement expenses. Moreover, the interest rates charged are high and the house price appreciation assumed is moderate by comparison, which makes the reverse mortgage unattractive to the borrower because the amounts of income payable are low.

One reason that lenders might give for requiring a conservative pricing basis is to provide for the NNEG. I argue that HPI is not an insurable risk by the private sector and it is affected by state actions; therefore, I recommend that the NNEG be provided by a government agency. In Canada, a logical agency to provide such insurance is the CMHC. If NNEG insurance is in place, the lender has a low-risk collateralized loan and should be able to lend an amount closer to the appraised value, using a pricing basis of the risk free rate plus expenses.

When these loans are priced so that especially attractive rates of return are unavailable to lenders, the only lenders who might be expected to offer such loans are institutions that might find the reverse mortgage to provide a hedge for some of its liabilities. There are few institutional liabilities for which the reverse mortgage would provide a suitable hedge. Certain pension plans may be an exception. Some of these pension plans are interested in real estate investments, both as an inflation hedge and as a portfolio diversifier. Moreover, a number of pension plans seek very long duration assets. A reverse mortgage is a long duration asset where the duration may increase over what was initially expected if the borrowers live longer than expected.

However, few pension plans are seeking to invest in residential real estate. For this to be an attractive investment, it is recommended that larger pension plans, such as CPPIB, OTPP or OMERS, take the lead to make reverse mortgage loans. These plans would then repackage these loans with other real estate investments to provide a real estate-backed security, which other pension plans could purchase as an investment.

An important consideration for borrowers is that the loan amount be close to the appraised value of the home. Key determinants of the portion of appraised value available will be the pricing basis used by the lender and the cost of the NNEG. Because pension plans seek real estate investments and because the NNEG is provided by a government agency, I have argued that the pricing basis used by the lender should be approximately the risk-free rate plus expenses. The research of Hosty, et al., (2007), and Li, et al., (2009), suggest that the cost of the NNEG is not as high as has been supposed.

Critical components are the assumptions and the method used to model the rate of house price appreciation. This is an area for further research. A government agency, such as CMHC, should have a lot of historical data that could be used. Hosty, et al., (2007), have outlined a methodology to use. Another area for research would be the development of a housing price index based on house appraisals. Work done to date uses indices developed from house sales, which may not reflect appropriately the extent of house appreciation for homes with a reverse mortgage in which the homeowner is aging in place.

For many Canadians their house represents a significant part of their retirement plan. It is important that the reverse mortgage product be improved to facilitate Canadians' retirement.

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