

Reverse Mortgages - Features & Risks

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Executive Summary

Elderly people all over the world share one common hardship – insufficient finances. Many of them do not have regular income, because they do not work or the savings during their earning life would have been used up. On the expense side, the situation worsens with increased medical needs, associated costs and increased cost of living due to inflationary pressures. In countries like India, where pension schemes are recently gaining popularity, only small ratio of these elderly people who were in 'working class' would have been lucky enough to be covered under pension schemes.

Still many of them may have one real asset – a 'dream' house. Until recently the only choice to meet the financial needs is selling or mortgaging their house, which was often a painful decision. This painful reality would mostly increase their financial burdens rather than easing them, because their monthly housing expenses may well be higher than before or they may still run out of funds.

The Reverse Mortgage is a promising financial solution to the elderly house owners who want to use their house to source their income that can meet their financial commitments. The attractive part of this solution is that the house owners can live in their house as long as they wish without bothering about repayment of loan. The contingency to repay loan arises when the house owner dies, sells the house or moves out of it.

This paper deals with the Reverse Mortgage concepts in three parts. The first part highlights the important features of Reverse Mortgages. Part two presents the risks from lender's perspective while providing elaboration for two of the critical risks - Crossover and Longevity. Finally, part 3 brings up the relevance of Reverse Mortgages to India market. The paper identifies a few potential target segments to enhance marketability of these products in India and suggests a survey be conducted to assess the potential in these segments in different geographies like Metros, Urban and Semi-urban areas and the survey results can be used to design new Reverse Mortgage products for better marketability.

Part-1

INTRODUCTION TO REVERSE MORTGAGES

1.1 Reverse Mortgages

A Reverse Mortgage is a form of financial arrangement between an 'Equity rich-Cash Poor' Borrower and a Reverse Mortgage Lender. This arrangement allows elderly persons to convert their substantial house equities into loans in the form of cash advances requiring no repayment until a future time. At the same time they will allow the borrowers to remain in their houses until their death, sale of the house property or until they move out permanently. Interest accrues on these loans but no repayment of loan and loan interest is required during as long as any of the events mentioned above do not occur. As the borrower receives payments, the amount of the debt secured by the Reverse Mortgage rises over time. This process of converting house equity into spendable cash while the house owner is still living in the house is called 'Home Equity Conversion' or simply Reverse Mortgage.

Lenders offer Reverse Mortgages because there is potentially large and growing market as the number of elder house owners is increasing in every country.

In the following sections of Part-1, we shall discuss the features and types of Reverse Mortgages, compare typical Forward & Reverse mortgages, and contrast Reverse Mortgages with Annuities.

1.2 Features of Reverse Mortgages

- **Minimum Age Limit:** Typically the borrowers should be more than 60 years of age. Lenders fix this age limit duly considering the guidelines in the social security system and other welfare measures offered by the government and also the, retirement age of the working class.
- **Loan Amount:** Maximum Loan Amount to borrowers depends on the house value, borrower's age, cost of the loan and the payment plan selected by the borrower. Typically, the loan amount or the Principal Limit is the maximum lump-sum payment a borrower can receive or the net present value of monthly payments or Line of Credit. The loan amount is restricted to percentage of the property value. In Roll up type of Reverse Mortgages offered in UK, higher amounts are granted in return for a higher interest loan. In some other cases, when the borrower get fewer amounts initially, further amounts will be made available depending on the property value. However, there are some restrictions which limit the time at which the borrower can apply for further advance.

(Formulas to calculate loan amount are given in Appendix A)

- **Loan Interest:** Loan interest charged on the debt of the borrower can be fixed or adjustable. For Fixed Rate Reverse Mortgages, the loan interest would remain same until it is repaid. In case of adjustable rates, the rates are adjusted at defined time periods based on some reference rate like T-Bill rate. Interest rate caps for the period as well as for life time are typically specified for these adjustable rates. In some cases as in Fixed Repayment Mortgage in UK, there is no explicit interest rate, but borrower agrees that when the house is sold, he will be pay the lender a higher sum than the amount borrowed. The higher amount will depend on the age and life expectancy. However, when borrower dies, the lender may charge interest on this higher sum from the date borrower die until the mortgage is actually repaid.
- **Payment Options:** Once the loan amount is determined, it will be disbursed according to the payment option chosen. The borrower will have the typical options like receiving a lump sum amount or a series of monthly payments or access line-of-credit.
- **Repayment:** No repayment is required on Reverse Mortgages as long as the borrower lives in the house as a principal residence. The full loan balance becomes due and payable when the borrower sells the house or permanently moves away or when the borrower dies. When the loan is payable due to death of the borrower, borrower's heirs can repay the outstanding loan and take title to the property or lender can sell the property and pay off the loan. If the property value is more than the outstanding loan balance, the difference is paid to the heirs.
- **Debt Limit:** The debt on a Reverse Mortgage equals all the loan advances received including any advances used to finance the loan costs or pay off prior debt, plus all the interest that is added to loan balance. Even if the loan balance grows to be greater than the home's future value, the borrower's debt is limited by the value of the home. This feature is called the "Non-Recourse" or "No Negative Equity Guarantee" and it protects the borrower, his estate and heirs from "deficiency judgments," that is, from being required to pay back more than the home's value.

- **Loan Costs:** Loan costs typically include an origination fee, appraisal fee, mortgage insurance fee, and other closing costs. There are usually caps on these upfront costs, which may be financed as part of the Reverse Mortgage.
- **Mandatory Occupation:** The borrower must occupy the property. The borrower's income and credit worthiness are not of concern because payments are made from the lender to the borrower.
- **House ownership:** Typically, lender does not own the house. The borrowers retain the title to the house and are responsible for taxes, insurance and upkeep. In the Home reversions schemes sold in UK, the lenders buy a share of the borrower property, so that there is transfer in the ownership to the lender.
- **Other features:** Prior to closing, the house is appraised to determine its value and to make sure that it meets minimum property standards. In cases where repairs are needed, the cost of these repairs may be financed as part of the loan.

Brief notes on features of Reverse Mortgage products in the USA, UK and Australia are given in Appendices B, C and D respectively.

1.3 Types of Reverse Mortgages

Table-1: Representative Types of Reverse Mortgages

Type	Description
Term	Borrower receives monthly payments for a set period of time. The loan is repaid with interest at the end of the set term unless he moves out or dies during the term.
Split Term	Borrower receives monthly payments for a set term. The payments will stop at the end of the set term. Expiration of the term is not a contingency to repay the loan as in the case of Term Reverse Mortgages. The loan has to be repaid when the homeowner dies or moves or sells the home.
Tenure	Borrower receives monthly payments as long as he lives in the house. Loan has to be repaid on death of borrower or on his move-out.
Line of Credit	Line-of-credit reverse mortgage offers borrowers access to a source of money they can use whenever and however they choose. The principal limit is approved based on the borrower's home value, age, origination fee, and percentage of shared appreciation the lender is entitled to. The entire line of credit may be advanced at closing.
Hybrid Term/Tenure	Hybrid term/tenure reverse mortgage combines the features of term or tenure plan and line-of credit plan. It allows the borrower to set aside part of the principal limit at origination to establish a line of credit. The borrower receives the rest of the principal limit in the form of equal monthly payments as long as the term does not expire or the borrower lives in the home.
Lifetime	Borrower receives monthly payments as long as he is alive even if he is NOT staying in the mortgaged house. The contingency to repay occurs on the death of the borrower. An annuity attached to this reverse mortgage enables income to be provided for life.
Roll Up	A lifetime Reverse Mortgage offered in UK, with an added feature of lending additional cash advance to the borrower in return for higher loan interest rate.

Type	Description
Fixed Payment Loans	The borrower gets cash in lump sum. Instead of being charged interest on the loan, borrower agrees that when house is sold he will pay the lender a higher sum than the amount borrowed.
Shared Appreciation Mortgage	Borrower agrees with the lender that they can have a share in any increase in the value of the borrower house when it is sold. Here the interest rate may be very less or nothing.

1.4 Forward Vs Reverse Mortgage

Reverse Mortgage differs significantly from a traditional mortgage in terms of purpose, borrower population, repayment, and servicing. Table-2 below compares Forward and Reverse Mortgages.

Table-2: Comparison between Forward & Reverse Mortgages

Forward Mortgage	Reverse Mortgage
Purpose is to purchase a home	Purpose is to generate income
Borrower population is general population	Borrower population consists of aging seniors with equity in their houses
Borrower needs income to qualify	No income qualification is necessary
Before closing, borrower has no equity in the home. At closing, borrowers equity is very less	A borrower has substantial equity in the house at closing
During the loan term, borrower makes monthly loan payments and as a result loan balance reduces.	During the loan term, borrower receives monthly payments from the lender and as such loan balance increases.
At the end of the loan term, borrower's liability is zero	At the end of loan term, borrower's liability is more
Borrower's equity increases over time – Loan balance decreases as payments are made to the lender – "Falling Debt and Rising Equity Transactions"	Borrower's equity decreases over time. The loan balance rises as loan advances are made to the borrower, interest is added to the outstanding loan balance, and no repayments are made. "Rising debt, falling equity" transactions.
Borrowers have more incentive to make capital investments to maintain the house	Borrowers have less incentive to make capital investments to maintain the house
Borrower makes repayment of the loan	No need to make repayment of the loan until death or move out or sale of the property.

1.4.1 Example to demonstrate the working of Reverse Mortgages:

Assumptions:

Monthly Loan advance – Rs.600

Monthly interest rate – 1.0%

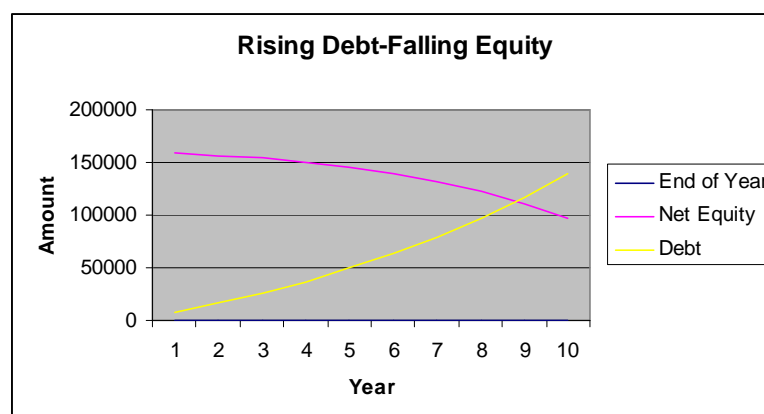
Original House value – 160,000

Appreciation Rate – 4% per year

Table-3: Example of 'Rising Debt-Falling Equity' feature of Reverse Mortgages

End of Year	Principal Advances	Interest	Loan Balance	House Value	Net Equity
1	7200	486	7686	166,400	158,714
2	14400	1946	16346	173,056	156,710
3	21600	4505	26105	179,978	153,874
4	28800	8301	37101	187,177	150,076
5	36000	13492	49492	194,664	145,173
6	43200	20254	63454	202,451	138,997
7	50400	28787	79187	210,549	131,362
8	57600	39316	96916	218,971	122,055
9	64800	52093	116893	227,730	110,837
10	72000	67403	139403	236,839	97,436

Figure-1 Rising Debt-Falling Equity



1.5 Reverse Mortgages are not Annuities

Reverse Mortgages with monthly payments, at the first instance, can be thought similar to annuities since both of them involve receiving of monthly payments by investors. But both of them are different in certain aspects as outlined below:

Table-4: Contrast between Annuities and Reverse Mortgages

Annuities	Reverse Mortgages
Providers of Annuities are generally Insurance Companies	Reverse Mortgage lenders are typically housing finance companies or investment banks.
Contract Owner or the Annuitant would have paid a lump sum to the annuity provider in order to receive regular payments.	No payment to the lender is required to receive monthly payments.
Only Fixed monthly amount is paid to the Annuitant and large quantity of money is locked with the Insurance Company and very less liquidity and flexibility is available to the annuitant.	Lot of flexibility and liquidity is available to the borrower – loan advance amounts can be changed or borrower can withdraw all the funds

	at one go and can set up a line of credit to meet unforeseen contingencies and changing financial needs.
Under a life annuity, an insurance company has the liability of making periodic payments to the annuitant as long as the person lives. So the term of the annuity is dependent on the life of the annuitant	In case of tenure Reverse Mortgages, the term of the payments is dependent on the borrower's life and also his continued stay in the house
An annuity can give annuitant monthly cash advances for life - no matter where he lives	Monthly Reverse Mortgage advances can only last for as long as borrower lives in his home. If he sells or moves out of the home, payments would stop
Main risks to the insurer in annuities are longevity and interest rate risks	In Reverse Mortgages apart from longevity and interest rate risks, there exist the mobility and property appreciation risk
In annuity products, there is a risk of losing value by early death	In Reverse Mortgages, in case of early death, borrower simply owes the lender what was loaned plus interest and the remaining equity goes to heirs
Annuities are Taxable	Reverse Mortgage payments are not taxable as the payments are interpreted as the receipt of loan proceeds
Annuity income may jeopardize some of the benefits offered under a social security program of the governments like Supplemental Security Income (SSI)	Loan advances generally are not counted as income by SSI, and are not counted as assets if the money is spent within the calendar month in which it is received.

**Part-2
RISKS IN REVERSE MORTGAGES**

2.1 Guarantees in Reverse Mortgages

One of the major product innovations in insurance space during last decade is introduction of 'Guarantees' with life and annuity contracts. World markets have been witnessing significant growth of both demand and supply of these Guarantees. Each type of guarantee has an associated benefit to the policy owner and a risk to the provider. We can take an analogy of this innovation and interpret the unique features of Reverse Mortgages as a bundle of the Guarantees as detailed in Table-5 below.

Table-5: Guarantees in Reverse Mortgages

Guarantee	Description
Tenancy Guarantee	House owner can stay in the house as long as he wishes.
Income Guarantee	Monthly loan payments where applicable continue as long as owner lives in the house

Repayment Guarantee	No loan repayment obligation to the owner as long as he lives in the house
Non-recourse Guarantee	Lenders cannot access any assets of the borrowers other than the mortgaged house for repayment of loan and repayment amount would not exceed the value of the house at the time of repayment.

2.2 Role of Actuaries

All these guarantees pose one risk or the other to the lender. Establishing and overseeing appropriate Risk Management Models for these 'Guarantees' become a challenge to the Actuarial World. Besides the traditional insurance/reinsurance options, actuaries across the world have been innovating different avenues especially to manage the most critical longevity risk. Design of mortality based securities such as Survivor Bonds and Survivor Swaps is an example of the complexity and challenge in dealing with longevity risk.

Further, actuarial experience and judgment is greatly needed in design & pricing of Reverse Mortgages that have features attractive to market and viable to lenders.

2.3 Risks in Reverse Mortgages

Risks typical to Reverse Mortgages are detailed in Table-6 below. We go on to elaborate Crossover and Longevity Risks in subsequent sections of this Part-2.

Table-6: Risks in Reverse Mortgages

S.No.	Risk	Description	Typical Risk Management Methods
1	Crossover Risk	Risk of loan value exceeding the house value is called Crossover risk. This is a function of Occupancy Risk / mobility risk, Mortality Risk, Interest Rate Risk, and Home Appreciation Risk.	Conservatism in deterministic factors like interest rate, appreciation rate etc. Other methods include charging Shared Appreciation Fees, Variable Interest Rates Diversification –demographic and type of properties such as independent house, flats, and villas - will enable risk control for general or specific home appreciation risk.
2	Longevity Risk	Risk of borrower living longer than expected.	Charge the Premium for non-aggregate longevity Risk. Hedge the Aggregate longevity Risk using Mortality Based Securities and Survivor Bonds where appropriate.

3	Antiselection	Risk of house value being overstated by Intermediaries or Borrowers.	This risk can be controlled using standardized and uniform processes for valuation of house property. Bench mark and constantly improve with experienced trends. Use available Laws and Regulations and suggest more measures that the Government can come up to regulate the market.
4	Moral Hazard	Risk of borrower's improper or negligent maintenance of property. And, risk of borrower not taking home insurance or not renewing house Insurance in time; and not paying property taxes.	Risk control measures like an Audit by Lender or a procedure to periodically verify the property and the insurance/ tax documents. Renewal of insurance can be done by lenders by charging the amount to the loan value. Punitive measures built in the product may also force proper maintenance of property.
5	Litigations	Risk of litigations with heirs during loan repayment or in handing over the property to lender.	More careful contractual procedures at the inception will enable minimize the litigation expenses to lender.

2.4 Crossover Risk

2.4.1 Underlying Risks:

The risk that arises due to the loan value exceeding the value of the mortgaged house is called Crossover risk. Since the interest rate charged from the borrower is usually higher than the house value appreciation rate, the loan value will certainly exceed the house value at some future point of time. The point in time when this happens is called the Crossover point. Lender will experience loss on every outstanding loan beyond the Crossover point. Longer-than-average tenure of stay or lower-than-average home appreciation will shift the Crossover point to the left.

The Crossover risk is a combination of few underlying risks as discussed in Table-7 below.

Table-7: Underlying Risks of Crossover Risk

Risk	Description
Occupancy Risk	The attractiveness of the reverse mortgage loan is that it allows the borrower to stay in his home till he dies. The duration of occupancy will be increasing due to increased longevity. Occupancy beyond average crossover point will cause loss to lender.
Mobility Risk	The events of contingency to repay loan other than death of the borrower are called mobility events. One reason could be selling of house for refinancing or realizing possible profits on sale due to favorable real estate trends. Another could be due to health or nursing care. Higher than average mobility may cause prepayment risk and lower than average mobility may cause occupancy risk.

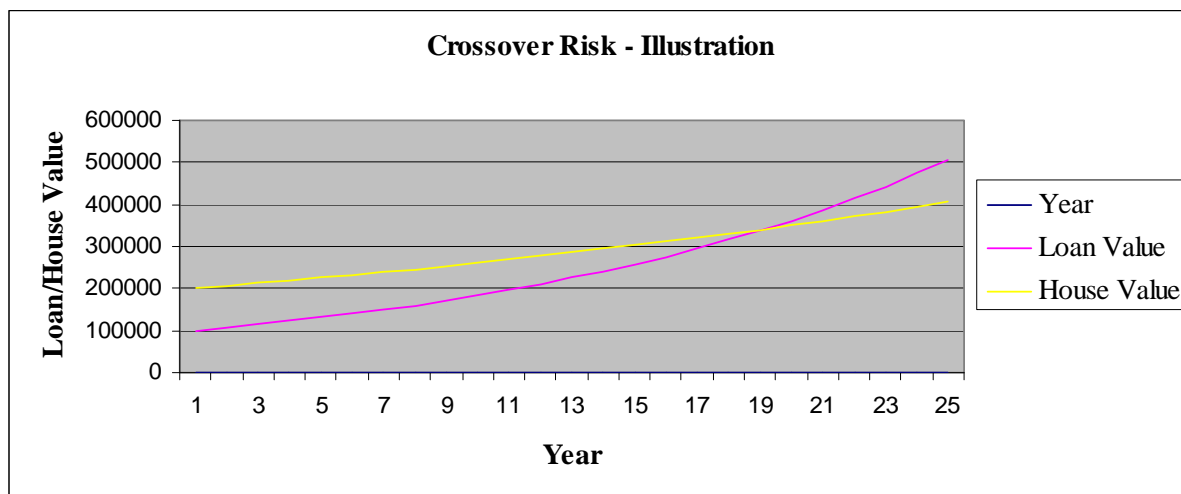
<p>Interest Rate Risk</p>	<p>Since the loan repayment amount beyond the Crossover point is capped by the house value, a high interest rate even at an average rate of appreciation of mortgaged house aggravate the Crossover risk.</p> <p>Interest rate risk has another dimension too. In the high interest rate regime, the lenders would find it difficult to achieve asset-liability matching. Reverse Mortgage loan assets are illiquid, they have early negative cash flows and due to high interest rates, the Crossover point is reached earlier than the expected time, which means assets lose value. On the other hand, higher interest rate might force the lender to yield higher payments on guaranteed investments or bonds. This would lead to Asset-Liability imbalance.</p>
<p>Home Appreciation Risk</p>	<p>If homes do not appreciate as much as expected, the Crossover point occurs sooner than expected. Property appreciation rates vary depending on location and type of property. Even if the general appreciation rate is as much as the rate lender predicts, he might face the property risk, in which case a part of portfolio will be contributing to the losses.</p>

2.4.2 Illustration of Crossover Risk:

Assumptions:

Flat Interest rate 7% Annual; House value appreciation rate is constant at 3% per year; Loan-to-Value is 50% of Property value; 62-year-old male to borrow a lump sum amount of 100,000 against his house which is currently valued at 200,000.

Figure-2 Illustration of Crossover Risk



Crossover point is in year 20. If the loan is repaid prior to 20th year, there is no loss to the lender. However, if the loan is repaid after 20th year, the difference between the loan balance and the house value is a loss to the lender if settlement has to be made at that point.

2.5 Longevity Risk

Mortality is believed to be the single most important consideration in pricing and risk management of Reverse Mortgages. Improvements in mortality will delay the settlement of Reverse Mortgage and will therefore number of cases hitting Crossover point will increase.

2.5.1 Risk Management of Non-aggregate Longevity Risk:

The industry has enough expertise in managing the individual (non-aggregate) longevity risk. A Mortgage Insurance Premium structure can be modeled by equating present values of expected losses and expected insurance premiums. The premiums can either be charged from the borrowers or can be loaded in calculation of principal factor.

An alternative approach to Insurance premium structure is to quantify the cost of Crossover risk using an option pricing approach and explicitly including this cost as a part of the lender's margin in the interest rate charged from the borrower on the loan amount or by implicitly including the same while arriving at the maximum Loan to Value Ratio. The expected claim loss on a Reverse Mortgage product is a maximum of zero or the difference between the loan value and sale price of the house. The expected claim losses can thus be viewed as series of European Put Options which can be priced using an option pricing approach like Black-Scholes method.

2.5.2 Risk Management of Aggregate Longevity Risk:

While insurance is the traditional method of managing the Reverse Mortgage risks, securitization has been widely discussed as a method for managing aggregate longevity risk. Swiss Re Brevity Risk Bond and European Investment Bank (EIB)'s survivor bonds are examples of mortality securitization. Using Survivor Bonds to hedge longevity risk is one of the recent initiatives in risk management. The high level mechanism of using Survivor Bonds to hedge aggregate longevity risk looks as follows:

Lender who is typically a Housing Finance company or Investment Bank has a portfolio of Reverse Mortgages. To hedge the longevity risk, the lender enters into an insurance contract with a special purpose company (SPC). The arrangement with the company is that the SPC will compensate the loss suffered by lender in case of larger number of survivors than anticipated. The SPC will collect a premium in exchange of the promise to compensate the loss and also restricts the compensation to a set maximum. The SPC will then issue a Survivor Bond with coupons in the capital market which will be subscribed by institutional investors. Coupon payments on these Survivor Bonds will depend on the underlying mortality experience of the lender's loan portfolio. If there is any claim by lender, during a particular year, SPC will pay the claim out of amount allocated for coupon payments and the adjusted coupon will be paid to investor. At maturity, the bond will pay back the principal amount.

Figure-3: Hedging of Longevity using Survivor Bonds – Arrangements & Players

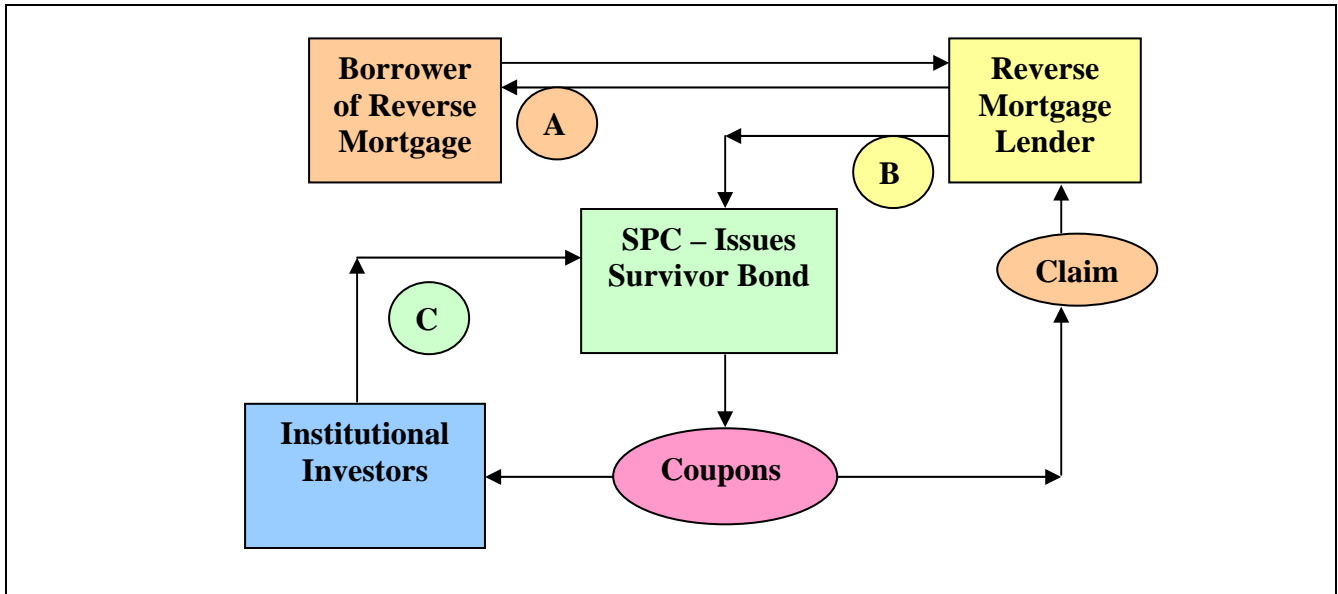


Table-8: Arrangements & Cash flows of the Players involved

Arrangement	Arrangement Type	Player 1	Player 2	Player-1 Inflow	Player-1 Out-flow
A	Reverse Mortgage	Borrower	Lender	Loan/Installments	Loan Pay off
B	Insurance	Lender	SPC	Benefit of claim	Premium
C	Survivor Bond	SPC	Institutional Investor	Capital	Coupons & Principal

2.5.3 Illustration of Longevity Risk Securitization:

We shall illustrate here how the loss to lender on account of longevity risk is compensated through receipt of coupon payments from a Survivor Bond of an SPC.

Assumptions & inputs:

Let us assume interest rate ($r=6%$) and home appreciation rate ($c=3%$) are constant.

Let all the borrowers are of age 65 at $t=0$ and the total number of Loans are l_0

Let the Loan amount on each loan be Q_0

Let the Home value at $t=0$ be H_0

Arrangement:

To hedge the longevity risk, lender goes for insurance from a Special Purpose Company. Let the lump sum premium paid by lender be P for such insurance arrangement.

Let the assumed cap of living population at time t be l'_t . This means, at time t , if there are l_t people living and that ($l_t > l'_t$), then the lender can claim benefit from the SPC. The loss to the lender at time t is given by the difference between what has been lent and what can be realized. The realization amount will be the least of outstanding loan value and the home value as of time t . Assuming the risk premium lender charges from borrowers as λ_1 and the premium lender pays to

SPC is λ_2 , and then the loss at time t is given by L_t . The loss L_t will increase with time t after Crossover point. The Table-9 and Figure-4 below illustrate this point.

$$L_t = [Q_0(1+r+\lambda_2)]^t - \text{Minimum of } [Q_0(1+r+\lambda_1)^t], H_0(1+c)^t]$$

An amount A_t is calculated as difference between one-year discounted loss at time $(t+1)$ and the loss at time t - i.e., L_{t+1} discounted for one year less L_t . A_t is always positive after Crossover point. The Table-9 and Figure-5 below illustrate this point.

$$A_t = [L_{t+1}/(1+r)] - L_t$$

The benefit claimed by lender from insurance company will be $A_t (I_t - I'_t)$.

Table-9 Illustration of L_t and A_t characteristics

Time (t)	L_t	A_t	Time (t)	L_t	A_t
1	-750	-881.185	11	-19101.01198	2433.49414
2	-1631.25	-1029.7038	12	-16667.58284	5795.46281
3	-2661.01875	-1197.5158	13	-10872.18504	6472.95876
4	-3858.599531	-1386.8687	14	-4399.291273	7211.07032
5	-5245.533207	-1600.2567	15	2811.71405	8014.83921
6	-6845.854919	-1840.447	16	10826.48826	8889.71626
7	-8686.366878	-2110.5081	17	19716.13951	9841.59432
8	-10796.93993	-2413.842	18	29557.66884	10876.8438
9	-13210.84688	-2754.2189	19	40434.44765	12002.3511
10	-15965.13081	-3135.8162	20	52436.73373	13225.5599

Figure-4: Loss L_t increases with time t after Crossover point

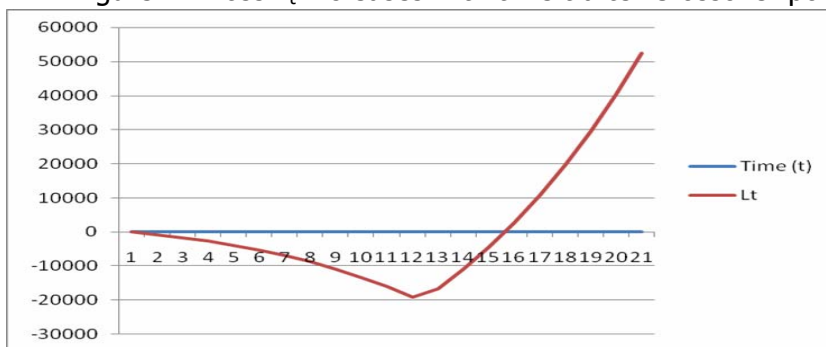
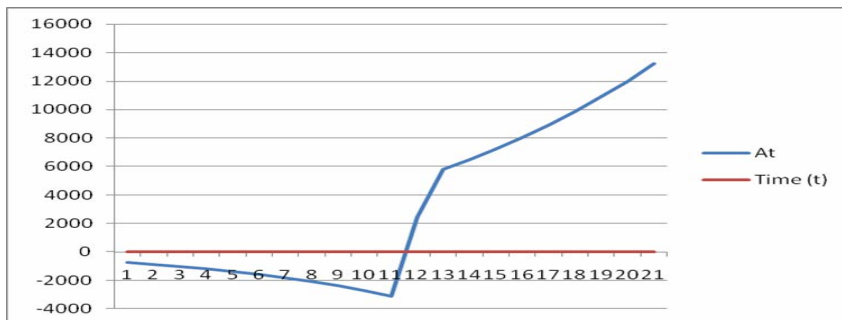


Figure-5: A_t is always positive after Crossover point



The SPC issues a Survivor Bond with a Face Amount F and a premium of P . The coupon on these survivor benefits will be shared between lender and the subscribers of Survivor Bond as detailed below in Table-10.

Table-10: Hedging of Longevity Risk through coupons of Security Bond

Event	$l_t \leq l'_t$	$l'_t < l_t < C / A_t$	$l_t > C / A_t$
Benefit claimed by Lender from SPC	0	$A_t (l_t - l'_t)$	C
Coupon payments to Subscribers' of Survivor Bonds	C	$C - [A_t (l_t - l'_t)]$	0

Part-3
RELEVANCE TO INDIA MARKET

3.1 Social Security Scenario

The share of the old persons (age 60 and above) to the total population in India is expected to rise from 6.9 in 2001 to 12.4% in 2026. The growth of this segment of population is causing tremendous pressure on the economic system. Government of India has already recognized the urgency and initiated measures which can address income and security needs of the old age persons. Pension reforms, amendments to housing policies, National Old Age Pension scheme and Maintenance & Welfare of Senior citizens Bill, 2007 are some steps in this direction. But, Government initiatives are sometimes constrained by disparities in income and social characteristics of the population and the result, no one size fits all.

Social responsibility has demanded on the public sector and private sector enterprises to launch financial products which can complement the welfare schemes of the government, so that the Indian Diasporas have a well orchestrated social security system. Thus, Pension, Housing Finance and Reverse Mortgage products from financial institutions have a major role in meeting the growth objectives of the business community and the welfare objectives of the Government. Public participation in these initiatives will not only cause improvement in the standard of life but has a large positive impact on the national economy.

3.2 Evolution of Reverse Mortgages

India should owe its progress to the business community. As businesses grew, they expanded globally. The products that these business enterprises marketed are suitably blended to meet the needs the population of that country just in time. Reverse Mortgage was one such product imported to India from the USA, UK and Australia. The introduction of Reverse Mortgages has just matched with the timing when Indian old age population needed such financial product.

The Union Government acknowledged the applicability of Reverse Mortgages to Indian population when it mentioned in the Budget 2007 that this product will be introduced by National Housing Bank (NHB). NHB quickly came up with the guidelines to the Primary Lending Institutions such as Banks and Housing Finance Companies. State Bank of India, Punjab National Bank, Allahabad Bank, Dewan Housing Finance Limited and LIC Housing Finance

Limited, are some premier financial institutions that expressed intent to design and market Reverse Mortgage products.

3.3 Potential segments for Reverse Mortgages

- **Middle Class segment:** An average middle class person would have utilized all his savings to purchase house so that later in his life he can fall back upon the property for his sustenance. Providing a start-up in living or financing education or performing marriage of the dependents is still the responsibility of some elderly population.
- **Health care priority segment:** Old age persons may need to incur high costs for health maintenance. Current income levels may not be sufficient to take lump sum costs. Besides, these people have low credit worthiness. Health insurance is not wide spread and even where the health insurance schemes exist; getting cashless service is a difficulty. The only way out in this case is to have a credit line available at the shortest call.
- **Small Business segment:** There is a remote possibility of non-salaried segments of population to have personal pension schemes. These people who may be owners of small businesses may not have any source of regular income after they retire from active business or after handing over business to their heirs.
- **People who can afford comfort spending:** A study conducted by Technical Committee on Population, Planning Commission shows that 52% of the elderly people in urban areas are living alone. A large segment of this population will be on the look out for a relaxed life style. They may also be having none to bequeath their property, so they may intend to spend the equity in their house to meet the expenses in increased standard of living.
- **Parents of Non-Resident Indians (NRIs):** This is a growing segment of old age parents living alone in India, while their children make a living abroad. Children would have no intention of coming back to India. In this case, utilizing house equity to enhance their living comfort is better than handing over property issues to the children. Also, increasing satellite families, migration of children to urban and industrial areas leaving aged parents at villages are few more reasons of aged parents living alone.

3.4 Constraints for marketability of Reverse Mortgages

- Indian Old parents do not want to shift from their house for reasons of proximity to family and friends, emotional attachments to their Houses. The hope to offset need for a regular stream of income by demanding maintenance from heirs. Heirs are promised rights over the property in return.
- Loan repayment in Term Reverse Mortgages could run into rough weather due to variations in the paying capacity of the heirs. Conflicting interests of the heirs might cause legal hurdles for lender to getting the loan paid off.
- It will be a tall order for the lenders to provide all the guarantees to make Reverse Mortgages attractive. For instance, inconsistency and lack of information in asset appreciation rates and over long periods in India may hamper Crossover risk assessment.
- Variations in standard of living between urban and rural India population and its impact on longevity, debt repayment commitment, satisfying legal requirements in mortgage contracts

etc makes it difficult for those designing Reverse Mortgage products to strike a balance between business and welfare objectives.

- Moral hazards in valuation of the property, will lead to erroneous lending. This may either cause losses or create unfair competition among the lenders.

3.5 Conclusions & Suggestions

- Split term Reverse Mortgages may be preferred to Term Reverse Mortgages by most people. Split Reverse Mortgages are safe to borrower because there is no need for mandatory repayment at the end of the term. However, they can be risky to the lender - especially in the context of absence of suitable property appreciation rates. On the other hand, Term Reverse Mortgages are safe from lender's perspective because crossover risk is minimized - only the interest rate and property appreciation rate are the risk factors but for a borrower it may not offer complete protection if he survives beyond the term.
- Government may initiate an insurance scheme to share the burden of Crossover Risk of lenders to encourage these products.
- Working with Life Insurers, Life Insurance protection to the extent of minimum of house value and the outstanding loan balance on the lives of borrowers can be provided. In the event of death of the borrowers, realization of proceeds can be hassle free for the lenders as well as to the heirs of the borrowers.
- Actuarial world can examine applicability of risk management options available to India. It needs to be explored if mortality securitization is feasible if different places in the country are categorized according to their geographic / demographic characteristics.
- Senior citizens may prefer to live in rural India if only they have all amenities. A government arm on the lines of Housing Development Authority can build projects in rural India, provide amenities and sell those houses to the NRIs who can gift the property to the parents. Parents can avail Reverse Mortgage loans for making a living and increasing their comforts. Economic activity in rural India will also increase as more and more projects come up.
- Professional bodies may initiate an exercise to collect information like mobility rates. Further, inadequacy of property appreciation data may force the lenders to have static assumptions while designing the products. Hence a regular study can be commissioned by National Housing Bank (NHB) to study the property appreciation rates in different geographies which can be used to price the products accurately
- Banks and Insurance companies can form joint venture and market Reverse Mortgage products on the lines of Bancassurance. The relationship can be leveraged to combine the skills in financing and risk management and to keep the costs at a lower level. The benefits can be passed on to the borrower.
- A study needs to be conducted among the senior citizens in different classes of cities to understand the income needs, their views on utilizing the house equity when they are alive for luxury needs. The study could throw light on the type of Reverse Mortgage most suited for that category of city. Probably availability of different variants of Reverse Mortgage products in the market, well marketed, would create a win-win situation to the borrower and the lender.

Part-4
APPENDICES & REFERENCES

4.1 Appendix – A: Reverse Mortgage Loan Calculation Formulas

The Maximum Loan amount or the Principal Limit is the Maximum Lump sum payment or the net present value of monthly payments if the borrower chooses takes monthly payments or Line of Credit.

(a) Determining the Maximum Lump Sum Payment:

Initial Principal Limit P_0 = Maximum Claim Amount * Principal Limit Factor

Maximum Claim Amount: Lesser of (Appraised value of property, Maximum value as per government body)

Principal Limit Factor: These are predetermined factors for each Expected Average Mortgage Interest Rate (EAMI).

EAMI: This can be fixed for fixed rate loans. For adjusted rate loans - it is calculated as per the rates of 10 year term US Treasury Securities

(b) Determining the Tenure or Term Monthly Payments:

The future monthly payment to the borrower under the tenure or Term plans is computed as an annuity, using the formula given below.

Under a Term plan, outstanding balance will equal the principal limit at the end of the term. Then no further payments are payable for a fixed rate loan but borrower can stay in the house. For Adjustable Rate loans, further payments will continue even if the outstanding loan is greater than the principal Limit.

Under Tenure Plan, outstanding balance will equal principal limit at age 100 and if the borrower survives beyond age 100 still payments will continue to the borrower

Monthly Payment = Available Principal Limit * $\{[(1+i)^m * i] / [(1+i)^{m+1} - (1+i)]\}$

i is the monthly compounding rate

m is the number of months that the loan's service fee is expected to be collected over the remaining duration of the loan

Available Principal Limit (or Net Principal Limit):

<p>Available Principal Limit = Accrued Principal Limit (at cutoff date) minus Outstanding balance minus Loan service fee set-aside as of the same date</p>

Accrued Principal Limit:

The principal limit increases each month by one-twelfth of the sum of the Loan Interest Rate and the annual mortgage insurance premium (MIP) rate.

The principal limit is increased each month according to the following formula:

$$P_k = P_0 * (1+i)^{k-1}$$

Where

i = the monthly compounding rate (EAMI+AMIP)/12

AMIP is Annual Mortgage Insurance premium rate

k = the number of months since loan origination.

Service Fee:

The lender is permitted to charge the borrower a service fee if this cost has not already been priced into the borrower's mortgage interest rate. Most reverse mortgage lenders charge a flat monthly servicing fee.

If the lender chooses to assess a servicing fee, the fee is established at closing as a monthly figure (S). The lender adds this fee to the borrower's outstanding balance monthly

Amount necessary to pay this fee throughout the life of the loan is calculated and set aside from the principal limit at closing.

$$\text{Service Fee Set-aside} = \{[S * (1+i)^{m+1} - (1+i)] / [i * (1+i)^m]\}$$

Service fee set-aside decreases as the loan duration (in months) k increases, reaching zero when the borrower is 100 years old. For each subsequent year, the value is set to zero.

If the loan's service fee charges are included in the interest rate and thereby paid as a percentage of the outstanding loan balance, then the monthly service fee S and Service Fee Set-Aside can be zero in this computation.

(c) Determining the Line of Credit:

The Initial Amount of Line of Credit = Available Principal Limit

Line of Credit in any month k = Initial Amount of Line of Credit $(1+i)^{k-1}$

Available Line of Credit = Line of credit in month k – sum of all draw downs from Line of Credit along with Interest and Mortgage Insurance Premium.

4.2 Appendix A – Brief about popular Reverse Mortgage products in the USA

Feature	HECM	Fannie Mae House Keeper	Financial Freedom Plan
Dates of operation	1989 – present	1995 – Present	1993 – Present
Distribution	FHA approved lenders in 49 States and DC and Puerto Rico	Fannie Mae approved lenders in 49 States and DC	Financial Freedom and Correspondents in 12 States (AZ, CA, CO, ML, NJ, NV, NY, OR, PA, UT, WA, WY)
Minimum borrower age	62	62	62
Eligible property types	1-4 Unit owner-occupied houses; FHA approved manufactured houses, condominiums and planned unit developments	Single-family house or condominium; special product available for house purchase	Single-family home, one-to-four-unit dwelling unit in a condominium building or planned unit development
Program equity limit	Up to \$219,849 varies with area, 203(b) limit	\$252,700	\$1,000,000
Payment option	Tenure, term, line of credit, modified tenure, modified term	Tenure, revolving line of credit, modified tenure	Lump sum, with optional annuity purchase for monthly payments.
Interest rate	Annual adjustable and monthly adjustable; Annual has 2% annual and 5% lifetime cap; Monthly has 10% life time cap; Fixed rate possible but not used	Adjustable, based on weekly average of one month secondary market CD index, with 12% lifetime cap	No explicit interest rate, loan is pure equity sharing arrangement
Origination fee	Greater of \$2,000 or 2 percent of maximum claim amount	2% of house value, or 2% of maximum lending value	2% of appraised value of home, maximum of \$10,000
Insurance premium	2% of maximum claim amount at origination, 0.5% of outstanding balance (added onto interest rate)	1% of origination fee to Fannie Mae, no explicit annual premium but all interest payments to Fannie Mae	No explicit insurance premiums
Servicing fee	Maximum \$30/month for fixed and annual adjustable, \$35 for monthly adjustable	Maximum \$30/month; Minimum \$15/month	No explicit servicing fee
Servicing	FHA approved lender services	Fannie Mae approved services	Financial Freedom

4.3 Appendix B – Brief about Home Reversion Schemes in the UK

The following are the types of Home Reversion Plans sold in UK*

Cash Reversions:

In the market at present most reversions are sold as cash products, i.e. the customer gets the value of the reversion paid over as a single cash sum at the outset of the scheme. Most lenders offer cash reversions with the optional purchase of an annuity if required

Income Reversions:

At present income reversions are not common as it is generally assumed that an annuity could be bought with the proceeds of a cash reversion. For the client an income reversion provides a guaranteed level of income for life and for the reversion company there will be an improvement in the funding and cash flow position.

Stepped Reversions:

With a stepped reversion the customer can take their benefits from the scheme either as a lump sum or as a series of payments and the amount that is repaid is expressed as a proportion of the property sale proceeds. The proportion starts as the proportion of the initial advance to the initial property value and "steps up" by a fixed percentage each year, adjusted for further payments as they are made. This product overcomes the main criticism of reversions, that the schemes are very expensive on early death.

-

*Source: "Equity Release Report 2005 UK Volume 1 Main Report, Volume 2 Technical Supplement" - The Actuarial Profession)

4.4 Appendix C – Brief about Home Reversion Schemes in Australia

In Australia, two types of House Reversion Schemes are available*:

Sale and lease model

- In the sale and lease model, the title to the property actually passes to the provider at the time the parties enter into the contract and the property is leased back to the consumer for the remainder of his or her life at a nominal rent.
- The provider pays the purchase price to the consumer in the form of a lump sum payment, in monthly payments over a period of between five and 30 years, or through a combination of the two.
- It is possible for the consumer to protect their interest in the property by lodging a caveat.
- The provider assumes responsibility for rates, maintenance and other outgoings upon title passing to it.
- The provider may then on-sell the property to investors who acquire the title subject to the lease to the consumer, which is acknowledged by deed.
- The investor then assumes responsibility for payments to the consumer as well as for paying rates and other outgoings, and maintaining the property.

Sale and mortgage model

- The sale and mortgage product is structured by two documents, a sale of land contract and a mortgage.
- Under the contract of sale the consumer sells a percentage of the property to the provider.
- The provider pays the consumer an agreed amount on the date the contract is signed. The title to the property remains in the consumer's name.
- To protect the provider's interest in the property, the consumer is required to give the provider a mortgage over the property, the terms of which prohibit the consumer from dealing with the property without the provider's consent.
- The contract may oblige the consumer to:
 - pay all outgoings
 - keep the property insured
 - maintain the property in a 'reasonable state of repair', and
 - Obtain the purchaser's consent before selling, leasing or renovating the property.

The sale and mortgage product that is currently available in Australia is solely distributed by employees of the one provider with whom the house reversion company has an agreement.

*Source: Australian Securities and Investments Commission (2005): "Equity Release Products" – Report 59

4.5 Appendix D - Acknowledgements & References

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