



Appreciation of House Price and its Impact to Reverse Mortgage Pricing

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Abstract

Reverse mortgage is a loan against home equity providing cash advances to a borrower and requiring no repayment until the homeowner dies or permanently moves out of the house. The reverse mortgage is a financial instruments that help elderly to sustain their retirement years by liquidity of their equity assets. The amount of reverse mortgage that can be received depends on home's appraised value, loan's interest rate and borrower age at the time of application. This study aims to determine the appreciation of house price in Malaysia and its effect on the price of reverse mortgage. The results obtained are able to aid retirees to better manage their retirement income.

Keywords: Reverse Mortgage, House Price Risk, Population Ageing

1. Introduction

Population ageing refers to a phenomenon in which the median age of the population in the country rose sharply compared to the total population. It occurs due to declining birth rates and rising life expectancy. According to the UN's (United Nations) projections, Malaysia is expected to reach the level of ageing population by 2030. The factors that contributed to the increase in the number of senior citizens in the Malaysia were the decline in fertility rates which relatively reduced the number of young people, as well as increased access to quality health services now. As people live longer lives, the longevity risk that the elderly face in their retirement is correspondingly increasing, and the adequacy of their retirement income to meet their needs is also being severely tested. A traditional mortgage is where an individual purchase or refinance a home and make regular loan payments to the lender. On the contrary, reverse mortgage is used to get the cash out of your home. A homeowner borrows against the equity in her homes and receives money from the lender. It enables older people to take their home equity without selling their own home. The monthly mortgage payments are not required but the interest and fees are added to the loan balance each month. It will decrease your home equity as loan balance grows.

Besides that, the age of borrower must be at least 60 years old for government's pensioner and private sector's retirees. The borrowers must own the property and it should be their primary residence. According to a study by Rasmussen, Megbolugbe, and Morgan, by taking a reverse mortgage loan about 80% of older homeowners can get their benefit. The most likely benefit from reverse mortgage is for households with low incomes, modest wealth, and poor health (Nakajima and Telyukova, 2014).

The Home Equity Conversion Mortgage (HECM) is the important reverse mortgage currently on the market. Reverse mortgage is an established product in the United States, Korea, Australia, Canada, United Kingdom, India, and Singapore. In Korea, it is known as Korean reverse mortgages (KRM) while in United Kingdom, it is known as Equity Withdrawal Mortgage and Lifetime mortgage. Moreover, as HECM is a predominant reverse mortgage in United States, in Canada and France the reverse mortgage plans are

known as Canadian Home Income Plan (CHIP) and Viager respectively.

In addition, the maximum loan amount are primarily dependant on these three factors such as the value of the home, the expected average mortgage interest rate, and the age of the borrower. The home values correlates positively with the loan amount, where expensive house will result in larger loan amount. The purpose of this study is to present new additional retirement income to elder so that they can manage their financial after retirement. Therefore, in Malaysia there is a need to develop this product for the elderly to earn extra income and benefits.

The next section provides a brief literature on population structure, principle limit factor (PLF) and house price risk. It is then followed by an explanation of the research method employed in this study. Implications and conclusion are presented in the last section.

2. Literature review

Population Ageing in Malaysia. At present, the number of Malaysian population is 28.6 million and is projected to increase to 41.5 million in the year 2040. According to Department Of Statistic Malaysia, the main factors that influence the changes in Malaysia population are birth and death. For the age 0 to 14 years and age 15 to 64 years, the population is projected to decrease in 2040. Over the next few decades, Malaysia's population of person aged 65 and over is estimated to increase significantly to 3.3 million in the year 2020. Ageing population usually happens when there is a rising in the median age of the population due to the increasing in life expectancy and decreasing in fertility rates (Gavrilov and Heuveline, 2003). The rising number of elderly are not growing rapidly but they become substantially healthier. Based on United Nations, it put pressure on health systems, increasing the demand for care, services and technologies to prevent and treat non-communicable diseases and chronic conditions associated with old age.

Malaysia's population ageing relate to longer life expectancies and declining fertility rates. According to Department of Statistic

Malaysia, life expectancy of Malaysia population continues to rise over the past decades. A male aged 65 could expect to live to age 79.9 years old and a female expected to live to age 81.9 years old. In the early years, the risk of death was high at every age, and only a small proportion of people reached old age. However, in modern societies, most people live past middle age, and deaths are highly concentrated at older ages.

Higher economic growth happens when life expectancy increases, fertility declines and mortality rate in ageing population rises. Life expectancy is a measure of the number of years, on an average, that a person can expect to live. Malaysia is experiencing a rapid growth of the older population. This is a direct consequence of the decades of socio-economic development and public health policies where falling fertility and rising longevity have resulted in the rise of new generations. Malaysia is in the third stage of her demographic transition, where fertility rates are declining faster than mortality rates (Hamid, 2012).

Rising Market House Price In Malaysia

Owning a house is for shelter and also defines one's individual achievement. Housing provision in any country is very crucial as it ensures social economic stability and promotes national development. However, housing is an important expression of the family and an expensive investment by households.



Figure 1: The Housing Price Index (House price index (2000=100))
Source : Malaysia Valuation & Property Services Department

Based on Figure 1, the house price index can be seen constantly hiking throughout the quarterly years and it rose from the basic 90 up to 230 in index terms in the period of 14 years. Malaysia's economic and financial strength can create a feasible place for the reverse mortgage instrument market. In the investment perspective, the seller has more realistic desires and the buyers looking for deal to expect more sales activity and transactions in commercial real estate. In addition, the investment property in price from 10% to 20% below the market price to see the achievable results and increase yields (SarkunanSubramaniam, 2017). A study made by Hashim (2010), rising house costs and low loan costs have filled the surge in mortgage loan and empower buyers to spend at high rates bolstered by the increment in their wages. Englund & Ioannides (1997) as housing is the quintessential non-tradable resource, house value cycles crosswise over nations might be synchronized if the forces driving house price such as yield, loan fee, utilization and wealth are acknowledged. Development and demand among buyers varies among houses in Malaysia. During retirement age, it is crucial for retirees to manage their house expenses wisely as to maintain sufficient financial support.

Reverse Mortgage

For many elderly, housing wealth is often the most important wealth component in their life (Bishop & Shan, 2008). Eventhough they have high home equity, they might have a low income to support themselves during their retirement years. According to Employees' Provident Fund Organisation more than three quarters of Malaysians do not have enough funds in their accounts for retirement. There is also no government policy or incentives for the retirees' home as this would lower down the

dependency of the retirees to support for their living cost. As a solution to the insufficient retirement income, a well-known financial product called reverse mortgage arises to provide extra cash for retirees via withdrawal of their home equity (Tsay et al, 2014).

Reverse mortgage is a loan against home equity providing cash advances to a borrower, and requiring no repayment until she dies or permanently moves out of the house (NeighborWorks@ America, 2015). Reverse mortgage allow elderly to release the equity of their home into cash without having to move or to repay a loan each month (Bhuyan, 2011). Reverse mortgages allowed the elderly to continue living in their house and this will increase the consumption of house-rich but cash-poor elderly homeowners (Bishop & Shan, 2008). The system helps the homeowners to access additional income to meet living and medical expenses through the liquidation of their housing assets.

Homeowner Equity Conversion Mortgage (HECM)

United States has created Home Equity Conversion Mortgage (HECM) insurance demonstration or also known as the Federal Housing Association (FHA) reverse mortgage program in 1987 (Case & Schnare, 1994). A HECM loan is a reverse mortgage secured by the borrower's home equity. Not more than 40,000 loans were begun through the HECM program for the first ten years since its initiation (Shan, 2008). But nowadays, this program is the most popular in the United States. According to Diventi and Herzog (1991), Home Equity Conversion Mortgages (HECM) are intended to grant elder people to get cash (for instance, a level-installment month to month annuity) by utilizing the value in their homes as security, without being compelled to move out of their homes. To qualify to get HECM loan the borrower need to be more than 62 years old, one-unit staying and borrowers have to own their homes free and clear, or have claims not surpassing the HECM loan that they can receive (Bishop, 2008). The payment of HECM loan to the borrower can be made by paying monthly or by lump sum.

Taking HECM loans are priced on age, interest rate, and housing value but they are not priced on gender or marital status (Shan, 2008). This is because females have great longevity than males and because until the last person moves out or dies, borrowers who are couples do not repay their mortgages. HECM loans may be more beneficial to single females and couples rather than to single males. Constraining the present value of HECM at origination to a fraction of the property value will protect the FHA structures.

One of the factors affecting the pricing of HECM is the principal limit factor (PLF). It is a percentage of the assessed value of the home up to Federal Housing Administration (FHA) mortgage limit of \$625,500. PLF is calculated based on expected interest rate, home value growth rate and age of younger spouse. The expected interest rate is used to estimate the future interest rate (Pfau, 2016). The PLF is applied when the home's pricing value does not exceed \$625,500.

3. Methodology

Appreciation of House Price. In designing reverse mortgage product, predictions about the fluctuation of housing prices over the next ten years are very important (Ma and Synn, 2009). In the HECM model, the geometric Brownian motion (GBM) is used in modeling the effective trends of possible long-term housing prices (Szymanoski, 1994). It is commonly used when modelling the stochastic process of exchange rates, real estate and stock prices. If the house price follows a lognormal distribution, it is also a stochastic model. With the assumptions in the equation, the returns for house prices are considered to be normally distributed and the rate of increase in house prices is considered equal to the expected rate, while the factors that deviate from the mean rate of increase in house prices are explained by volatility. Meanwhile, the annual appreciation rate of each property can be considered as

an independent observation derived from the normal distribution with mean and standard deviation.

$$E[H(N)] = H_0 e^{\mu N + 0.5\sigma^2 N}$$

H_0 = Initial house price

N = Number of years

μ = Appreciation rate of house price

σ = Volatility of the appreciation rate of house price

The expected house price at a future time period ($E(H(N))$), derived from the aforementioned GBM of house prices. In the equation above, μ and σ are constants. In the HECM model, $\mu = 4\%$, $\sigma = 10\%$ are applied.

Determination of Reverse Mortgage Amount

In HECM, if the loan balance exceeds the house price at the end of the loan, the loan amount is determined at the point where the expected losses are equal to the expected guarantee fees to be paid during the borrower's lifetime. Since the calculation process of the loan amount can be applied for any given age of the borrower and expected interest rate, it is possible to derive the Loan-to-Value (LTV) ratio of each mortgage loan. The monthly loan payments are calculated by applying the amount of the interest rate and guarantee fee rate in the LTV formula obtained using house prices (Park, 2012). Appropriate amount of loan payments can be calculated using the balance of earnings and expenditures, in which the present value of the expected amount of damage from reverse mortgages is matched against the present value of expected guarantee fees (Ma, 2008).

$$PVG = UP_0 + \sum_{t=1}^{T(a)} \frac{mip_t \times P_{a,t}}{(1+i)^t}$$

PVG = Present value of reverse mortgage guarantee fees

UP_0 = Initial guarantee fees at time $t = 0$

(a) = Time left for borrower to live until maximum age limit of 100

mip_t = monthly guarantee fee

mip_t = $(LB_{t-1} + pmt) \times$ monthly guarantee fee

pmt = monthly payment (pension)

LB = accumulated loan balance at period t

LB_t = $(LB_{t-1} + pmt + mip_t) \times (1 + i)$

i = expected interest rate

$P_{a,t}$ = Probability loan of the borrower at age a survive until age $a+t$

4. Conclusion

In the next decade, the number of population in Malaysia will greatly increase and because of that life expectancy of elderly people also will increase. They need some retirement protection scheme to make sure they will not live under chronic financial strain. The reverse mortgage plan need to be taken seriously by the government or local banks so that the financial burden on the government may be moderately lessened and alternative ways of financial support could be provided to the elderly people. The results of finding the price risk, it can determine the amount of reverse mortgage to aid retirees to improve their income during their old days. Future studies can help to estimate potential demands for reverse mortgage products and reduce the poverty rate in ageing population in Malaysia.

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