



Institute
and Faculty
of Actuaries

Lifetime Mortgages

A good and appropriate investment for life companies with annuity liabilities?

IFoA Equity Release Member Interest Group

Contents

1.	Executive summary	3
2.	Scope of this paper	8
3.	Defining the Equity Release asset.....	9
3.1	The nature of Lifetime Mortgage assets.....	9
3.2	Behaviour of the asset in different circumstances	12
4.	Liability matching	17
4.1	Characteristics of Annuity Liabilities	17
4.2	Lessons from the 2007 global financial crisis.....	19
4.3	Lifetime Mortgages – an appropriate asset for matching annuity liabilities.....	20
4.4	A comparison of Lifetime Mortgages with other asset types used for matching annuity liabilities	22
4.5	Summary - the investment thesis	24
5.	How does the equity release investment affect an insurer's balance sheet?.....	26
5.1	Background	26
5.2	Lifetime Mortgage valuation bases.....	26
5.2	Pillar I Balance Sheet.....	29
5.3	Pillar II Balance Sheet.....	34
5.4	Worked Example	39
5.5	Operational Risk.....	46
6.	Treatment of unmatched ER cashflows.....	48
7.	How does the asset behave under a range of scenarios and stresses vis-a-vis liabilities being matched against.....	54
7.1	Base position.....	54
7.2	Scenario – extended longevity.....	55
7.3	Scenario - House Price Inflation Risk.....	57
8.	Solvency II	61
8.1	Eligibility of the asset class.....	61
8.2	Loan Characteristics that meet Asset Eligibility Criteria	61
8.3	Risk Transformation	63
8.4	Solvency Capital Requirements.....	64
9.	Conclusions	66
Bibliography	67	
APPENDICES	67	
APPENDIX I – Bases and Assumptions	68	

1. Executive summary

In recent years Lifetime Mortgages have become an important part of the investment strategy for a number of UK insurers writing annuity business. UK insurers' annuity funds are now the dominant source of funding for Lifetime Mortgages and hence for the UK Equity Release market as a whole.

The economic crisis may have strengthened the case for alternative assets such as equity release, by highlighting how highly correlated traditional markets such as bonds and equities are in adverse scenarios. The expected diversification benefits of these traditional asset classes did not materialise when firms needed it most.

In recent months the Solvency II process (in particular the debate around the Matching Adjustment) has also brought equity release to the attention of a wider audience, who may have previously been less familiar with the asset.

Against this background, the Equity Release Member Interest group has taken a look at why Lifetime Mortgages remain a good and appropriate investment for life companies with annuity liabilities. The Group hopes that this paper will be particularly helpful to those less familiar with the asset, in understanding the nature of equity release assets and the potential benefits of investment in this asset type. Note also that the same arguments will apply for many occupational pension schemes.

For simplicity, the paper is primarily written from the point of view of an annuity monoline, with an investment strategy including corporate bonds and Lifetime Mortgages. However the principles considered and conclusions reached will usually apply to more complex situations.

In terms of Solvency II, this paper considers the eligibility of Lifetime Mortgages for matching adjustment based on the Solvency II Directive 2009/138EC. We note that the importance of the eligibility of Lifetime Mortgages for the viability of the UK market has been recognised at both a government and regulatory level.

"The Government also recognises the importance of a final settlement on Solvency II which ensures the continued viability of the UK annuity and equity release markets. We will continue to work together to reach a positive outcome." (Department of Health; ABI, 2014)

"Insurers are significant funders of, for instance, equity release mortgages and residential mortgages. Rendering such loans inadmissible for the matching adjustment might have a possible dual impact on these markets." (EIOPA, Technical Findings on the Long-Term Guarantees Assessment, 2013)

The MIG believe it is in the interests of all stakeholders that a positive final settlement on Solvency II is reached as equity release :

- Presents an attractive risk adjusted asset for life companies and annuity funds providing yield and diversification
- Allows pensioners to remain in their own homes and familiar surroundings for longer
- Due to the lower cost of domiciliary care, it reduces the cost to already stretched government budgets

Further, the potential future opportunity cost of equity release not being classified as a suitable investment could be substantial for all stakeholders.

Lifetime Mortgage Assets have the following characteristics

- Long duration, illiquid, predominantly fixed interest assets
- Interest accumulates on the loan until redemption
- Principal and accumulated interest repayable on redemption
- Timing of repayments dependent on mortality, move into Long Term Care (LTC) and Voluntary Early Repayment (VER)
- House Price Inflation risk due to “No Negative Equity Guarantee” (NNEG), although loans are written at substantially lower loan-to-value ratios compared to residential mortgages

We have also considered the main characteristics of annuity liabilities and the key risks associated with them.

- Security - annuity payments are fixed and guaranteed by the provider
- Term - the fact that payments continue for the life of the policyholder means the duration of cash flows is dependent on longevity and hence is uncertain at an individual policy level, for portfolios, particularly larger ones, the cashflow profile is more reliably predictable
- Yield - guarantee a fixed yield based on an assumed longevity profile
- Marketability - annuity liabilities are highly illiquid. The customer has no right to terminate (nor does the issuer)
- Key risks - annuity liabilities involve very long interest guarantees, which combined with uncertain duration means exposure to liquidity and reinvestment risks

These liability characteristics have implications for the choice of suitable assets

- Security - secure cash flows in timing and amount
- Term - Long-dated
- Yield - Fixed income
- Marketability - Liquidity not an absolute requirement
- Key risks - Capital efficient in terms of risk return trade off

Traditionally, insurers in the main have used a mixture of gilts and credit (corporate bonds / commercial mortgages) of long average tenors to match their annuitant liabilities. Whilst these fixed income assets do meet the liability characteristics outlined above, this approach led to the following consequences:

- Due to the scarcity of long-dated bonds, insurers built up a high concentration to particular corporate sectors including the financial sector
- This lack of credit supply led to a downward pressure on long-dated yields and credit spreads

The financial crisis that began in 2007 led to large credit spread widening and rating downgrades (even sovereign debt) and brought into sharp focus insurers' large exposure to credit risk, particularly in their annuity books. This led to insurers taking a more conservative approach to credit risk while the financial storm took its course.

In 2014 the global economic outlook is much brighter than it has been since the financial crisis started 7 years ago. The challenges facing insurers' annuity investment strategy are:

- Historically low yield environment with no sign of significant rise in the near future;
- A tightening in credit spreads due to the rosier economic outlook and;
- A lack of supply of credit at a time of record annuity new business due to baby boomers hitting retirement

Given this backdrop insurers in recent years have been turning to alternative fixed income assets that could be a suitable match to their annuitant liabilities. The key characteristic of these new "alternative" fixed income assets are they tend to be very illiquid. Equity release (Lifetime) mortgages have been one of the main "alternatives" that some insurers have turned to address the challenges they face.

Lifetime Mortgages meet many of the criteria for suitable assets for matching annuity liabilities, and we conclude that Lifetime Mortgages can in principle be considered a suitable asset for inclusion in a portfolio of assets backing an annuity fund.

This conclusion arises from consideration of the nature of the cash flows, the nature and extent of the underlying risks, the diversifying characteristics of the risks, and the reward for illiquidity which is available at the present time. However, we also note that certain specific features of the assets can cause difficulties, for example in valuing the assets and in terms of additional operational risks.

We have considered how an investment in Lifetime Mortgages affects an insurer's balance sheet, by means of some worked examples.

Lifetime Mortgages are Level 3 assets requiring the holder to mark to model to determine "fair value" for the IFRS and regulatory balance sheets.

The mark to model approach can be considered in two parts –

- Loan Asset – the gross recoverable from the loan before any no Negative Equity Guarantee (NNEG) costs
- NNEG cost – the implicit option provided through the NNEG

Each holder must determine a mark to model methodology and assumptions. This has led to a number of different valuation approaches being adopted in terms of

- Valuation of NNEG (stochastic / Black Scholes)
- House Price Assumptions
- Decrement rates (fixed / dynamic)
- Determination of rates to discount asset cash flows (risk free / risk free plus illiquidity premium)
- Determination of illiquidity premium

In this paper we have set out an approach and basis for illustration purposes and it is not a recommended basis for use by any insurer. We note that in practice there are a number of ways of approaching the valuation and reporting of the assets and this paper only covers one approach and basis for illustrative purposes.

We have set out a number of worked examples to show the Pillar I and Pillar II balance sheet impacts of an investment in Lifetime Mortgages compared to a scenario where annuity liabilities are wholly matched by corporate bonds.

Our examples illustrate how such a switch can release capital in the fund, depending on relative risk adjusted yields at the time (this appears to be the case at the current time on the basis used in our example). This can be thought of as the reward for investment in higher yielding assets where the key risk of liquidity is not material given the nature of the liabilities in an annuity fund.

We have also considered some additional considerations arising from investment in Lifetime Mortgages, including the possibility of unmatched lifetime mortgage cashflows, and the behaviour of the assets in circumstances of extended longevity (the asset's longevity characteristics should result in a capital efficiency and also reduce the additional reinvestment risk) and low house price inflation (possible reduction in yield realised from the assets and a modest balance sheet impact).

The wider benefits of Equity Release

This paper does not address the social and economic aspects of the Equity Release Market as these have been covered well in other publications, notably the recent report by Towers Watson¹, and we note the following conclusions from their report regarding the potential of Equity Release.

“The European elderly population is growing and will exceed 120 million by 2030. This population group is unlikely to have enough retirement income to fund their retirement needs. However, many hold a large amount of wealth in their property. This wealth can become trapped. Equity release products are a viable option to access this value. Many of the European markets for equity release products are still in their infancy, but we forecast that demand will increase. Insurers are a natural supplier for these products given the long-term nature and link to life expectancy.”

“There are multiple benefits if European policymakers put in place a suitable framework to enable and encourage the sale of equity release products. The increased ability for retirees to release value from their homes in retirement would remove some of the burden on governments to provide for older people...”

“Even if it (equity release) is a suitable solution for only a small proportion of the elderly population then it would still be transformational in terms of increasing access to retirement funds and narrowing the pensions gap.”

In the opinion of the Member Interest Group, this latter point i.e. the opportunity for Equity Release to be a solution to the enormous pensions savings deficit problem, is of fundamental importance.

¹ Equity Release – Accessing housing wealth in retirement, Towers Watson, June 2013

In addition, Equity Release could provide a part of the solution to the issues in the UK regarding the large volumes of outstanding interest only mortgages, where customers do not have adequate provision for repayment.

2. Scope of this paper

In recent years Lifetime Mortgages have become an important part of the investment strategy for a number of UK insurers writing annuity business. UK insurers' annuity funds are now the dominant source of funding for Lifetime Mortgages and hence for the UK Equity Release market as a whole.

The economic crisis may have strengthened the case for alternative assets such as equity release, by highlighting how highly correlated traditional markets such as bonds and equities are in adverse scenarios. The expected diversification benefits of these traditional asset classes did not materialise when firms needed it most.

In recent months the Solvency II process (in particular the debate around the Matching Adjustment) has also brought the equity release asset to the attention of a wider audience, who may have previously been less familiar with the asset.

Against this background, the Equity Release Member Interest group has taken a look at why Lifetime Mortgages remain a good and appropriate investment for life companies with annuity liabilities. The Group hopes that this paper will be particularly helpful to those less familiar with the asset, in understanding the nature of equity release assets and the potential benefits of investment in this asset type.

The group has considered issues around matching, diversification and illiquidity, and looked at the cost- and risk-adjusted yields available on lifetime mortgages compared to other asset classes.

In terms of Solvency II, this paper considers the eligibility of Lifetime Mortgages for matching adjustment based on the Solvency II Directive 2009/138EC.

This paper summarises key points from previous work on this subject and adds more recent views from the group. It also takes into account a number of questions and points of feedback from the Life Conference in November 2013.

The paper is primarily written from the point of view of an annuity monoline, with an investment strategy including corporate bonds and Lifetime Mortgages. The examples allow for closed portfolio with no further new business. We hope the principles and examples we have considered will also be useful for insurers with a wider product portfolio and a more diversified balance sheet.

The paper is confined to consideration of Lifetime Mortgages as an asset for matching annuity liabilities and does not consider any socio-economic, market, consumer, regulatory or other aspects of Lifetime Mortgages or the UK Equity Release market. Many of these aspects have been covered elsewhere including in a recent report by Towers Watson². Nor does it cover other Equity Release products, such as Home Reversions. The paper mainly considers the standard lump sum roll up Lifetime Mortgage product.

² Accessing housing wealth in retirement, Towers Watson

The paper does not provide any recommendations regarding methodology or bases for use by any specific insurer. We would emphasise that there are already a range of practices and approaches in use in the market, for example in terms of the approach to the valuation of the NNEG (and whether a market consistent approach is used) and in the determination of the illiquidity premium (and whether this set on day one and then treated as fixed throughout). This paper only covers one approach and basis for illustrative purposes. Whilst we would encourage providers to compare our results with their own methodology and assumptions and ensure that they are satisfied as to the reasons for any differences, there is a health warning as our results should only be used as a check in this regard. In practice insurers should set methodology and assumptions in light of their own product features, target market, expense profile, accounting and capital policies, reporting bases and appetite for risk.

3. Defining the Equity Release asset

3.1 The nature of Lifetime Mortgage assets

In summary, Lifetime Mortgage Assets have the following characteristics

- Long duration, illiquid, predominantly fixed interest assets
- Interest accumulates on the loan until redemption
- Principal and accumulated interest repayable on redemption
- Timing of repayments dependent on mortality, move into Long Term Care (LTC) and Voluntary Early Repayment (VER)
- House Price Inflation risk due to “No Negative Equity Guarantee” (NNEG)

Further details of the asset characteristics are set out below.

Type of asset	Mortgage secured on a residential property. Generally must have first charge on the property.
Borrower	Can be written on single life or joint life (with repayment following the death of the last surviving borrower). Typically up to 2/3rds of Lifetime mortgages are joint life, usually to married couples. Lifetime Mortgages are usually available to borrowers aged 55 and over.
Interest coupon	Interest accumulates and is repaid together with loan principal, hence the asset is “zero coupon” in nature. There are also a small number of “interest serviced” contracts on the market, where customers can make ongoing payments of interest.
Interest	Usually fixed rate, typically 6.0-7.5% as at May 2014 (lenders’ headline monthly rates).

	<p>Fixed rate products comprise the majority of the current market and inforce portfolios, although some (capped) variable rate and inflation linked products have been offered at various times.</p> <p>We note that it is a requirement of membership of the Equity Release Council, the industry trade body (formerly SHIP), that Lifetime Mortgage products have either fixed or capped variable interest rates to protect customers against excessive roll up of interest. From a funder or provider point of view, this provides additional certainty of cashflows and removes the additional exposure to NNEG risk that would accompany uncapped variable interest rates.</p>
Term	<p>The timing of mortgage repayment is uncertain (depends on mortality, morbidity, prepayment rates) and the expected duration depends on borrower age, gender, single / joint life.</p> <p>The expected average duration in force is likely to be in excess of 20 years for loans issued to younger ages (e.g. age 60-65), excluding voluntary early repayments, with the tail extending to very high ages.</p> <p>The fact that 2/3rds of loans are issued to joint borrowers and repayment is due following the death or move into long term care of the last surviving borrower also means that expected durations are longer than for single borrowers.</p>
Illiquidity	Lifetime Mortgages are illiquid assets in the sense that they cannot be redeemed at the option of the issuer or owner and there is likely to be limited opportunity to trade the mortgages once acquired. Hence we assume a 'buy and hold' approach to the assets.
Repayment	<p>The mortgage is repayable within a specified maximum period, typically 12-18 months, following the borrowers' death, permanent move into Long Term Care or permanent vacation of property.</p> <p>Following death, the mortgage is typically repaid within 6-9 months of customer moving out of the property (although this can take longer in some cases). The loan continues to accrue interest until it is redeemed.</p> <p>This gives a relatively stable and predictable normal repayment profile, and gives the asset some positive exposure to increased longevity (if the customer lives longer in their own home, the loan is inforce and accrues interest for longer).</p>
Early Repayment	<p>The loan is repayable at any time at the option of the customer (may be subject to Early Redemption Charge (ERC) and Administration charge).</p> <p>Most providers operate marked to market ERCs, providing some protection to the funder against reinvestment risk and anti-selection as a result of customers seeking to reduce their interest rate by switching to a new loan.</p>

	<p>In practice it is our understanding that early repayment rates have generally been relatively low and stable in most lifetime mortgage portfolios. In a previous paper³, the Equity Release Member Interest Group paper commented on early repayment rates and included a basis with expected rates varying between 0.25% and 2.5% p.a., depending on duration.</p> <p>The issuer has no early redemption rights.</p>
No Negative Equity Guarantee	<p>The mortgage repayment amount is subject to a maximum of the proceeds of the sale of the property on which the loan is secured, exposing the funder to the risk that the property value is lower than the amount of loan principal plus interest on redemption.</p> <p>This exposure is to the individual mortgaged property rather than to a property index.</p>
Other Risks	<p>The uncertain repayment profile and possibility of voluntary early repayment (see above) are drivers of cashflow mismatching risks.</p> <p>For example, short term cashflow matching can be affected in periods where there are fewer redemptions than expected e.g. due to lower deaths or increased time between death and redemption e.g. due to a slow property market. Interest on the assets continues to accrue until redemption.</p> <p>Uncertainty arising from random fluctuations in mortality, LTC and early repayment tends to reduce the larger the portfolio of loans.</p> <p>In addition, the nature of Lifetime Mortgages means there are a number of operational risks, such as those associated with customer administration (possibly including third parties), fraud, legal and regulatory.</p>
Security	<p>The property must be independently valued and confirmed of suitable type and condition (some property types are not acceptable security, in other cases repairs may have to be completed before some or all of the loan is advanced).</p> <p>The mortgage is portable to other acceptable property types, subject to the required Loan to Value (LTV) being available from the lender.</p> <p>Unlike a standard residential mortgage there is no dependence on the borrowers' income and ability to pay.</p>
Loan to Value	<p>Loan to value ratios depend on age and are lower than standard residential mortgages to allow for the accumulation of the interest on the loan e.g. the maximum available to a borrower aged 60 tends to be 18-25% of the property value, rising to a maximum of 45-50% at higher ages.</p> <p>Providers often offer alternative products with different LTVs – with the higher LTV being available at a higher interest rate.</p>

³ Pricing and Risk Capital in the Equity Release Market, Hosty etc, 2007.

Legal form (where funder is different to originator)	The asset owned by a funder often takes the form of a beneficial interest in the mortgage cash flows.
Origination	A Lifetime Mortgage is a financial product as well as a financial asset, hence there will be origination costs for the lender (e.g. administration, marketing, distribution). It is likely that the funder will need to reimburse these costs as part of the funding transaction.
Other Funding obligations	<p>On drawdown plans the customer is guaranteed the right to withdraw funds in future up to a borrowing limit fixed at outset – in this case the funder is likely to be required to undertake to provide funds in future to meet these additional withdrawals. The interest rate on future drawdowns is not guaranteed and will depend on the lender's rates at the date of drawdown. The Funder will need to ensure sufficient funds can be made available to meet such withdrawals, the timing and amount (up to the agreed limit) of which is at the option of the borrower.</p> <p>On Cash Release plans, the borrower can apply for an additional loan subject to a re-valuation of the property and the lending criteria (e.g. maximum LTV) available at the time. The availability of additional borrowing is not guaranteed by the lender at outset but is usually provided in practice assuming the lender has ongoing lending capacity.</p>
Borrower obligations	The borrower has certain obligations (e.g. to keep the property insured and maintain in acceptable condition). The funder is at risk if the property is destroyed and the borrower has no insurance (although maintaining insurance cover in place is a condition of the mortgage). Hence, funders usually take out additional insurance cover for this risk.

3.2 Behaviour of the asset in different circumstances

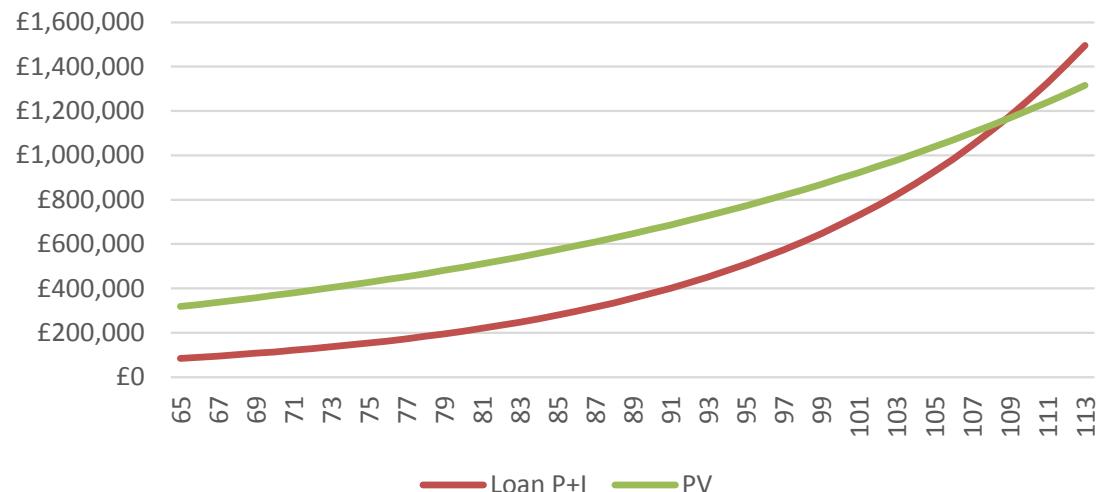
The following charts illustrate key aspects of lifetime mortgages.

Figure 3.1 shows the roll up of principal plus interest on a typical lump sum roll up mortgage (assumed age 65 at outset, £75k loan, 25% LTV, 6.00% monthly interest rate) together with the change in the property value with assumed house price inflation of 3% p.a.

The chart shows that after 45 years the loan plus interest exceeds the property value, hence redemption in this period will result in the No Negative Equity Guarantee biting and the customer repaying less than the full amount of loan and accumulated interest. The fact that the lines only cross at age 108 indicates the extent to which the NNEG is likely only to be an issue at longer durations.

Figure 3.1 – 1 Lifetime Mortgage inforce - principal plus interest and property value

Example: roll up of Loan + (6%) Interest vs change in Property Value (3% p.a.)



It is important to note that the Negative Equity Guarantee does not result in a loss in the usual sense of the term; it results in the lender earning a lower return on the mortgage asset than they would have done had the NNEG not been present.

We have also set out below a number of profiles of expected redemption cash flows for portfolios of lifetime mortgages, highlighting how the cash flows vary depending on customer or loan characteristics, as well as economic, demographic and behavioural experience and reporting bases. The assumptions used are set out in Appendix I.

Figure 3.2 – Lifetime Mortgage – variation in expected redemption cashflows by entry age

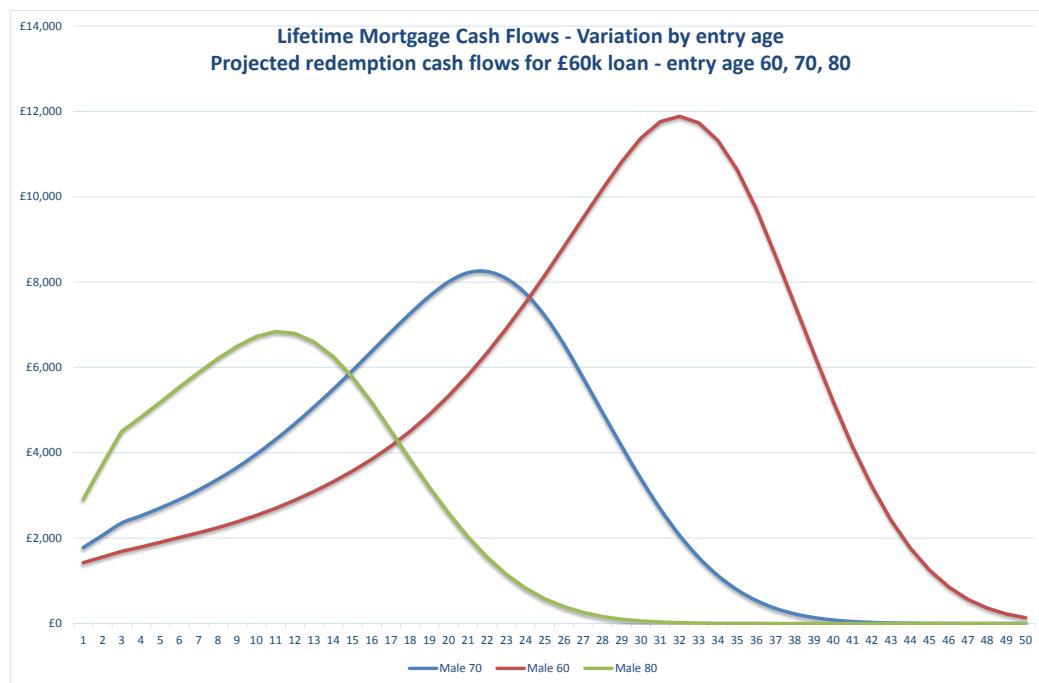


Figure 3.2 shows the impact of age on expected redemption cashflows, impacting both the duration of cash flows and (because of the accumulating nature of the asset) the total amount of redemption cash flows.

Figure 3.3 – Lifetime Mortgage – variation in expected redemption cashflows – Single Life Male, Single Life Female, Joint Life

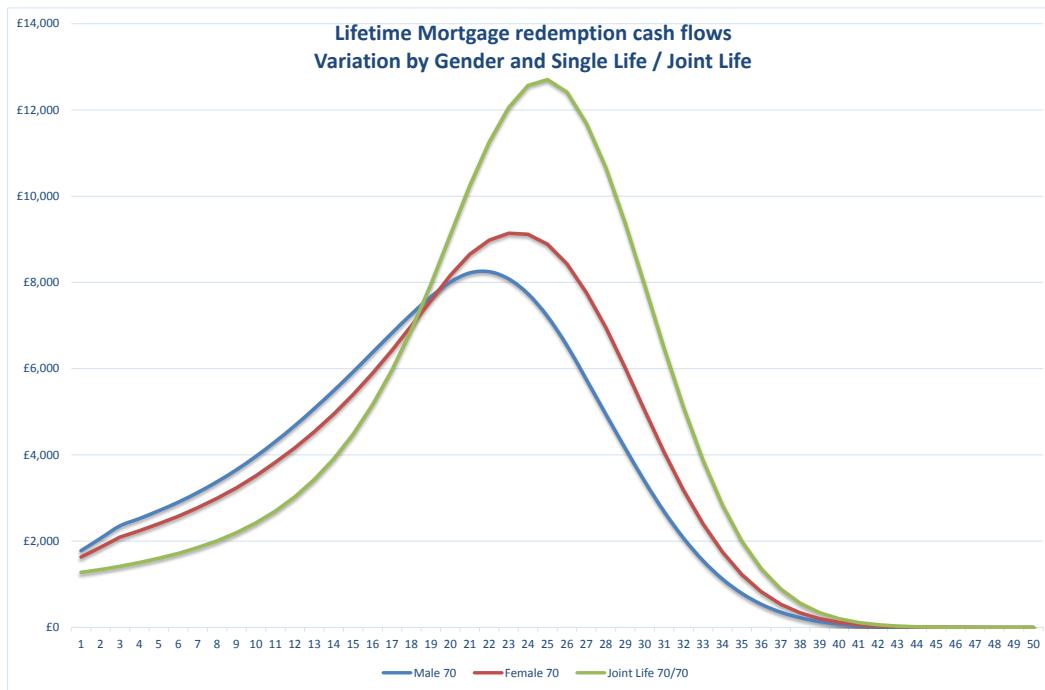


Figure 3.3 illustrates the impact of gender and single life / joint life on expected redemption cash flows (for age 70 at outset). In the illustrative basis used in this paper (see Appendix I), the higher expected duration in force of female lives pushes the cash flow curve to the right – peaking after 23 years (21 for male). The accumulating nature of the LTMs means the redemption amount is higher the longer the mortgage is in force. In the case of joint borrowers, Mortgages are redeemed following the second death, hence the redemption curve is pushed further to the right, peaking at duration 25. Note these charts include voluntary early repayments of 2% p.a.

Figure 3.4 – Lifetime Mortgage – variation in expected redemption cashflows by mortality and early repayment experience

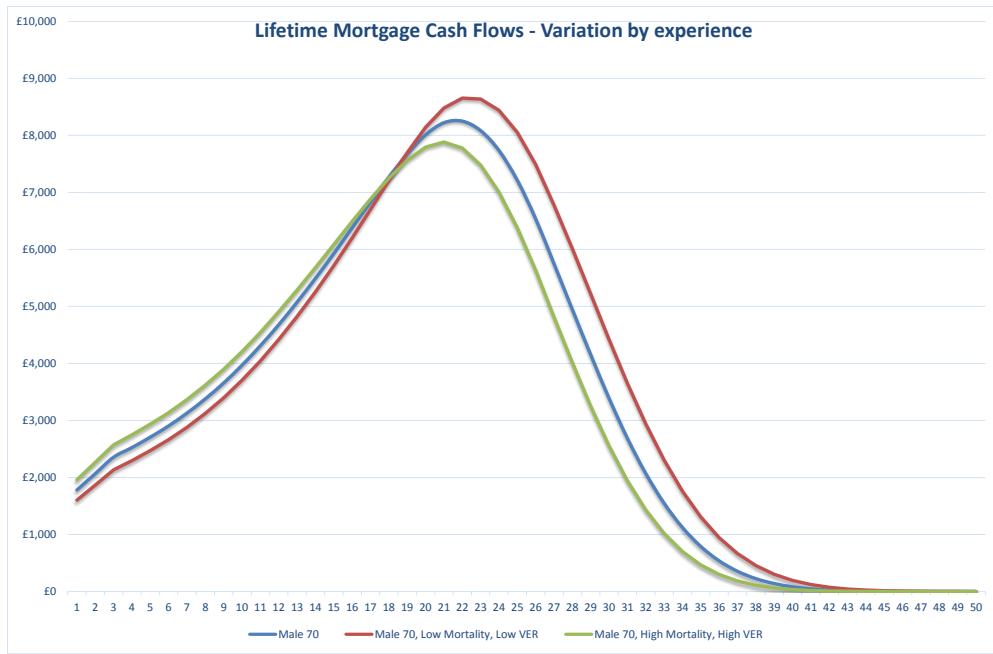


Figure 3.4 shows the impact of higher and lower decrements on the assumed redemption cash flows, with proportional changes in Mortality (+/-10%) and Voluntary Early Repayments (+/-10%) compared to the central basis (see Appendix I).

Figure 3.5 – Lifetime Mortgage – impact of low HPI on expected redemption cashflows

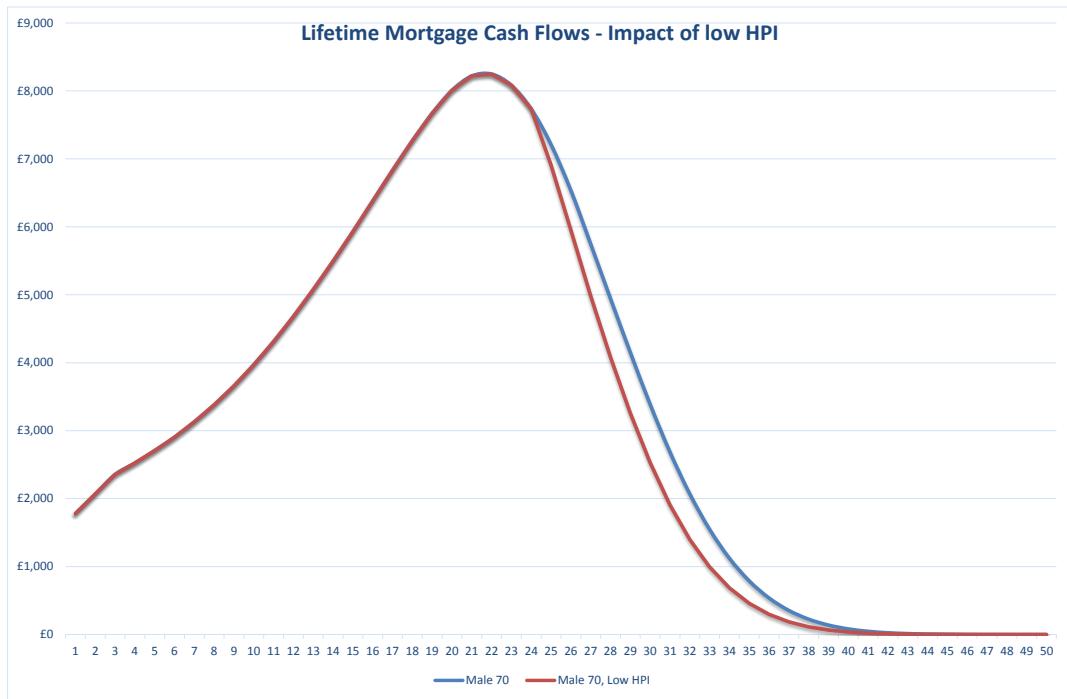
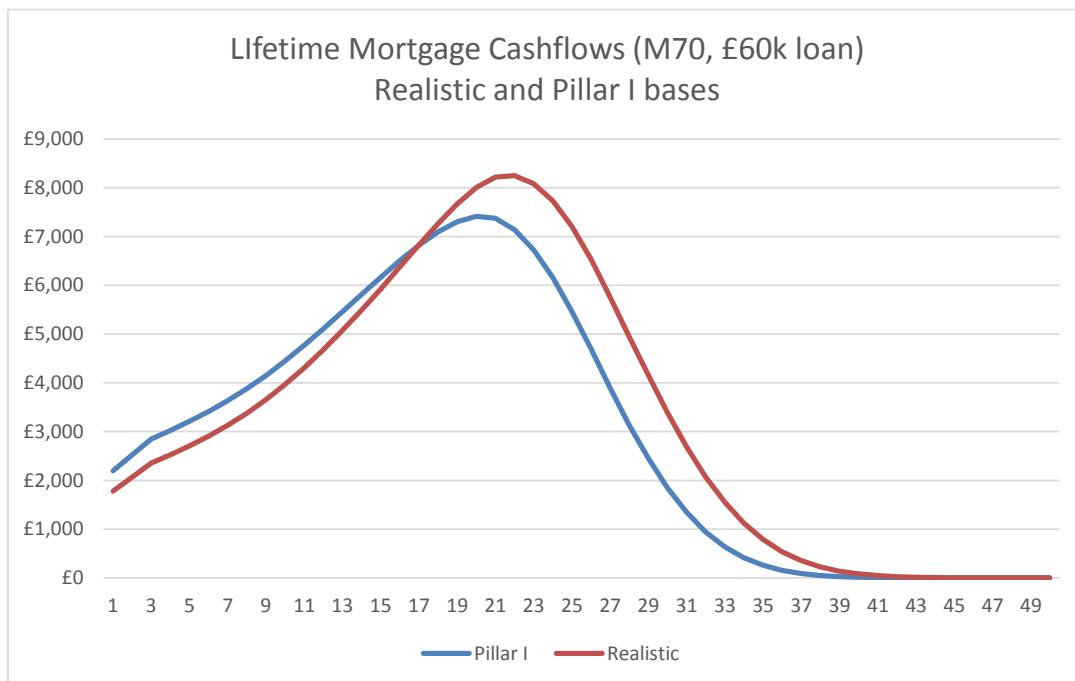


Figure 3.5 shows the impact of low HPI (1% p.a. compared to 4.5% p.a. in the central basis) in reducing expected redemption cash flows. The low HPI results in NNEG losses at later durations when the accumulated mortgage and interest exceeds the value of the property.

Figure 3.6 – Lifetime Mortgage – variation in expected redemption cashflows by reporting basis (the impact of prudent margins)

Figure 3.6 shows the difference in redemption cashflows on the two illustrative reporting bases we have used in this paper – realistic (Pillar II) and prudent (Pillar I) assumptions. The Pillar I valuation basis relative to the realistic Pillar II basis assumes higher mortality, higher early repayment rates, lower house price inflation and higher property volatility (see Appendix I for details). Therefore, realistic cash flows have a longer average duration and a higher risk adjusted yield.

Please note however that practices vary across the market. Some companies may use the same mark to model value for both Pillar I and Pillar II reporting.



4. Liability matching

This section considers

- the characteristics of annuity liabilities;
- the main investment strategies used by annuity providers to match their liabilities;
- key criteria which make an asset “appropriate and good” for matching annuity liabilities;
- why lifetime mortgages meet this key criteria and;
- a comparison of various asset types against this criteria.

4.1 Characteristics of Annuity Liabilities

We have considered below the main characteristics of annuity liabilities and the key risks associated with them. This is limited to conventional pension annuities without escalation and nil guarantee periods, for a range of ages and genders.

Key characteristics

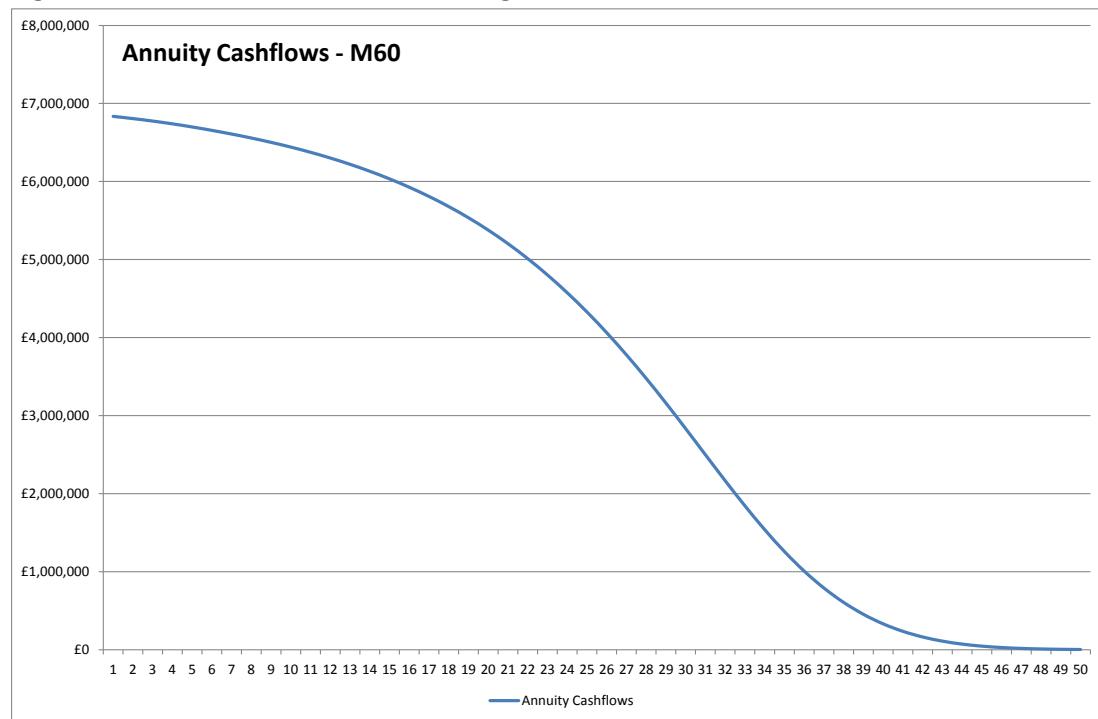
Security	Annuity payments are fixed and guaranteed by the provider
Term	The fact that payments continue for the life of the policyholder means the duration of cash flows is dependent on longevity and hence is uncertain However the “law of large numbers” tends to reduce the impact of random fluctuations in experience and allows cash flows from a large portfolio to be viewed as “fixed”
Yield	Guarantee a fixed yield based on an assumed longevity profile
Marketability	Annuity liabilities are highly illiquid. The customer has no right to terminate (nor does the issuer)
Key risks	Annuity liabilities involve long-dated interest guarantees, which combined with uncertain duration exposes the provider to liquidity and reinvestment risks

Pension annuities are typically taken out at ages 60-65, with cash flows then arising over a period of up to 50 years.

The nature of the annuity cash flows can vary depending on whether payment is in advance or arrear, the frequency of payment, whether the annuity escalates, any period in which payments are guaranteed, as well as age, gender, and single or joint life.

Chart 4.1 below shows projected cash flows from a portfolio of annuities (Single life, male, aged 60, level annuity, nil guarantee period).

Figure 4.1 – Cashflows from CPA, male aged 60



The implications of these liability characteristics for the choice of suitable assets are shown in the table below

	Liabilities	Characteristics of suitable Assets
Security	Fixed and guaranteed by the provider	Secure cash flows in timing and amount
Term	Dependent on longevity and hence uncertain “Fixed” in a probabilistic sense	Long-dated
Yield	Fixed yield based on an assumed longevity profile	Fixed income
Marketability	Highly illiquid	Liquidity not an absolute requirement
Key risks	Very long interest guarantees, which combined with uncertain duration means exposure to liquidity and reinvestment risks	Capital efficient in terms of risk return trade off

4.2 Lessons from the 2007 global financial crisis

Traditionally, insurers in the main have used a mixture of gilts and credit (corporate bonds / commercial mortgages) of long average tenors to match their annuitant liabilities. Whilst these fixed income assets do meet the liability characteristics outlined above, this approach led to the following consequences:

- Due to the scarcity of long-dated bonds, insurers built up a high concentration to particular corporate sectors including the financial sector.
- This lack of credit supply led to a downward pressure on long-dated yields and credit spreads

The financial crisis that began in 2007 led to large credit spread widening and rating downgrades (even sovereign debt) and brought into sharp focus insurers' large exposure to credit risk, particularly in their annuity books. This led to insurers taking a more conservative approach to credit risk while the financial storm took its course.

In 2014 the global economic outlook is much brighter than it has been since the financial crisis started 7 years ago. The challenges facing insurers' annuity investment strategy are:

- Historically low yield environment with no sign of significant rise in the near future;
- A tightening in credit spreads due to the rosier economic outlook and;
- A lack of supply of credit at a time of record annuity new business due to baby boomers hitting retirement

Given this backdrop insurers in recent years have been turning to alternative fixed income assets that could be a suitable match to their annuitant liabilities. The key characteristic of these new "alternative" fixed income assets are they tend to be very illiquid; insurers are using the illiquid nature of their liabilities to improve returns by accessing illiquidity premiums on their assets. Equity release (Lifetime) mortgages have been one of the main "alternatives" that some insurers have turned to address the challenges they face, given their illiquid nature, with no option for the provider to redeem the mortgages and little opportunity to trade mortgages once acquired.

In order to match annuity liabilities the provider needs to invest primarily in long dated, fixed interest assets with liquidity being of a tertiary nature. Ideally they will exactly replicate the annuity liability cash flows and provide sufficient risk adjusted yield to allow competitive pricing. Both Pillar I and Pillar II regimes penalise any degree of mismatch through interest rate stresses.

However, in practice such perfect assets do not exist.

- Even sovereign debt has a level of default risk
- Corporate debt has a number of disadvantages
 - The "shape" of cashflows (coupon and principal) is inconvenient
 - Supply is lumpy in terms of available maturity dates and credit quality
 - Lack of supply leads to a poor risk / return trade off

- Varying levels of default risk. Also exposes the insurer to significant spread risk and balance sheet volatility
 - Default risk is reflected by increased yield, but some of the increased yield is the premium for holding an illiquid asset, with these separate components difficult to quantify
 - Leads to concentration risk at the longer maturities to a specific sectors and counterparties
 - Reduces the asset diversification benefit
- The supply of sovereign and corporate debt available with durations long enough to match the long end of annuity liabilities is limited, which can expose the insurer to significant reinvestment risk

In practice, various investment strategies are used in the UK market, including gilts, corporate bonds, commercial mortgages as well as lifetime mortgages, however the liability characteristics and availability and nature of suitable assets present ongoing challenges for providers in balancing risk adjusted yield, capital requirements and regulatory risk (for example the implications of Solvency II).

We consider the characteristics of a number of asset types in more detail below.

4.3 Lifetime Mortgages – an appropriate asset for matching annuity liabilities

In recent years, there has been a growth in investment in Lifetime Mortgages by UK annuity funds, which have concluded that these assets are appropriate and attractive assets for matching annuity liabilities. Lifetime Mortgage assets need to be treated differently to corporate bonds due to their nature and the fact that the mortgages are an insurance product of their own. The inherent risks need to be assessed and appropriate reporting bases need to be developed by each insurer.

We have set out below a summary of the extent to which Lifetime Mortgages meet the criteria for “suitable assets” set out in 4.1 above.

	Characteristics of suitable assets for matching annuity liabilities	Characteristics of Lifetime Mortgages
Security	Secure cash flows in timing and amount	<p>Meets criteria, however</p> <ul style="list-style-type: none"> • Security of cashflows is linked to out of the money NNEG (Cost of “NNEG” option depends on a number of factors including LTV and age of the borrower – we have illustrated possible costs in section 5 below) • Cash flows can be lumpy in small portfolios due to fluctuations in mortality and early repayments
Term	Long dated	Expected to meet criteria (longer duration than bonds – potentially beyond the longest annuity cashflows), however duration is dependent on repayment experience
Yield	Fixed income	Meets criteria (Lifetime Mortgages offer

		long term fixed returns, with a premium for illiquidity), however yield is dependent on repayment experience
Marketability	Liquidity not an absolute requirement	Meets criteria - Lifetime Mortgage cashflows are illiquid and can be considered "fixed" to a certain extent in a probabilistic sense
Key risks	Capital efficient in terms of risk / return trade off	Meets criteria in terms of its longevity characteristics and exposure to risks such as property values which may offer some diversification from credit risks etc. However they also bring a number of operational risks and reputational risks.

We have included additional comments on a number of these aspects below, on

- "Fixed" nature of cashflows (see also 4.4 below)
- Lifetime Mortgages and Early Repayment Risk
- Longevity characteristics
 - There is some offset to the impact of extended longevity on annuity liabilities (see section 7)
 - Depends on the relative populations behaving in a similar way
- Capital implications of property exposure vs credit default exposure
- The nature of diversification within the asset class

The "fixed" nature of Lifetime Mortgage cash flows

We have commented above that the redemption cashflows from a portfolio of Lifetime Mortgages are reasonably predictable and can be considered fixed to some extent in a probabilistic sense. This is based on the following rationale

- Mortality is reasonably predictable as given the experience of the industry in writing and managing products for a similar customer age group (i.e. for pension annuities). The mortality element also means a strong temporal diversification – i.e. a whole portfolio of loans will not redeem (for this reason) at a particular point in time
- Transfers to long term care (LTC) are less predictable but considered to be much less significant than mortality. The 2007 Equity Release Working Party IFoA paper considered LTC rates as likely to amount to a small acceleration of mortality decrements
- Voluntary early repayments (VER) are the most difficult to predict as there are a number of drivers, however experience is thought to have been generally low and relatively stable to date. The presence in most portfolios of mark to market early repayment charges tends to discourage rate driven switching and keep VER rates lower. In portfolios without these charges, VER rates have tended to be higher. Random fluctuations in redemption rates and cash flows are likely to be less significant the larger the portfolio of loans (and converse is true).
- Redemptions amounts are predictable (accumulation of the loan amount at a fixed interest rate) as long as the NNEG is out of the money. Even when house prices are relatively

depressed, low average LTVs on most portfolios and the fact that the NNEG is only applicable on contractual redemptions (following death or move into Long Term Care) is likely to mean that NNEG losses are limited in nature and spread over time as redemptions occur. We have considered the extent of NNEG risk elsewhere in this paper.

Lifetime Mortgages and Early Repayment Risk

The 2007 Equity Release Working Party paper⁴ considered early repayment risk and we have not repeated this here. However, we note the following key points:

- VER rates are likely to depend on a number of factors – e.g. customers may choose to move to a smaller property and partially or fully repay the loan, or may receive additional funds through inheritance. However in the experience of the Member Interest Group, many borrowers are unlikely to have the funds available to choose to repay the Lifetime Mortgage early, given the reasons for taking out the product in the first place.
- However there is also likely to be an incentive at times for customers to re-mortgage and switch to a loan with a lower interest rate (or higher LTV) if available. This may be as a result of general falls in market yields (and hence pricing benchmarks) or as a result of lower pricing spreads amongst providers.
- Any sizeable Lifetime Mortgage portfolio will be spread over a large number of individual loans and borrowers, and it is unlikely that borrowers will act collectively to redeem a large proportion of the portfolio within a short time, although it is possible some distributors may seek to encourage this among their clients.
- Incentives for interest rate driven switching are reduced to a significant degree by the common (but not universal) practice among providers of applying marked to market Early Repayment Charges. These apply if gilt yields have fallen since the outset of the loan, and are generally capped at 25% of the loan, which is typically sufficient to cover the impact of a fall in gilt yields of up to c1.5%.
- For providers, in the event of early redemption, these Early Repayment Charges provide some mitigation of reinvestment risk when gilt yields have fallen, but do not compensate for any reduction in spreads available on reinvestment.
- Hence, whilst there are some clear drivers of early repayment risk, there are also a number of mitigating factors, and we believe experience to date tends to reflect this.

4.4 A comparison of Lifetime Mortgages with other asset types used for matching annuity liabilities

This section compares our views of some of the key characteristics of Lifetime Mortgages with other relevant asset types, such as Corporates Bond and Commercial Mortgages.

Table 4.3 - Suitability for matching annuity liabilities – comparison of asset types

	Corporate Bonds	Commercial Mortgages	Lifetime Mortgages
Timing of cash flows	Fixed	Fixed	Linked to borrower demographics and behaviour Early redemption risk

⁴ Pricing and Risk Capital in the Equity Release Market, 2007, (Hosty, Groves, Murray, Shah)

			is usually mitigated to a certain degree by marked to market early repayment charges
Probability of default	Variable Secured on company cashflows, exposed to performance of company. Risks increase the longer the term of the bonds.	Variable Driven by lenders ability to pay, but secured on underlying property	Low-medium, Primarily driven by NNEG risk, which varies by LTV
Loss on default	Medium Possible significant loss in event of default by corporate. In practice losses are most likely due to trading out of a bond at a time when its spread has widened following a credit downgrade.	Medium Less likely to result in lost or deferred interest payments, security depends on underlying property value	Low-medium, Primarily driven by NNEG risk, which varies by LTV Loan is secured on (insured) residential property hence not exposed to total loss – given the low LTVs any NNEG losses are likely to reduce the yield earned on the asset but not lead to a loss of principal
Skewness of losses	Medium Holdings of individual corporate bonds are likely to be much larger and a much higher proportion of the total portfolio than is the case for Commercial or Lifetime Mortgages. Hence a default has a correspondingly larger impact on the portfolio.	Low	Low Redemption rates are unlikely to be correlated with periods of particularly low HPI. Actual losses may arise on specific properties redeeming at the time, and hence affect only a small proportion of the total portfolio. The number of properties suffering losses depends whether the NNEG loss is due to poor performance of an individual property or systemic property index performance.
Diversification	Limited	Medium	High

achievable		Diversification across a portfolio in terms of exposure to regional or sector-specific factors	Diversification across a portfolio in terms of exposure to regional or property-specific factors, although exposure to general HPI performance remains Also offers diversification with other risks in the insurer's portfolio, which is likely to be heavy on credit risk
Liquidity	Medium	Low	Low
Degree of longevity hedge for annuity liabilities	None	None	Some May be some longevity hedge if populations the same – i.e. asset stays in force longer. This reduces the reinvestment risk that arises in investing in assets with a fixed term.
Operational risk	Low Investment management risks only.	Medium Loans to individual companies which require sales, marketing, underwriting and administration. Individual loan amounts can be high.	Medium A Lifetime Mortgage is a regulated financial product which requires marketing, sales and customer administration. These may bring a number of operational risks.

4.5 Summary - the investment thesis

Given the characteristics of annuity liabilities described in 4.1 above, the disadvantages of traditional investment strategies (4.2 above), the characteristics of Lifetime Mortgages (4.3) and the comparison with other asset types (4.4), we conclude that Lifetime Mortgages can in principle be considered a suitable asset for inclusion in a portfolio of assets backing an annuity fund.

This conclusion arises from consideration of the nature of the cash flows, the nature and extent of the underlying risks, the diversifying characteristics of the risks, and the reward for illiquidity which is available at the present time. However, we also note that certain specific features of the assets can cause difficulties, for example in valuing the assets and in terms of additional operational risks.

These factors are explored in more detail in the examples in section 5 below.

5. How does the equity release investment affect an insurer's balance sheet?

5.1 Background

We understand that valuation and reporting practices vary between companies in the UK market.

We have set out an approach below which we believe to be currently in use by one or more insurers within the market, and which we feel serves to illustrate the consequences of investment in Lifetime Mortgages.

We have also provided some additional comments where we believe practices may vary significantly across the market, based on the current understanding of the Member Interest Group.

This basis set out in this paper is for illustration purposes and is not a recommended basis for use by any insurer. It is incumbent on each provider to adopt a methodology and basis suitable for their own requirements taking into account their own accounting, reporting, risk and investment policies.

We have considered both a realistic (Pillar II) and a prudent (Pillar I) basis, and illustrated our comments using some simplified examples.

5.2 Lifetime Mortgage valuation bases

Lifetime Mortgages are Level 3 assets requiring the holder to mark to model to determine "fair value" for the IFRS and regulatory balance sheets.

The mark to model basis is required for statutory purposes under GENPRU as there is no observable market price for lifetime mortgages (except at outset when the mortgage is purchased – either direct from the customer or from a third party). GENPRU requires that the model

- Is based on appropriate assumptions which have been assessed and challenged by suitably qualified parties independent of the development process
- Has been independently tested, including validation of the mathematics, assumptions and software implementation
- Uses market inputs in line with market practice so far as possible
- Ensures appropriateness of the market inputs and the parameters of the model on a frequent basis
- Uses generally accepted valuation methodologies for particular products where these are available
- Is periodically reviewed to determine the accuracy of its performance

The full regulations are included for information in Appendix II.

The absence of a liquid and observable market means that each holder must determine their own mark to model methodology and assumptions.

This has led to a number of different valuation approaches being adopted in terms of

- Valuation of NNEG (stochastic / Black Scholes)
- House Price Assumptions
- Decrement rates (fixed / dynamic)

- Determination of rates to discount asset cash flows (risk free / risk free plus illiquidity premium)
- Determination of illiquidity premium

We have summarised a possible approach to the valuation of assets and liabilities below, although we are aware that practices vary across the market.

	Assets	Liabilities
Bonds	Current market value	Annuity liabilities valued at a discount rate corresponding to the cost- and risk-adjusted return being earned on the underlying assets
Lifetime Mortgages	Mark to model based on market interest rates (swaps), illiquidity premium, central house price expectations and volatility of HPI <ul style="list-style-type: none"> • The loan (excluding NNEG) is valued on a discounted cash flow basis • The NNEG cost is valued using option pricing methodology (i.e. based on NNEG being a put option on future house prices exercisable on repayment of the loan) • Total market value on day 1 is observable (assumed to be the purchase price of loan) so the model can be calibrated to that value. • As a day one gain is not allowed under IFRS, any profit margins above the purchase price are taken into account in the illiquidity premium. 	The discount rate will be determined by the return on the lifetime mortgage asset net of risk and expenses

Hence the mark to model approach can be considered in two parts –

- Loan Asset – the gross recoverable from the loan before any NNEG costs
- NNEG cost – the implicit option provided through the NNEG

The Loan Asset

The amount recoverable from the loan on redemption at any given future point is known, as the interest rate is fixed at outset. However, the redemption cashflow arising at any given future point is

not known for certain, given the dependence on demographic and behavioural factors. Hence to project the redemption cashflows from the loan requires assumptions relating to

- Mortality
- Move into Long Term Care
- Voluntary Early Redemption

Valuing this cashflow requires selection of an appropriate discount rate. This discount rate should be the sum of:

- Risk free rate – e.g. swap rates as an observable market input
- Allowance for illiquidity – the initial illiquidity margin is derived from the initial market price. Given the different characteristics of different loan books it is not possible to derive an observable market price for illiquidity at subsequent points. Hence a possible approach is to maintain the illiquidity margin at its original level throughout the lifetime of the loan. Different books of business will hence have differing illiquidity premia – but this is likely to reflect differences in their characteristics (such as the portfolio LTVs)

The NNEG Cost

The ‘no negative equity guarantee’ is a feature unique to Equity Release products, and exists to provide the customer with an important safeguard, that they will never have to repay more than the open market value of their property on contractual redemption (i.e. following death or move into Long Term Care). From a provider point of view this effectively provides the customer with an important financial guarantee, which can be thought of as a put option to sell their property on repayment of the loan with an exercise price equal to the value of the loan at that point. If the house price exceeds the loan then the option is out of the money (and expires without value) while if the house value is lower than the loan balance, the difference is payable to the customer (by reduction of the amount repayable under the loan).

Given a projected repayment profile of a portfolio of loans, it is possible to price a series of options at each potential future repayment date and combine these to provide the total cost of the option. Black Scholes methodology can be used for pricing these options, albeit there are some issues to consider such as the nature of the distribution of House Price Inflation

In addition to the assumptions on mortality, early redemption and discount rate, assumptions are also required for:

- Central HPI – there is no deep and liquid market in future long dated HPI so this assumption is not directly observable from the market. Over long periods, HPI has been strongly correlated to RPI where there is a much more deep and liquid market.
- We have not performed a full HPI analysis, as this has been covered in a previous paper⁵. However we note that average nominal HPI for the period 1952-2013 was 7.7% p.a. and for the period 1974-2013 7.5%, based on Nationwide data. The Nationwide analysis also shows HPI adjusted for RPI since 1975, in this case trend real HPI over the period was 2.8% p.a.
- An assumption for future HPI could be derived from observing the RPI market and adding an allowance for the long term difference between RPI and HPI, for example based on past data, with whatever adjustments are deemed appropriate. For example, we could assume future long term CPI

⁵ Pricing and Risk Capital in the Equity Release Market, by Hosty, Groves, Murray, and Shah

of 2% p.a., RPI of 2.5-3% p.a., long term real HPI of 2% p.a., and hence future long term nominal HPI of 4-5% p.a.

- House price index volatility – historic volatility of the house price index is observable and was considered in a previous paper⁶, with historic index volatility of 5% (11% when de-smoothed)
- Spread of individual house price performance around the index. While the average house price will move in line with the index, individual properties will fare better or worse than the mean. This spread should be allowed for in the model either by increasing volatility or by allowing for individual property values to be distributed around the central HPI projection. .
- Any allowances deemed necessary for property sales costs, under-performance of particular property types, biases in the portfolio to particular regions or property types, or possible underperformance of properties with lifetime mortgages versus the property stock as a whole.

Note in addition that the NNEG cost will vary significantly according to the mortgage interest rate, which determines the amount due on redemption in each period.

We note that alternative approaches are possible, such as using a market consistent basis for the NNEG valuation, and assuming future house price inflation equal to the risk free rate. This could have implications for the calculation of Pillar I and Pillar II capital (see 5.4 below).

5.2 Pillar I Balance Sheet

There are a number of different methodologies employed by UK annuity funds for their Pillar I balance sheets when investing in Lifetime Mortgages. We have commented on possible approaches below.

Pillar I value of assets and liabilities

In this paper we have largely considered the following methodology (in particular in the examples in sections 5.3 and 5.4 below)

- Annuity payments are projected on the basis of prudent assumptions regarding mortality rates, future mortality improvements, expenses
- Annuity liabilities are then calculated by discounting the projected payments using the yield on the backing assets, with prudent risk allowances, for example for defaults and reinvestment risk.
- Lifetime Mortgage assets are valued at acquisition cost, which includes the nominal amount of the mortgage (plus any interest accrued at the time of purchase of the asset) together with acquisition costs (which may be the actual origination costs if the holder of the asset is also the originator, or a premium or discount to par value paid to the issuer in the case of purchase of the asset from a third party originator)
- An effective yield is then calculated, allowing for the expected redemption and expense cashflows of the mortgage and the mortgage acquisition cost. Excess yield over risk free is adjusted for risk (prudent) and the remainder (illiquidity premium) used to increase the liability valuation rate of interest

A possible disadvantage of this methodology is that it assumes a liquidity premium is set at outset and fixed, whereas in practice the data to do this may not be available. Further, it may mean that two identical Lifetime Mortgages have different illiquidity premia.

⁶ Pricing and Risk Capital in the Equity Release Market, by Hosty, Groves, Murray, and Shah

As mentioned above, we note that this is not the only method used by UK annuity funds. We understand some companies set their illiquidity premia on Lifetime Mortgages in line with their assumptions for corporate bonds. In this approach it is possible that the Illiquidity Premium could change in the event of a widening in credit spreads (and would be assumed to change in a spread stress).

Adjustments for risk in the above methodology include the allowance for NNEG risk, but may also include other risk allowances. For example, there may also be an allowance for interest rate risk, particularly where the underlying lifetime mortgage product does not have marked to market early repayment charges.

The approach set out above is not the only one used by providers in the market. One alternative approach is to reflect some or all of the “illiquidity premium” in the value of the asset rather than the liability. In this case, the annuity liabilities are valued at a discount rate equal to the risk free rate (or risk free plus any illiquidity premium not used in the asset valuation).

Pillar I Capital

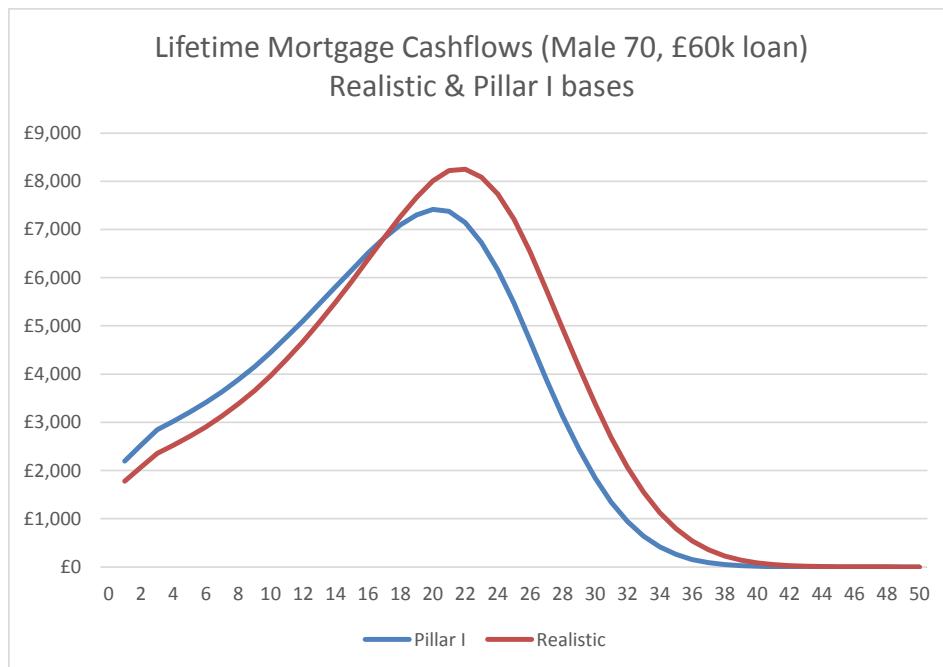
Required capital is calculated on a formula basis (4% of reserves, reduced for any reinsurance arrangements) together with a Resilience Capital Requirement (based on a fall of 20% in property values together with plus / minus 1% in interest rates)

We have set out a number of charts below which show the Pillar I balance sheet in a specific illustrative scenario.

Illustrative scenario - key assumptions

- Simplified model and balance sheet for an annuity monoline insurer
- Portfolio of single life annuities, male aged 60, non-escalating
- Investment of c20% of annuity liabilities in a portfolio of lifetime mortgages,
- Lifetime Mortgages are single life, male aged 70, average loan size £60k, 30% LTV at outset, 6.00% mortgage interest rate (monthly), 5% acquisition costs
- Lifetime Mortgage Cash flows adjusted for NNEG risk using Black Scholes
- Remainder of annuity cashflows matched exactly by a hypothetical portfolio of ‘A’ rated corporate bonds
- One model point each used for annuity and LTM portfolios
- Realistic basis assumptions as follows:
 - Risk free rates 3.00% p.a
 - ‘A’ Corporate spreads 1.50%, zero investment expenses
 - Corporate default risk deductions 0.50% (realistic), 0.75% (Pillar I)
 - Mortality PNMA00 (MC) (also for annuities)
 - 2% p.a. early repayments
 - Property risk – HPI 4.5%, volatility 12.5%, 2.5% sales costs
 - Mark to model value of LTMs at outset assumed equal to acquisition cost (but note practices vary in the market)
- Pillar I basis assumes MADs in decrements and valuation of NNEG
- Assumptions are set out in detail in Appendix I

Figure 5.1 Lifetime Mortgage cashflows – Pillar I basis (shown together with realistic or Pillar II cashflows)

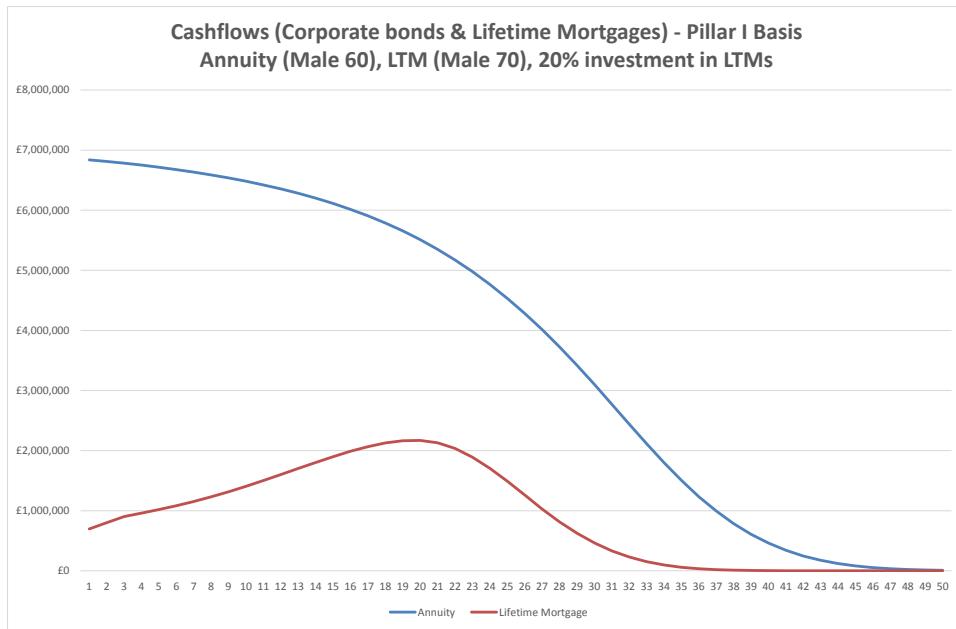


The chart shows the familiar features of lifetime mortgage cashflows, with some early cashflows mainly due to the assumed level of voluntary early redemptions, long average durations, and the accumulating nature of the mortgages significantly increasing cashflows following the majority of deaths take place in the mid years of the projection.

In this example we have assumed higher decrements in a pillar I basis compared to a realistic basis, hence the redemption cashflow curve is shifted left and reduced compared to the realistic basis.

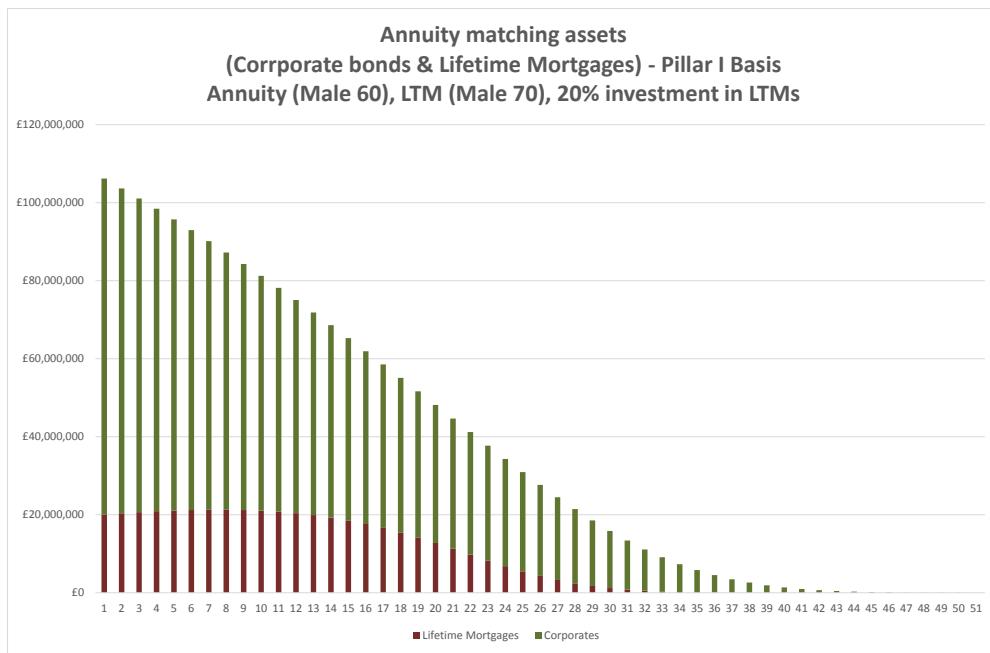
Figure 5.2 Pillar I – Lifetime Mortgage and Annuity Cashflows

The following chart shows the annuity and lifetime mortgage cashflows in the illustrative scenario.



A key point to note is that the cashflows from the lifetime mortgage portfolio provide a good match for a large part of the longer annuity cashflows. In this scenario we have assumed the lifetime mortgage assets have an average age of 70 at outset, whereas the annuities are aged 60 at outset. Whilst this is broadly representative of much of the annuity and lifetime mortgage business originated in the UK market, it also has the effect of reducing the expected duration of the mortgages relative to the annuities and ensuring in many scenarios that all the expected lifetime mortgage cashflows can be used to match annuity liabilities (see section 7 below for more about “unmatched” cashflows).

Figure 5.3 - Pillar I - assets and liabilities



This chart shows how the relative values of lifetime mortgages and corporate bonds varies over time in our illustrative scenario. In this scenario for a closed portfolio the initial lifetime mortgage share of matching assets of 20% increases during the projection term. This point is more pronounced on a pillar II basis which is assumed to include more realistic (lower) voluntary early redemption rates (see chart 5.8 below). In addition, if lifetime mortgage assets with a younger age at outset are purchased or issued, these assets may account for a significantly higher proportion of total matching assets at longer durations.

The opening balance sheet position is shown in the table below

Figure 5.4 – Pillar I Balance Sheet - £20m investment in Lifetime Mortgages

Asset (£m)		Liability (£m)
(Matching) Lifetime Mortgages (before NNEG Option)	20.9	Annuity Liabilities 107.5
(Matching) NNEG Option	-0.9	RCR 4.7
(Matching) Corporate Bonds	87.5	Required Margin 4.3
(Matching) Gilts	0.0	Surplus Capital 0.0
Other Assets required	9.0	

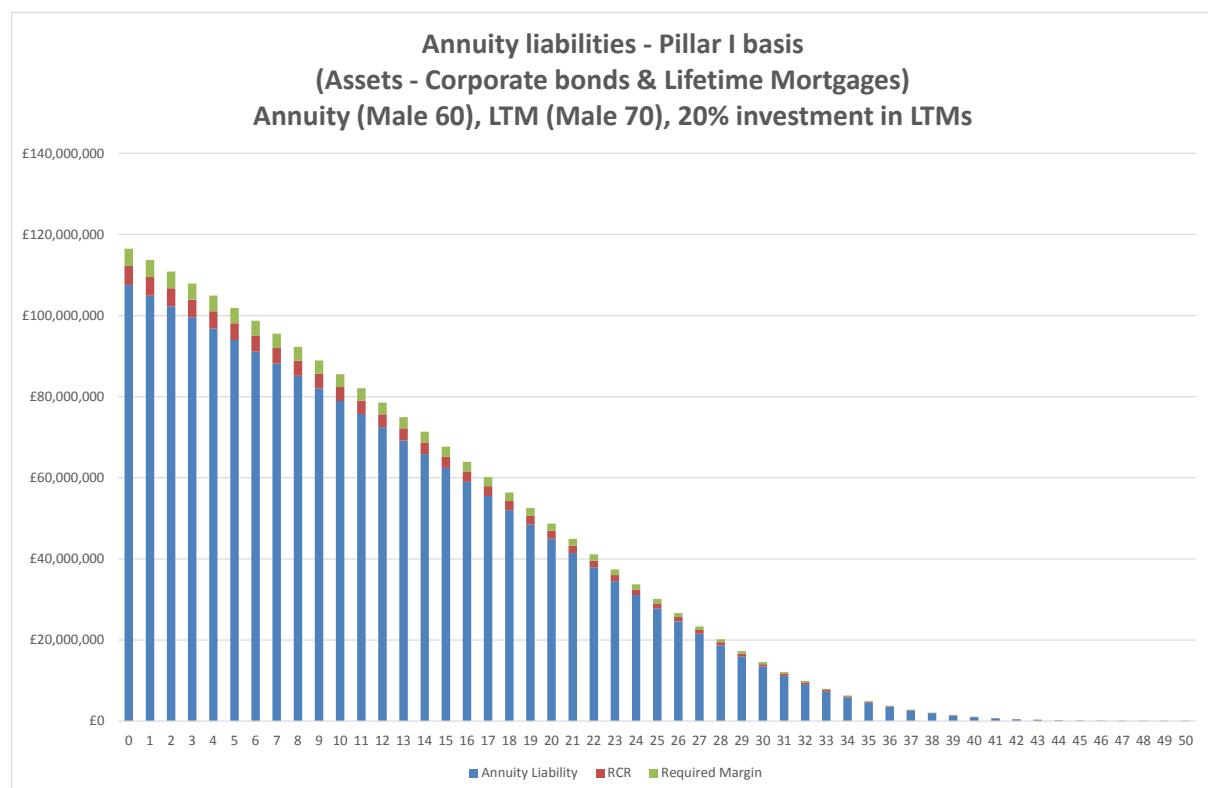
Total	116.0	Total	116.0
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The pillar I balance sheet is derived as follows

- Annuity liability matching assets
 - £20.0m of Lifetime Mortgages yielding 5.43% (risk adjusted, pillar I basis)
 - £87.5m of Corporate Bonds yielding 3.75% (risk adjusted, pillar I basis)
- Weighted average liability valuation rate of interest (at outset) 4.14%
- Resilience Capital Requirement (RCR) calculated as 4.38% of annuity liabilities (further details are included in 5.4 below)
- Required Margin of 4% of liabilities

Figure 5.5 – Pillar I – development of Pillar I liabilities and capital requirements

The following chart illustrates the development of annuity liabilities and capital requirements. Please note the example does not capture the impact on RCR of the changing mix of assets over time.



5.3 Pillar II Balance Sheet

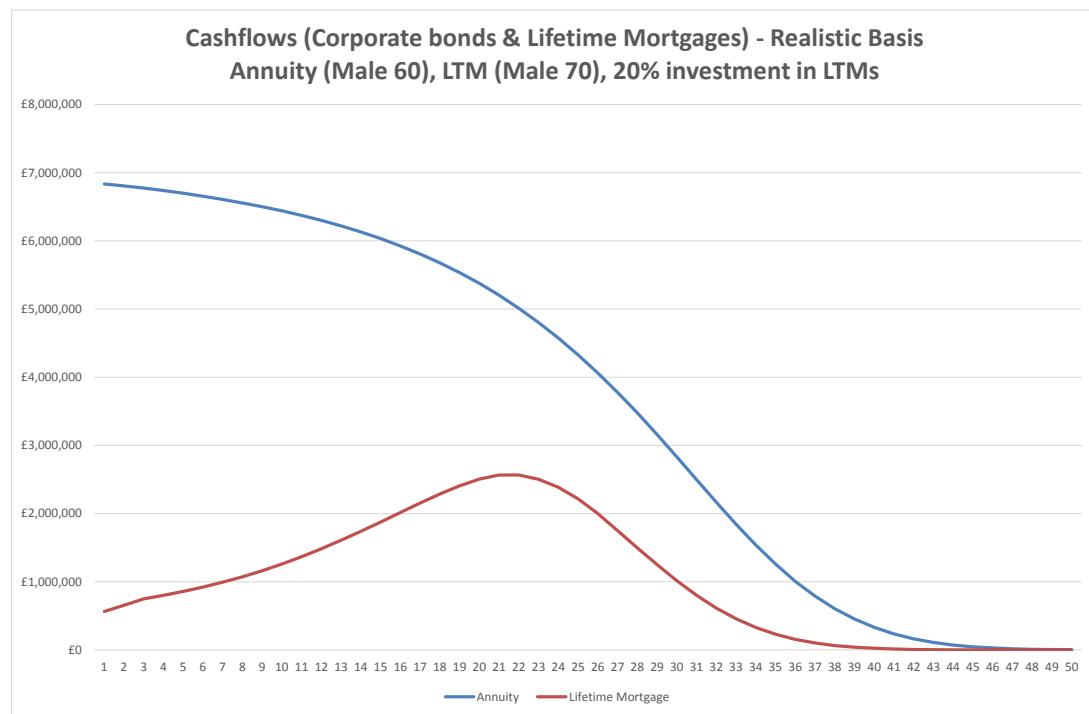
Like all UK insurers, annuity funds are also required to privately submit to the regulator an economic balance sheet (Pillar II / ICA) where the capital requirement is equivalent to a 99.5% one-year VaR. Pillar II is a principles-based regime, with liabilities typically valued at risk-free plus an allowance for an illiquidity premium based on the assets held. The capital calculation typically includes a spread-

widening stress for credit investments but also allows for diversification between asset classes. There will, therefore, be different considerations for a standalone annuity fund to one that is part of a diversified group.

The main features of the Pillar II basis in our illustrative scenario are as follows

- Annuity liabilities are valued on the basis of realistic assumptions regarding mortality rates, future mortality improvements and expenses, using a valuation interest rate of swaps/gilts plus an illiquidity premium
- Lifetime Mortgages are valued at acquisition cost as in Pillar I above, but realistic assumptions are made for mortality, voluntary early repayment and property risk, resulting in a higher risk adjusted yield and a higher illiquidity premium used to value liabilities
- Capital requirement (ICA) is calculated by stressing the values of assets and liabilities. A series of stresses is applied to each item in the basis in turn, and the capital for each scenario is calculated as the difference between the stressed net asset value and the best estimate value. Allowance is then made for diversification between risks in calculating the final ICA or pillar II capital requirement
- For a monoline annuity provider investing in corporate bonds and lifetime mortgages, the ICA is driven by key risks such as longevity, credit default and house price inflation.

Figure 5.6 – Annuity and Lifetime Mortgage cashflows – Realistic Basis - Illustrative Scenario



This chart shows the projected cashflows from our example portfolio, but using realistic rather than prudent assumptions. In particular we have assumed 2% p.a. voluntary early repayments which has extended the duration and amount of the lifetime mortgage cashflows. On this realistic basis the lifetime mortgages match the vast majority of the annuity cashflows at longer durations.

Figure 5.7 – Values of Annuity Liabilities and Matching Assets – Realistic basis

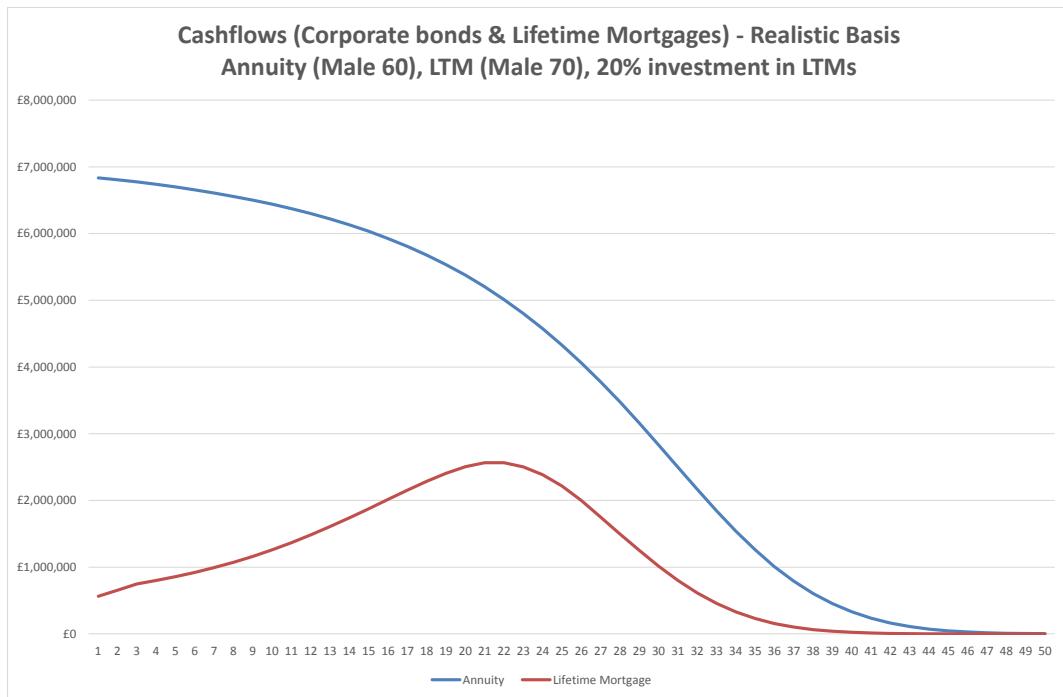


Figure 5.8 – Values of Matching Assets – Realistic basis

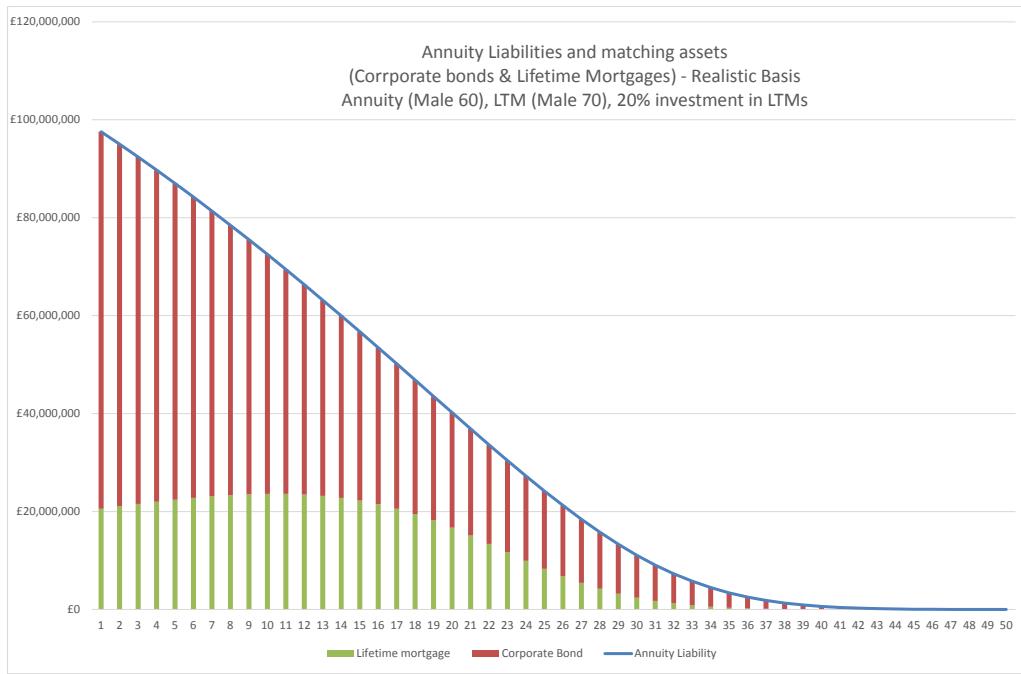


Chart 5.8 shows the asset values corresponding to the cashflows projected on a realistic basis in each year of the projection.

In this scenario for a closed portfolio the proportion of lifetime mortgages increases over the period of the projection.. The insurer will need to monitor the cashflow matching position and ensure that

adequate liquid assets are available to meet any short term fluctuations in redemption cashflows from the Lifetime Mortgage portfolio.

The pillar II balance sheet values at outset for this illustrative scenario are set out below.

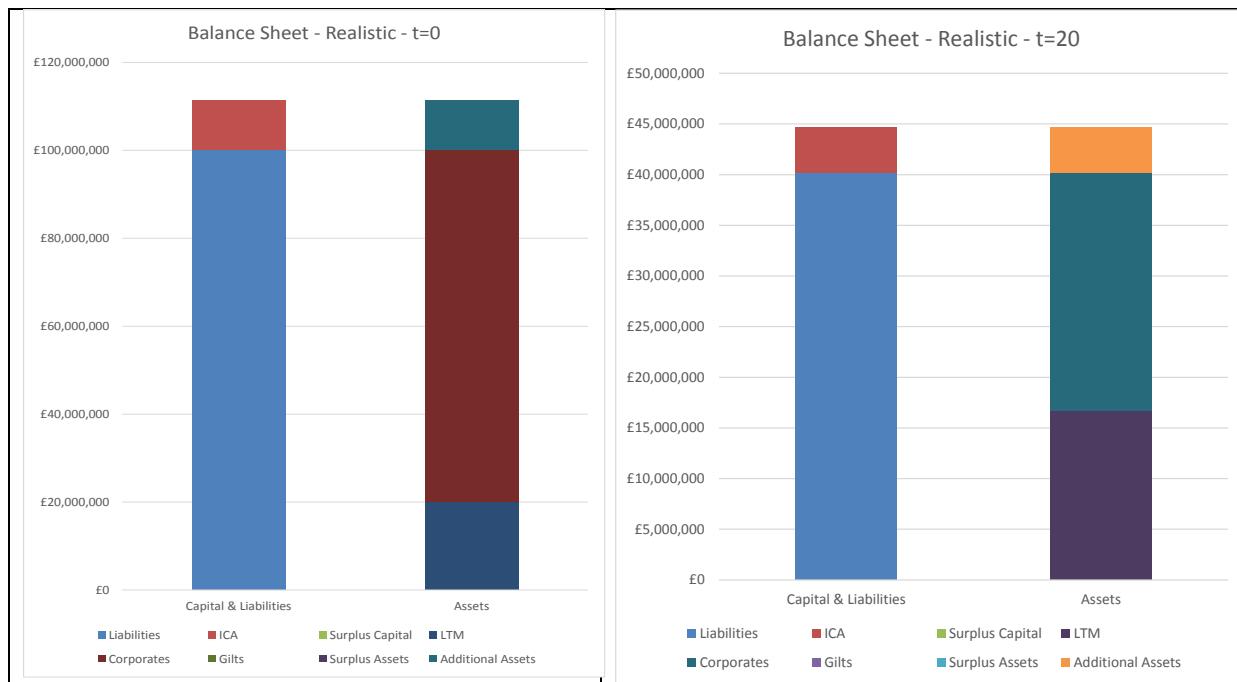
Figure 5.9 – Pillar II Balance Sheet – £20m investment in LTMs - Realistic basis

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	20.2	Annuity Liabilities VROI 4.50%	100.0
(Matching) NNEG Option	-0.2	ICA	11.3
(Matching) Corporate Bonds	80.0	Surplus Capital	0.0
(Matching) Gilts	0.0		
Surplus	0.0		
Other Assets required	11.3		
Total	111.3	Total	111.3

The pillar II balance sheet is derived as follows

- Annuity liability matching assets
 - £20M of Lifetime Mortgages yielding 5.74% (risk adjusted)
 - £80m of Corporate Bonds yielding 4.0% (risk adjusted)
- Weighted average liability valuation rate of interest (at outset) 4.50%
- ICA calculated as 11.3% of annuity liabilities (further details are included in 5.4 below)

Figure 5.10 – change in asset mix over time



The composition of the balance sheets is set out in more detail in the worked example in Section 5.4 below.

It is important to note that results will be highly sensitive to all key assumptions, in particular

- Mortgage interest rates and acquisition costs
- Product design - Loan to Value Ratios, Early Repayment Charges
- House Price Inflation basis
- Decremnts (Mortality, Voluntary Early Repayments, Long Term Care)

5.4 Worked Example

We have set out below an example showing the implications for the insurer's balance sheet of moving from investment wholly in corporate bonds to a mixed corporate bond / lifetime mortgage strategy.

As in the illustrative scenario above this is on a closed fund basis, i.e. a portfolio of annuities is originated at a specific point in time, and the funds invested in either corporate bonds or lifetime mortgages. No further annuities are originated.

The example considers both realistic (Pillar II) and prudent (Pillar I) balance sheets.

Assumptions are as for the illustrative scenario in 5.3 above, and are set out in detail in Appendix I below. We have considered the following matching asset portfolios:

- Portfolio A – 100% Corporate Bonds
- Portfolio B – 90% Corporate Bonds, 10% Lifetime Mortgages
- Portfolio C – 80% Corporate Bonds, 20% Lifetime Mortgages
- Portfolio D – 70% Corporate Bonds, 30% Lifetime Mortgages

5.4.1 Initial situation (Portfolio A)

£100m of annuity liabilities, wholly invested in a portfolio of 'A' rated corporate bonds, assumed to provide a perfect match to the annuity cash flows.

Key assumptions (full details set out in Appendix I):

- Risk free rates 3.00% p.a.
- 'A' Corporate spreads 1.50%
- Risk deductions 0.50% (Pillar II), 0.75% (Pillar I)
- Regulatory deduction of 2.5% on Pillar I basis
- Spread widening for ICA 3.00% (illiquidity premium 50% of total spreads)
- Liability valuation rate of interest 4.00% (Pillar II), 3.66% (Pillar I)
- Using the assumptions in Appendix I we have calculated an ICA requirement at outset of 14.5% of annuity liabilities and an RCR of 5.0% of liabilities (further details below).

Figure 5.11 - Pillar I balance sheet - 100% investment in Corporate Bonds

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	0.0	Annuity Liabilities VROI 3.66%	112.4
(Matching) NNEG Option	0.0	RCR	5.6
(Matching) Corporate Bonds	112.4	Required Margin	4.5
(Matching) Gilts	0.0	Surplus Capital	0.0
Other Assets required	10.1		

Total	122.5	Total	122.5
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Pillar I liabilities are £112.4m based on discounting the projected annuity cashflows at the adjusted yield on matching assets of 3.66%, with a required margin of £4.5m and Resilience Capital Requirement of £5.6m.

The RCR has been derived as follows:

Figure 5.12 – Calculation of RCR – Portfolio A

Scenario	Assumed basis	Additional Assets Required - Portfolio A	
		£m	
1	Property values -20%, Interest rates +1%	5.6	
2	Property Values -20%, Interest Rates -1%	-7.5	
RCR		5.6	

Note – Illiquidity premium for Corporates assumed to be 50% of Yields.

For Portfolio A, the RCR of £5.6m is derived solely from the yield curve stresses.

Figure 5.13 - Pillar II Balance Sheet at outset – 100% investment in Corporate Bonds

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	0.0	Annuity Liabilities VROI 4.00%	105.9
(Matching) NNEG Option	0.0	ICA	15.4
(Matching) Corporate Bonds	105.9	Surplus Capital	1.2
(Matching) Gilts	0.0		
Other assets required	16.6		
Total	122.5	Total	122.5

Pillar II liabilities are £105.9m, with a pillar II capital requirement of £15.4m. We have assumed the total value of assets is unchanged from Pillar I, resulting in a Pillar II surplus capital of £1.2m. We have set out the ICA assumptions and results below.

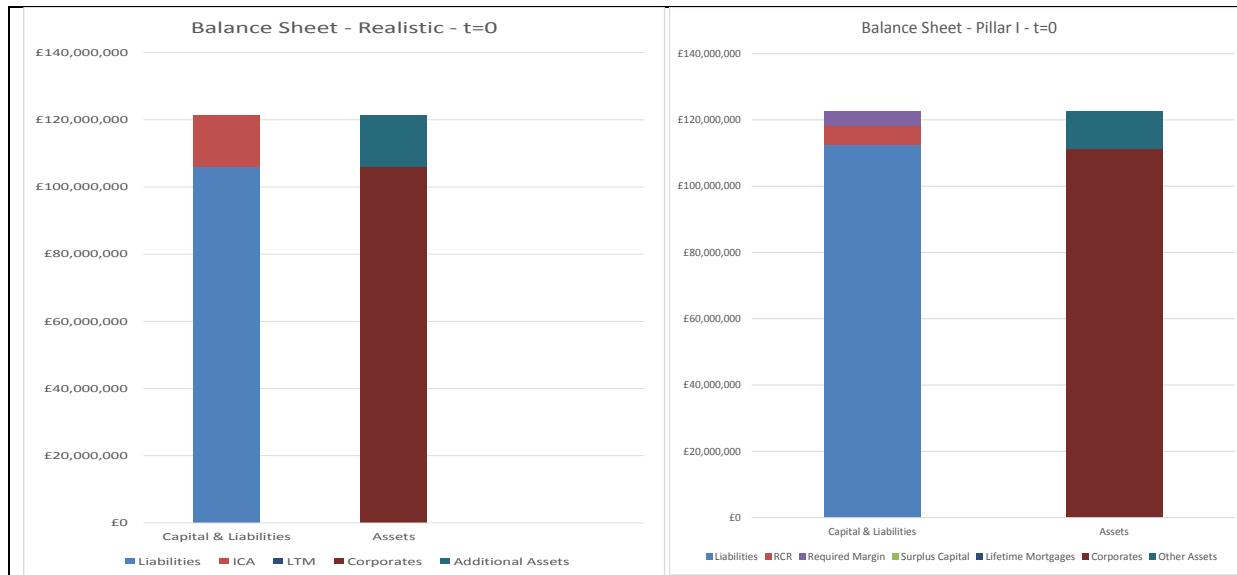
Figure 5.14 – Calculation of ICA for Portfolio A

Risk Driver	Assumed Stress	Additional Assets Required - Portfolio A
		£m

Property values	-30%	-	
House Price Inflation (HPI)	3% p.a.	-	
HPI Volatility	+3%	-	
Voluntary Early Repayment (VER) up	+50%	-	
VER down	-50%	-	
Mortality up	+20%	-	
Mortality down	-20%	4.2	
Interest rates up	+2.0%	-	
Corporate spread stress	+3.0% (50% illiquidity premium)	14.8	
Total Risk Capital		19.0	
Diversification benefit	Correlation 50% Property / Credit	3.6	
ICA		15.4	

In the case of Portfolio A (100% Corporates), the property related stresses are not relevant (affecting Lifetime Mortgages only). Hence the capital requirement is driven by the mortality down (longevity) stress and the corporate spread stress. After allowing for diversification by a simple sum of squares method the ICA is £15.4m.

Figure 5.15 – Balance Sheet comparison at t=0 – Pillar I and Pillar II



5.4.2 Revised situation – Portfolio C

We have then considered the implications of selling some corporate bonds and reinvesting in lifetime mortgages to match the projected annuity cash flows. In this example, we show the detailed impacts of a purchase of £20m Lifetime Mortgages (Portfolio C), and the results for purchases of £10m (Portfolio B) and £30m (Portfolio D) of lifetime mortgages.

Assumptions for the mortgages are as for the illustrative scenario in 5.3 above and are set out in detail in Appendix I, with key points as follows

- Lump sum roll up lifetime mortgage
- Age 70, LTV 30%, £60k loan size, interest rate 6.00% monthly (c6.20% annual)
- Purchase price of 105% of face value of mortgage
- Effective yield after allowance for NNEG of 5.74% (Pillar II), 5.43% (Pillar I)

Portfolio C – Purchase of £20m Lifetime Mortgages

The valuation rate of interest increases from 3.66% to 4.03% (Pillar I) and 4.0% to 4.5% (Pillar II) due to the purchase of higher yielding lifetime mortgages to match annuitant liabilities. Hence there is a reduction in liabilities and in total required assets.

In addition using the basis in Appendix I we have calculated the RCR at outset to be 4.38% of liabilities (compared to 5.0% for a corporate bond only strategy) and the ICA capital requirement at outset to be 11.3% of annuity liabilities (compared to 14.5% for a corporate bond-only strategy) resulting in a further reduction in assets required.

The results are summarised below.

Figure 5.16 – Pillar I balance sheet following switch to £20m lifetime mortgages

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	20.9	Annuity Liabilities 4.03%	107.5
(Matching) NNEG Option	-0.9	RCR	4.7
(Matching) Corporate Bonds	87.5	Required Margin	4.3
(Matching) Gilts	0.0	Surplus Capital	6.0
Other Assets	15.0		
Total	122.5	Total	122.5

In the Pillar I balance sheet we have valued the Lifetime Mortgages at the acquisition cost of £20m (£20.9m before NNEG) with a risk adjusted yield of 5.43%. When combined with the corporate bond portfolio this results in an increase in the liability valuation rate of interest to 4.03% and a reduction in annuity liabilities from £112.4m to £107.5m. This together with the reduction in RCR (and the proportionate reduction in required margin) results in a release of capital of £6.0m on a Pillar I basis.

The RCR has been calculated on the following basis for this example scenario:

Figure 5.17 – Calculation of RCR – Portfolios A & C

Scenario	Assumed basis	Additional Assets Required - Portfolio A £m	Additional Assets Required - Portfolio C £m

1	Property values -20%, Interest rates +1%	5.6	4.7
2	Property Values -20%, Interest Rates -1%	-7.5	-4.7
RCR		5.6	4.7
% Annuity Liabilities		5.0%	4.4%

We note that for Portfolio C in our illustrative methodology we have assumed a fixed rate of future HPI which means that our NNEG value is unaffected when stresses are applied to the Risk Free Rate. This is a simple approach for illustrative purposes. An alternative approach is to allow for an impact on assumed HPI when stressing the Risk Free Rate, for example by assuming HPI is Risk Free Rate plus a margin, or by assuming changes in Risk Free Rate affect RPI and hence HPI.

The corresponding results for Pillar II are shown below.

Figure 5.18 – Balance Sheet at t=0 – Pillar II - £20m investment in lifetime mortgages

Asset		Liability	
(Matching) Lifetime Mortgages (before NNEG Option)	20.2	Annuity Liabilities	100.0
(Matching) NNEG Option	-0.2	ICA	11.3
(Matching) Corporate Bonds	80.0	Surplus Capital	11.2
(Matching) Gilts	0.0		
Other Assets Required	21.3		
Total	122.5	Total	122.5

In the Pillar II balance sheet the Lifetime Mortgages have again been valued at the acquisition cost of £20m (£20.2m before NNEG) with a risk adjusted yield of 5.74%. When combined with the corporate bond portfolio this results in an increase in the liability valuation rate of interest to 4.50% and a reduction in annuity liabilities from £105.9m to £100.0m. This together with the reduction in ICA from £15.4m to £11.3m results in a release of capital of £10.0m on a Pillar II basis (giving a total capital surplus of £11.2m).

The ICA has been calculated on the following basis for this example scenario:

Figure 5.19 – Calculation of ICA – Portfolios A & C

Risk Driver	Assumed Stress	Additional Assets	Additional Assets
		Required - Portfolio A £m	Required - Portfolio C £m
Property values	-30%	-	0.7
House Price Inflation (HPI)	3% p.a.	-	0.6
HPI Volatility	+3%	-	0.4

Voluntary Early Repayment (VER) up	+50%	-	0.6
VER down	-50%	-	-
Mortality up	+20%	-	-
Mortality down	-20%	4.2	3.7
Interest rates up	+2.0%	-	-
Corporate spread stress	+3.0% (50% illiquidity premium)	14.8	10.2
Total Risk Capital		19.0	16.2
Diversification benefit	Including correlation of 50% for Property/Credit	3.6	4.9
ICA		15.4	11.3

Our comments below Figure 5.17 above are also relevant for the calculation of Pillar II capital for lifetime mortgages. We have not allowed for a stress on illiquidity premium on lifetime mortgages.

In this illustrative example, the alternative investment strategy (Portfolio C) reduces ICA by £4.1m compared to Portfolio A due to:

- A reduction in corporate spread stress capital, which outweighs the increase in required capital as a result of property risk on the Lifetime Mortgages
- A reduction in mortality down capital as a result of the increased valuation rate of interest (and a small increase in the value of the Lifetime Mortgage assets)
- An additional diversification benefit arising from the combination of property and credit risk

5.4.3 The reward for illiquidity

The change from Portfolio A (100% Corporate Bonds) to Portfolio C (20% Lifetime Mortgages) has resulted in a £10m release of capital in our illustrative scenario. This can be thought of as the reward for investment in higher yielding assets where the key risk of liquidity is not material given the nature of the liabilities in an annuity fund.

Alternatively we can think of this in terms of the nature of the annuity liabilities effectively hedging the asset's illiquidity risk. For example – assume hypothetically that an annuity portfolio is wholly backed by lifetime mortgages and the annuity liability is in fact “liquid”, i.e. assume the annuity portfolio can be surrendered (with surrender value equal to the reserve) at any time.

This risk would need to be included in the ICA calculations (assume the ICA stress considers a 20% mass surrender which would create a severe liquidity issue). In this case we assume in a 1/200 scenario there would be no way of generating extra liquidity from the Lifetime Mortgage portfolio – hence additional capital after diversification of say 15% of liabilities may need to be held.

In this case the investment in an illiquid asset would be heavily penalised, removing the benefit of the “illiquidity premium”.

There may still need to be some consideration of liquidity in the sense of short term cashflow mismatching risk, for example as a result of fluctuations in numbers of redemptions and subsequent impact on period-to-period cashflows.. We have not considered this aspect further in this paper.

5.4.4 Revised situation – Portfolios B & D - Purchase of £10m and £30m of Lifetime Mortgages

Similar results are obtained for portfolios B and D, using the same assumptions and methodology. Results are set out for comparison below.

Figure 5.20 Pillar I - Balance Sheet Comparison

£m	Portfolio A	Portfolio B	Portfolio C	Portfolio D
Investment Strategy	100% Corporates	90% Corporates 10% LTMIs	80% Corporates 20% LTMIs	70% Corporates 30% LTMIs
Assets				
- LTMIs	0.0	10.0	20.0	30.0
- Corporates	112.4	98.7	87.5	73.7
- Other	10.1	13.8	15.0	18.8
Total Assets	122.5	122.5	122.5	122.5
Capital & Liabilities				
- Liabilities	112.4	110.0	107.5	105.0
- RCR	5.6	5.1	4.7	4.3
- Required Margin	4.5	4.4	4.3	4.2
- Surplus	0.0	3.0	6.0	9.0
Total Capital & Liabilities	122.5	122.5	122.5	122.5
Release of Capital	0.0	3.0	6.0	9.0
Valuation RoI	3.66%	3.84%	4.03%	4.23%

Note: RCR has been calculated for portfolios A and C and estimated for portfolios B & D.

Figure 5.21 Pillar II - Balance Sheet Comparison

£m	Portfolio A	Portfolio B	Portfolio C	Portfolio D
Investment	100% Corporates	90% Corporates 10% LTMIs	80% Corporates 20% LTMIs	70% Corporates 30% LTMIs
Assets				
- LTMIs	0.0	10.0	20.0	30.0
- Corporates	105.9	93.0	80.0	67.1
- Other	16.6	19.5	22.5	25.4
Total Assets	122.5	122.5	122.5	122.5
Capital & Liabilities				
- Liabilities	105.9	103.0	100.0	97.1
- ICA	15.4	13.3	11.3	9.4
- Surplus	1.2	6.2	11.2	16.0
Total Capital & Liabilities	122.5	122.5	122.5	122.5
Release of Capital	-	5.0	10.0	15.0

Valuation Rol	4.00%	4.25%	4.50%	4.77%
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Note: ICA has been calculated for portfolios A and C and estimated for portfolios B & D.

On both Pillar I and Pillar II bases in our illustrative example, a progressive increase in the amount of Lifetime Mortgages in the investment portfolio results in an increasing release of capital, with a greater release on Pillar II than Pillar I. This is as a result of an increasing valuation rate of interest and reductions in capital requirements. As the proportion of lifetime mortgages increases, greater consideration should be given to the impact on cashflow mismatching risks.

Whilst we have determined our illustrative example as representative of market rates as at May 2014, the results will clearly vary according to the relative yields available from time to time on bonds and lifetime mortgages, as well as to the valuation, risk and capital bases used by the provider and the underlying product design (LTVs, Early Repayment Charges etc).

5.5 Operational Risk

Our illustrative example above has not considered Operational Risk. By their nature, Lifetime Mortgages present a number of operational risk considerations which need to be assessed by the insurer. If the insurer is purchasing an existing portfolio of Mortgages these are all examples of areas that should be fully investigated in the portfolio due diligence.

Possible operational risk considerations include:

- Customer administration and servicing
 - Lifetime Mortgages are regulated financial products sold to retail customers and involve initial and ongoing administration and customer service
 - This is a particular area for attention if the annuity provider does not have experience of mortgage administration and servicing
 - If the annuity provider has purchased a portfolio of Lifetime Mortgages from a third party, the third party may continue to perform the administration of the portfolio (see next point about outsourcing)
 - Ongoing administration may involve additional borrowing and drawdowns even if the provider is not actively selling new loan arrangements
- Outsourcing arrangements
 - In the case of portfolios purchased from third parties who are still performing the administration, these third parties may be relatively small compared to the insurer's usual large scale third party admin providers – management of these parties will require additional processes
 - Solvency II will drive a requirement for significantly increased data from third parties for valuation purposes
 - In addition to administration arrangements, there are a number of other outsource arrangements which will need to be managed, most notably the panel of surveyors (for property valuation and inspection) and solicitors (for mortgage conveyancing)
- Legal risks
 - Legal risks may relate to a number of areas, including the conveyancing process, ensuring mortgage documentation is to required standards, and ensuring redemption monies or vacant possession of properties is obtained within a reasonable time following the (last) borrower's death
- Property Underwriting

- The Lifetime Mortgage provider or funder should ensure appropriate underwriting criteria are in place for types of property, property condition, regional mix etc. This is to ensure a portfolio is of adequate quality and levels of risk.
- Property Insurance
 - It is a condition of Lifetime Mortgages that borrowers keep the property in good condition and maintain buildings insurance in force. There is a risk that the borrower does not do this. To mitigate this risk, lifetime mortgage providers often take out contingency insurance.
- Property Condition
 - Given the importance of the value of the property for the security of the loan, it is important that the property is properly maintained. Providers may wish to take steps on a regular basis to ensure this is the case, for example by performing drive-by inspections or full inspections on a sample basis.
- Reputational risk
 - This may or may not be an operational risk, but is mentioned for completeness.
 - Participation in the equity release sector has tended to be accompanied by concerns about the mis-selling risks and knock on impact on the brand and reputation of the provider. The sector has at various times suffered from concerns about sales process and product design. Negative publicity appears to have reduced significantly in recent years, in particular since the advent of mortgage regulation in 2004 and as a result of the efforts of SHIP and the Equity Release Council.
 - Providers should ensure Lifetime Mortgages are adequately covered by their processes for product governance and distributor management.
- Fraud
 - Market experience is that fraud risk is very low for lifetime mortgages.

The size of the operational risk will depend on the assessment of the mortgage documentation, sales process, record keeping, systems and controls.

6. Treatment of unmatched ER cashflows

The examples in section 5 above have avoided the issue of “unmatched lifetime mortgage cashflows”. This situation can arise as in Figure 6.1 below, whereby there are “excess” Lifetime Mortgage cashflows, i.e. at durations longer than the annuity liability cashflows, which cannot be used to match annuity cashflows.

These arise for example where lifetime mortgage assets are purchased or originated at younger ages, i.e. where the age of the lifetime mortgage customer is similar to that of the annuitant. Even where the lifetime mortgage customers are slightly older than the average age of the annuitants, unmatched cashflows are likely to arise due to the accumulating nature of the mortgage.

We understand that the unmatched cashflows are typically valued as part of the asset valuation, but as a non-matching asset become surplus assets in the annuity fund (or may be excluded altogether e.g. for pillar I purposes).

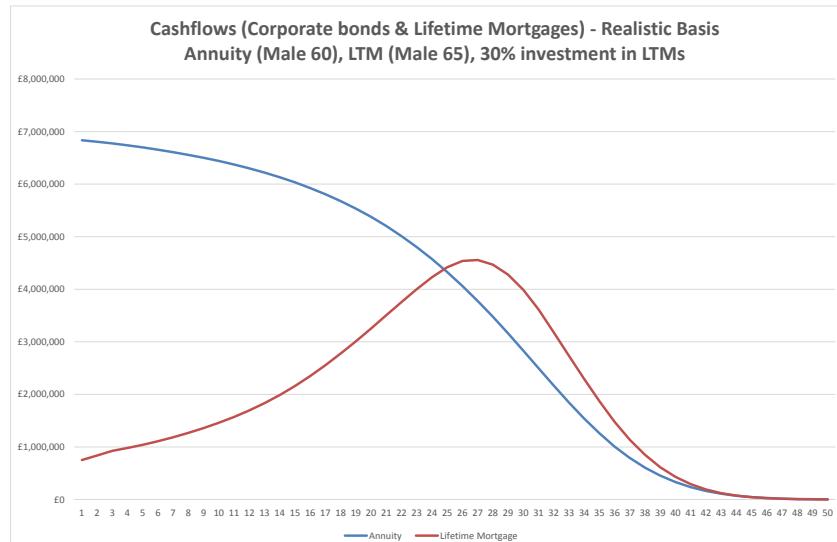
This long dated fixed interest “unmatched cashflow” asset introduces interest rate volatility to the balance sheet and is proportionately very highly exposed to NNEG risk. However the asset is very useful for matching liabilities in the event of extended longevity in the annuity portfolio.

The extent to which unmatched cashflows arise will depend on

- Average ages - the average age of the lifetime mortgage customers compared to the average age of customers in the annuity portfolio
- Relative mortality experience – e.g. impaired life annuities and standard mortality mortgages would exacerbate the mismatch
- Product type – the shape of cashflows from escalating annuities differs from level annuities
- The proportion of assets invested in Lifetime Mortgages

The chart below shows projected lifetime mortgage cashflows from a portfolio with average age at entry 65.

Figure 6.1 – Annuity and Lifetime Mortgage cashflows – including “unmatched cashflows”



The corresponding balance sheet values are shown below. This is based on the same scenario as in 5.4.2 above, except we have removed the capital released as a result of switching from corporate bonds.

Figure 6.2 - PII balance sheet (t=0) with unmatched lifetime mortgage cashflows (30% investment in LTMs aged 65)

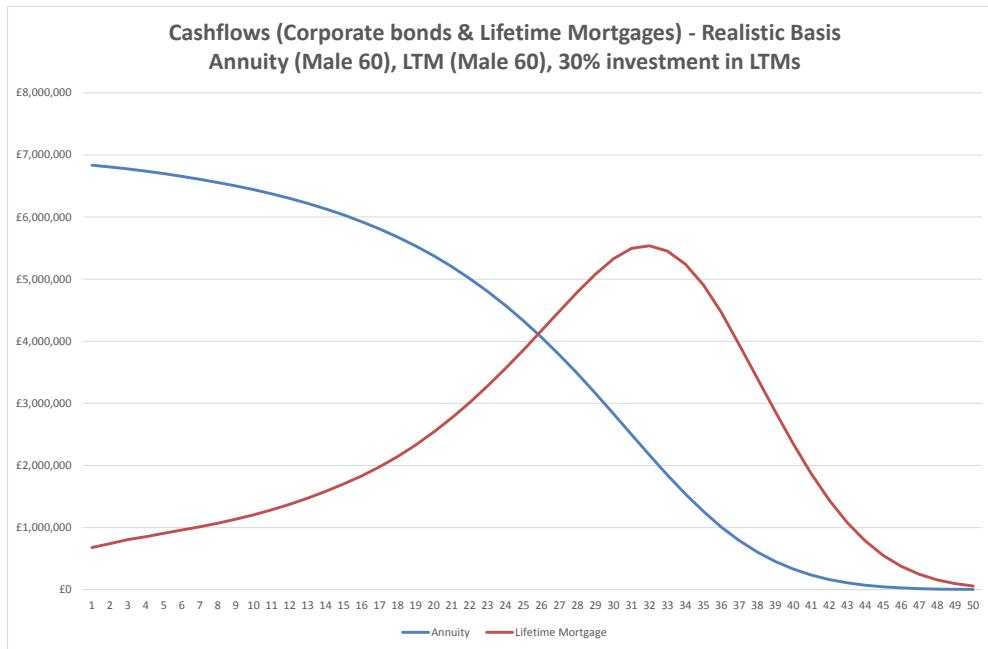
Asset (£m)		Liability (£m)
(Matching) Lifetime Mortgages (before NNEG Option)	28.3	Annuity Liabilities Annuity VROI 4.90%
(Matching) NNEG Option	-0.1	ICA
(Matching) Corporate Bonds	67.6	Surplus Capital
(Matching) Gilts	0.0	
Unmatched Lifetime Mortgage Asset	1.8	
Additional Assets Required	7.4	
Total	105.0	Total
		105.0

This balance sheet recognises the unmatched cashflows as surplus assets which are not used for matching purposes but which we have assumed are available to meet the required minimum capital requirements.

Note in this example the liability valuation interest rate is assumed to have increased slightly (e.g. to 5.16% on a Pillar II basis) because a) the lifetime mortgage issued to a younger customer may be expected to have a higher effective yield assuming no change in loan acquisition costs and b) most of the NNEG cost is borne by the surplus asset of the unmatched lifetime mortgage cashflows, resulting in a higher net yield on the assets matching the annuity liabilities.

To illustrate this further, we have also considered a more extreme scenario, with the lifetime mortgage customers aged 60 at outset.

Figure 6.3 – Unmatched cashflows – Lifetime Mortgage aged 60



In this example the longer duration asset results in higher total cashflows but also increased unmatched cashflows.

Figure 6.4 – PII Balance sheet at t=0 - Unmatched cashflows, 30% investment in Lifetime Mortgage aged 60

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	24.0	Annuity Liabilities	96.8
(Matching) NNEG Option	-0.0	ICA	9.3
(Matching) Corporate Bonds	72.8	Surplus Capital	0.0
(Matching) Gilts	0.0		
Excess Lifetime Mortgages	6.0		
Additional Asset required	3.3		
Total	106.1	Total	106.1

In this scenario, after 20 years of the projection there is a further development of the balance sheet position, whereby the value of the unmatched lifetime mortgage cashflows is significantly higher as a proportion of total liabilities than at outset. At this point the amount of this asset is higher than the ICA capital requirement resulting in surplus capital resources being held within the fund..

Figure 6.5 – PII Balance sheet at t=20 - Unmatched cashflows, 30% investment in Lifetime Mortgage aged 60

Asset (£m)		Liability (£m)
(Matching) Lifetime Mortgages (before NNEG Option)	30.9	Annuity Liabilities Annuity VROI 5.74%
(Matching) NNEG Option	-0.1	ICA
(Matching) Corporate Bonds	6.8	Surplus Capital
(Matching) Gilts	0.0	
Excess Lifetime Mortgages	18.8	
Total	56.4	Total

Pillar I basis impacts

Figure 6.6 – Pillar I cashflows

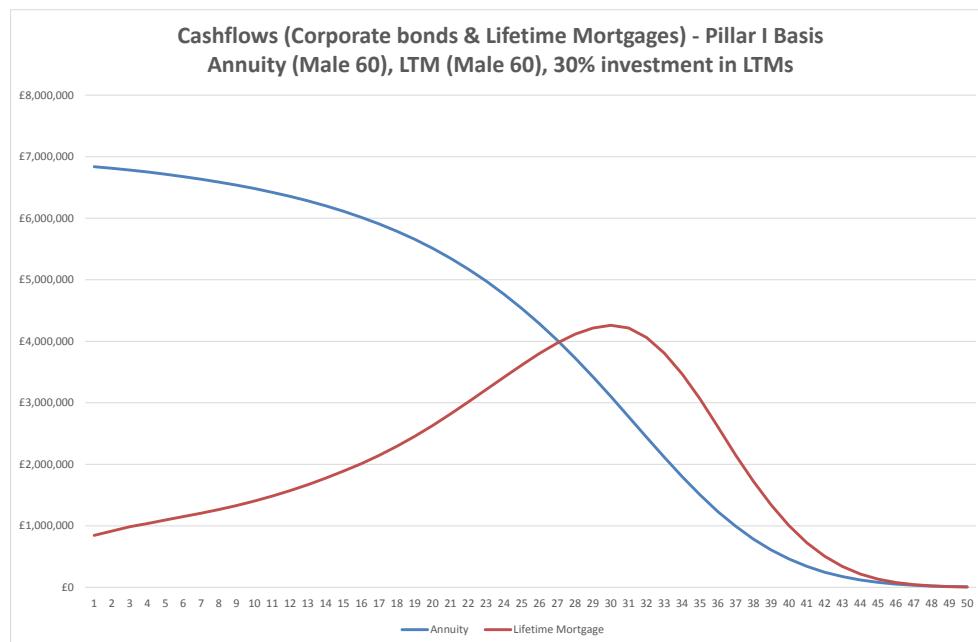


Figure 6.7 – Pillar I balance sheet t=0 – unmatched cashflows – 30% investment in LTM aged 60

Asset		Liability
(Matching) Lifetime Mortgages (before NNEG Option)	27.8	Annuity Liabilities VROI = 4.48%
(Matching) NNEG Option	-0.3	RCR

(Matching) Corporate Bonds	73.2	Required Margin	4.0
(Matching) Gilts	0.0	Surplus Capital	0.0
Excess LTM	2.3		
Additional Assets Required	7.2		
Total	110.2	Total	110.2

Figure 6.8 – Pillar I balance sheet t=20 – unmatched cashflows

Asset		Liability	
(Matching) (Lifetime Mortgages (before NNEG Option)	33.3	Annuity Liabilities	41.2
		VROI = 5.33%	
(Matching) NNEG Option	-0.8	RCR	1.7
(Matching) Corporate Bonds	8.4	Required Margin	1.6
(Matching) Gilts	0.0	Surplus Capital	3.8
Excess LTM	7.4		
Additional Assets Required	0.0		
Total	48.3	Total	48.3

In the following example we have limited the lifetime mortgage cash flows to 70% of the yearly annuity cash flows (on a Pillar I basis) as an example of a measure to address short term cashflow mismatching risks which could arise e.g. due to fluctuations in lifetime mortgage redemptions cashflows. This reduces the value of the matching lifetime mortgage cash flows and increases the corporate bonds required to match the liability cash flows.

Figure 6.9 – Pillar I balance sheet t=20 – unmatched cashflows – matching lifetime mortgage cashflows restricted to 70% of annuity cashflows in each year

Asset		Liability	
(Matching) (Lifetime Mortgages (before NNEG Option)	27.0	Annuity Liabilities	42.4
		VROI = 4.88%	
(Matching) NNEG Option	-0.3	RCR	1.7
(Matching) Corporate Bonds	15.3	Required Margin	1.7
(Matching) Gilts	0.0	Surplus Capital	9.5
Excess LTM	13.3		
Additional Assets	0.0		

Required			
Total	55.3	Total	55.3

7. How does the asset behave under a range of scenarios and stresses vis-a-vis liabilities being matched against

We have also considered the balance sheet implications for annuity funds investing in lifetime mortgages under different scenarios. In particular we have considered in 7.2 the impact of extended longevity and in 7.3 the impact of low HPI.

7.1 Base position

The base position uses the example set out above in section 5, with a 20% investment in lifetime mortgages.

Figure 7.1 Pillar II Cashflows - base

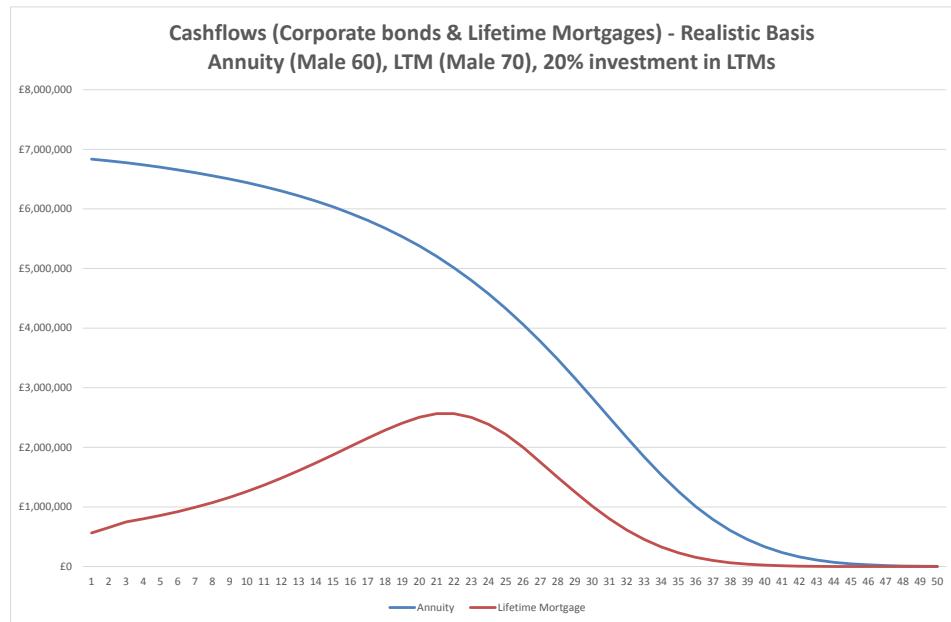


Figure 7.2 Pillar II Balance Sheet t=0 (Liability VROI 4.50%)

Asset		Liability	
(Matching) Lifetime Mortgages (before NNEG Option)	20.2	Annuity Liabilities (valuation rate 4.50%)	100.0
(Matching) NNEG Option	-0.2	ICA	11.3
(Matching) Corporate Bonds	80.0	Surplus Capital	0.0
(Matching) Gilts	0.0		
Excess Lifetime Mortgages	0.0		
Additional Assets Required	11.3		
Total	111.3	Total	111.3

7.2 Scenario – extended longevity

This scenario considers the impact of mortality of 80% of the central basis. We have considered the impact on the starting pillar II balance sheet in the case of a corporate bond only strategy and a 20% lifetime mortgage strategy.

Figure 7.3 – Balance Sheet summary t=0 - corporate bond only – base mortality

Asset		Liability	
(Matching) Lifetime Mortgages (before NNEG Option)	0.0	Annuity Liabilities (VROI 4.00%)	105.9
(Matching) NNEG Option	0.0	ICA	15.4
(Matching) Corporate Bonds	105.9	Surplus Capital	0.0
(Matching) Gilts	0.0		
Excess Lifetime Mortgages	0.0		
Additional Assets Required	15.4		
Total	121.3	Total	121.3

Figure 7.4 - Balance Sheet summary t=0 - corporate bond only – extended mortality (assume 20% reduction in mortality rates)

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	0.0	Annuity Liabilities (VROI 4.00%)	110.1
(Matching) NNEG Option	0.0	ICA	16.0
(Matching) Corporate Bonds	105.9	Surplus Capital	0.0
(Matching) Gilts	0.0		
Excess Lifetime Mortgages	0.0		
Additional Assets Required	20.2		
Total	126.1	Total	126.1

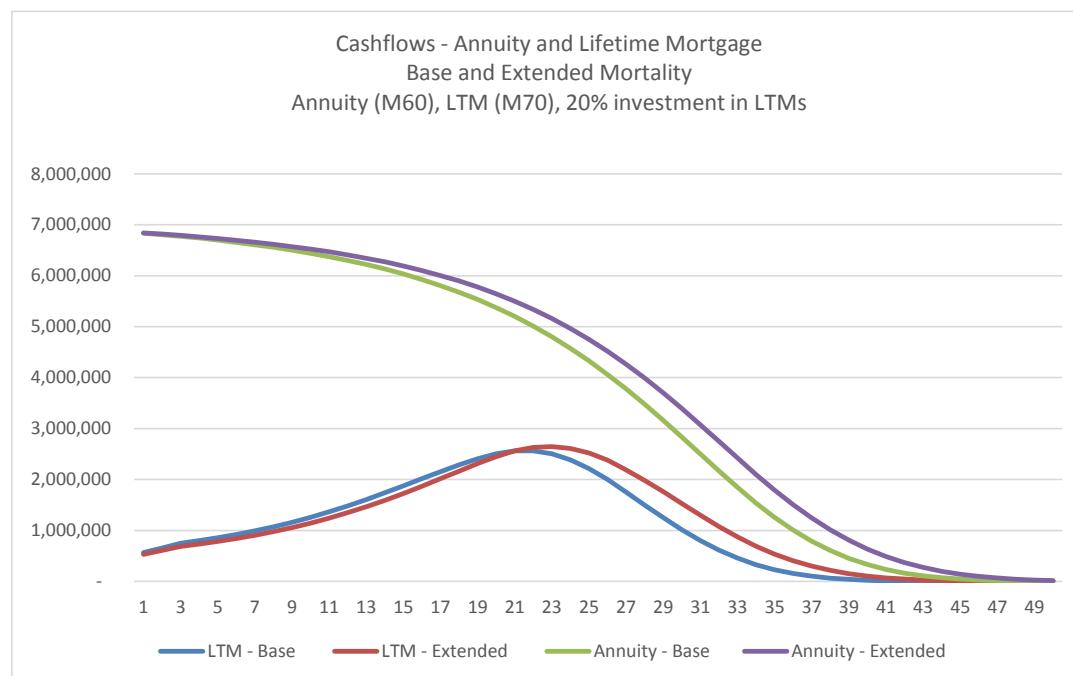
ICA is assumed to be 14.5% of liabilities in both cases, based on applying the basis set out in Appendix I. The extended longevity increases expected annuity payments and increases liabilities. The value of the corporate bonds does not change. Hence £4.8m of additional assets are required to meet liabilities and required capital.

The following tables set out the impact of extended longevity in a scenario of investment of £20m in lifetime mortgages. Figure 7.5 shows base mortality, 7.6 and 7.7 extended mortality.

Figure 7.5 - Balance Sheet summary t=0 - 20% investment in Lifetime Mortgages – base mortality

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	20.2	Annuity Liabilities (valuation rate 4.50%)	100.0
(Matching) NNEG Option	-0.2	ICA	11.3
(Matching) Corporate Bonds	80.0	Surplus Capital	0.0
(Matching) Gilts	0.0		
Excess Lifetime Mortgages	0.0		
Additional Assets Required	11.3		
Total	111.3	Total	111.3

Figure 7.6 – Cash flows - 20% investment in Lifetime Mortgages – impact of extended longevity



This assumes the increase in longevity applies similarly to both lifetime mortgage and annuity populations.

Figure 7.7 – Balance Sheet summary t=0 - 20% investment in Lifetime Mortgages – extended longevity

Asset (£m)		Liability (£m)	
(Matching) Lifetime Mortgages (before NNEG Option)	20.3	Annuity Liabilities (VROI 4.51%)	103.7
(Matching) NNEG Option	-0.3	ICA	11.7
(Matching) Corporate Bonds	80.0	Surplus Capital	0.0
(Matching) Gilts	£0		
Excess Lifetime Mortgages	£0		
Additional Assets Required	15.4		
Total	115.4	Total	115.4

In this scenario the extended longevity has resulted in a requirement for an additional £3.5m of assets to meet liabilities and capital requirements (versus £4.5m in the corporates only strategy). Although the value of the Lifetime Mortgages (net of NNEG cost) is unchanged, there is a slight increase in valuation rate of interest. This illustrates the slightly lower impact of an extended longevity scenario when the fund's assets include lifetime mortgages which have some positive longevity characteristics.

One of the key benefits of the Lifetime Mortgage asset is that the duration of the asset has extended in line with longevity, which avoids the reinvestment risk that would be inherent in a strategy involving assets with a fixed term.

7.3 Scenario - House Price Inflation Risk

We have included this section to try to illustrate clearly and simply the extent of house price inflation risk in Lifetime Mortgages as a result of the NNEG, as an alternative to focusing on the precise methodology and assumptions for quantification of the NNEG option cost.

We have considered below the impact of various levels of HPI on the returns from a portfolio of Lifetime Mortgages used to match part of an annuity portfolio, on the illustrative assumptions used throughout this paper and set out in Appendix I below.

The following chart shows projected Lifetime Mortgage cash flows on a range of assumptions for rates of future house price inflation.

Figure 7.8 – Projected Redemption Cash Flows with varying HPI assumption (central mortality and VER)

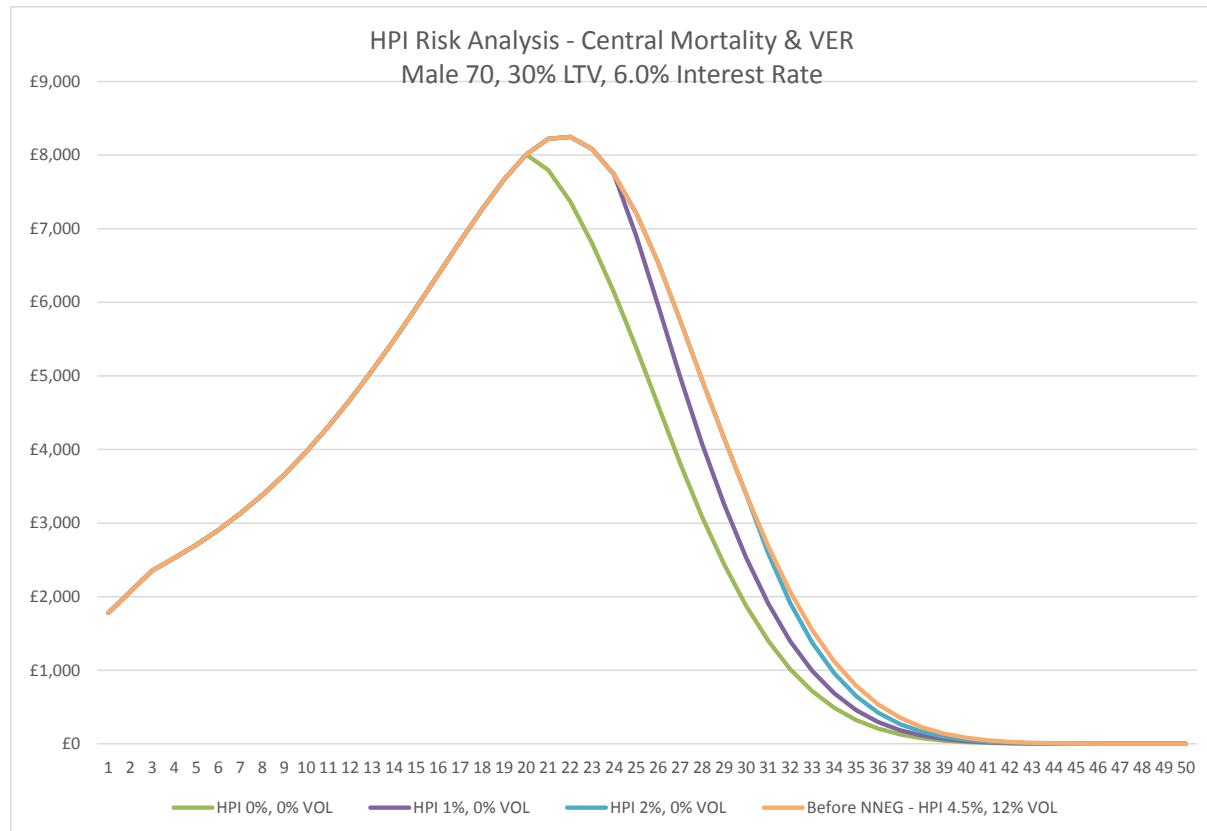


Figure 7.8 shows the impact of NNEG losses driven by low HPI. The chart shows the gross cash flows before any NNEG losses assuming 4.5% future house price inflation, as well as redemption cash flows net of NNEG losses in deterministic scenarios assuming HPI of 0%, 1% and 2% p.a. Note that the NNEG option can only result in a reduction in redemption cash flows received, it cannot increase the redemption amount due from the borrower.

In this scenario, 2% p.a. HPI has a minor impact on redemption cash flows, 1% p.a. has a more significant effect and 0% p.a. HPI has a very significant effect. We have also run the projections for higher rates of HPI – these do not result in any material NNEG losses and hence have no impact on the redemption cash flows. In other words, If HPI averages above 2% p.a. there are unlikely to be any significant NNEG losses.

This conclusion applies in general to a portfolio. It is possible for individual properties to underperform the index and this could result in some NNEG losses in a portfolio even if index HPI has been sufficient to avoid this.

The conclusions above are highly dependent on factors such as the Loan to Value ratio and the Lifetime Mortgage interest rate (as well as the decrement assumptions).

Each scenario can also be considered in terms of the impact on the opening Pillar II balance sheet. The following table shows the balance sheet with the value of Lifetime Mortgage assets calculated assuming 0%, 1%, 2% and 3% p.a. HPI.

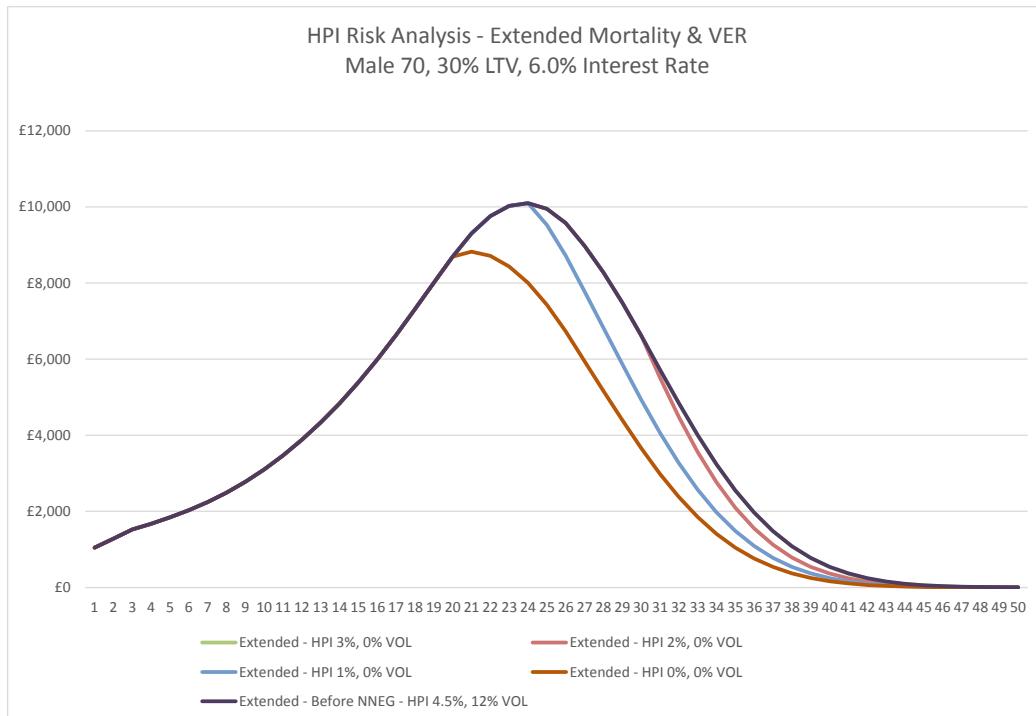
Figure 7.9 – Pillar II Balance Sheet - Varying HPI assumption - (20% investment in Lifetime Mortgages, age 70, 6% interest rate, 30% LTV)

£m	Central Basis as 5.3 above	Assuming no NNEG Losses	HPI 0% p.a.	HPI 1% p.a.	HPI 2% p.a.
Assets					
- LTMIs	20.0	20.2	18.9	19.8	20.2
- Corporates	80.0	80.0	80.0	80.0	80.0
- Other	11.3	11.3	11.3	11.3	11.3
Total Assets	111.3	111.5	110.2	111.1	111.5
Capital / Liabilities					
- Liabilities	100.0	99.9	100.7	100.2	100.0
- ICA	11.3	11.3	11.3	11.3	11.3
- Surplus	0.0	0.3	-1.8	-0.4	0.2
Total Capital & Liabilities	111.3	111.5	110.2	111.1	111.5
Change in Net Assets		+0.3	-1.8	-0.4	0.0
LTM Effective yield	5.74%	5.82%	5.31%	5.66%	5.82%

The results for 0% HPI show that even for this very low level of nominal HPI, there is balance sheet impact of only £1.8m (in terms of present value of the reduced asset proceeds).

We have also considered the above analysis on assumptions of lower mortality and early repayments, as shown below.

Figure 7.10 – Projected Redemption Cash Flows with varying HPI assumption (extended duration - 80% mortality and 50% VER)



This chart shows that the 0%, 1% and 2% have a more significant impact on cash flows than for the central basis above. For example the effective yield on the Lifetime Mortgage would be 5.11% instead of 5.31% in the central scenario.

As mentioned above, the impact of NNEG losses is highly dependent on LTV and Mortgage Interest Rate. For example, if the mortgage interest rate is 7.00% (monthly, 7.23% annual), the effective yield on the asset in the extended mortality and VER scenario is 5.51% compared to 6.93% before NNEG, a reduction due to NNEG losses of 1.4% (this compares to a reduction of 0.77% in the scenario of a 6% mortgage interest rate and extended mortality / VER).

8. Solvency II

8.1 Eligibility of the asset class

EIOPA's report on Long-Term Guarantees Assessment ("LTGA") recognised the importance to the Lifetime Mortgage market of the asset class being admissible for the matching adjustment.

"Insurers are significant funders of, for instance, equity release mortgages and residential mortgages. Rendering such loans inadmissible for the matching adjustment might have a possible dual impact on these markets." (EIOPA, Technical Findings on the Long-Term Guarantees Assessment, 2013)

The impact on the Lifetime Mortgage market is likely to be negative due to significant reduction in funding from UK annuity writers, less competition to the detriment of consumers in terms of product choice and cost. In light of these findings EIOPA's LTGA report recommended that:

"no closed list of admissible types of assets should be defined (as was done for the LTGA), but rather suitable conditions in terms of predictability and ability to match liability cash flows" (EIOPA, Technical Findings on the Long-Term Guarantees Assessment, 2013)

This recommendation was confirmed in the PRA letter on Solvency II asset eligibility for matching adjustment:

"Asset eligibility is a case-by-case judgement and there is no 'closed list' of eligible asset classes... firms must apply their judgement, and consider carefully whether they are compliant with the criteria laid out in the Directive." (PRA, 2014)

The significance of these statements is that Lifetime Mortgages, as an asset class, is not ineligible for matching adjustment and that insurers should consider whether the asset characteristics match the liability cash flows. For the reasons set out below we believe that Lifetime Mortgages can meet the asset eligibility criteria for matching adjustment as stated in the Solvency II Directive 2009/138EC.

8.2 Loan Characteristics that meet Asset Eligibility Criteria

The asset eligibility criteria are contained in Article 77b 1 (c) of the Solvency II Directive, which describes the asset cash flow characteristics of the Assigned Portfolio as:

"the expected cash flows of the assigned portfolio of assets replicate each of the expected cash flows of the portfolio of insurance or reinsurance obligations in the same currency and any mismatch does not give rise to risks which are material in relation to the risks inherent in the insurance or reinsurance business to which the matching adjustment is applied;" (EIOPA, Omnibus II, 2014)

Lifetime Mortgage portfolio gives rise to mismatch risk due to the expected cash flows being directly dependent on the longevity of the borrower(s). Article 77b 1 (e) of the Solvency II Directive goes on to state that portfolio insurance obligations are permitted to vary due to longevity risk:

"the only underwriting risks connected to the portfolio of insurance or reinsurance obligations are longevity risk, expense risk, revision risk and mortality risk" (EIOPA, Omnibus II, 2014)

The materiality of the mismatch risk therefore depends on basis risk between annuitants and borrowers. The Institute of Actuaries session paper recommended the use of annuitant base and mortality improvement tables in pricing Lifetime Mortgages given the:

“...close link between annuitant mortality and that expected for equity release customers.” (Institute of Actuaries and Faculty of Actuaries, 2007)

The conclusion from these findings is that the mismatch risk arising from longevity risk is not material.

Lifetime Mortgage portfolio expected cash flows varies due to entry into long-term care which is effectively an acceleration of mortality. Article 77b 1 (f) states that immaterial mortality risk is permitted under matching adjustment:

“where the underwriting risk connected to the portfolio of insurance or reinsurance obligations includes mortality risk, the best estimate of the portfolio of insurance or reinsurance obligations does not increase by more than 5 % under a mortality risk stress that is calibrated in accordance with Article 101(2) to (5);” (EIOPA, Omnibus II, 2014)

The Actuarial working party (Equity Release Working Party, 2005) concluded that morbidity risk was substantially less significant than the longevity in determining expected Lifetime Mortgage portfolio cash flows. The conclusion from these findings is the mismatch risk arising is not material.

In terms of the ability of the issuer, or in the case of Lifetime Mortgages, the borrower to voluntarily repay the loan early Article 77b 1 (h) of the Solvency II Directive states:

“the cash flows of the assigned portfolio of assets are fixed and cannot be changed by the issuers of the assets or any third parties; In the event that issuers or third parties have the right to change the cash flows of an asset in such a manner that the investor receives sufficient compensation to allow it to obtain the same cash flows by re-investing in assets of an equivalent or better credit quality, the right to change the cash flows shall not disqualify the asset for admissibility to the assigned portfolio” (EIOPA, Omnibus II, 2014)

On the basis of Article 77b 1 (h) Lifetime Mortgages that allow borrowers to change cash flows are eligible provided the firm receives sufficient compensation to offset the loss of future cash flows. The eligibility of Lifetime Mortgages will depend on the definition of “sufficient compensation”.

Article 77b 1 (c) helpfully defines eligible assets as those that do not give rise to material mismatch risk. This definition implies that the compensation under Lifetime Mortgages would be sufficient provided the mismatch risk arising from the borrower exercising their prepayment option was not material. A number of Lifetime Mortgage products include an early redemption charge which the borrower is obliged to pay in the event of voluntary prepayment. These charges range from a fixed percentage of the loan advanced to a dynamic mark-to-market charge that references a market index such as gilt yields.

The mismatch risk arises due to the reinvestment risk of not being able to invest in assets of similar quality or better. The reinvestment risk can be measured using the Solvency II calibration of interest rate risk defined as:

“...the Value-at-Risk of the basic own funds of an insurance or reinsurance undertaking subject to a confidence level of 99,5 % over a one-year period.” (EIOPA, Omnibus II, 2014)

Therefore, provided the interest rate risk is not material, Lifetime mortgages meet the criteria in Article 77b 1 (h). In respect of materiality, EIOPA stated:

"The LTGA technical specification sets out a matching requirement that permits a 15% mismatch by duration on aggregate. This was for the purposes of this exercise only, but should be revised to a more prudent level while making some allowance for mismatching at very long durations, where the market in appropriate assets may be thin." (EIOPA, Technical Findings on the Long-Term Guarantees Assessment, 2013)

As yet EIOPA has not provided further guidance as to what constitutes a prudent level of mismatch. A prudent level of say 5% would mean an interest rate solvency capital requirement ("SCR") less than 5% would be considered immaterial.

The Lifetime Mortgage portfolio expected cash flows allow for the risk of getting less than the value of the accrued loan due to NNEG risk. This is consistent with Article 77c (b) of the Solvency II Directive which states:

"the matching adjustment must not include the fundamental spread reflecting the risks retained by the insurance or reinsurance undertaking;" (EIOPA, Omnibus II, 2014)

Article 77c 2 (a) states that the fundamental spread consists of two components:

*"(i) the credit spread corresponding to the probability of default of the assets;
(ii) the credit spread corresponding to the expected loss resulting from downgrading of the assets;"* (EIOPA, Omnibus II, 2014)

In respect of Lifetime Mortgages the probability of default and expected loss from downgrade is measured by the cost of NNEG risk. The cost of NNEG would vary between Firms depending on the portfolio characteristics, such as loan to value, borrower age and gender and loan interest rate and the best-estimate assumptions used including longevity, house prices and prepayment rates.

In conclusion, Lifetime Mortgages is not an ineligible asset class for matching adjustment. Firms and regulators will assess eligibility on case by case basis. Lifetime Mortgages can meet these eligibility criteria provided the Firm can evidence the mismatch risk that arises as a result is not material.

8.3 Risk Transformation

If firms cannot establish that the mismatch risk is immaterial then this may lead them to seek alternative solutions to meet the eligibility criteria. Firms are currently considering risk transformation transactions in order to obtain a portfolio of eligible assets (PRA, 2014). In respect of Lifetime Mortgages, there are a number of possible transformation structures that firms could use to mitigate the material mismatch risk. Firms should ensure that these transformation structures meet the Solvency II overarching risk management requirements and the Prudent Person Principle. The Prudent Person Principle requires firms to be able to identify, measure, and manage risks within their asset portfolios, to invest in the best interest of all policyholders and beneficiaries, and to only use derivative instruments where they genuinely contribute to a reduction in risk or facilitate efficient portfolio management.

An example of the types of risk transformation transactions firms could consider is restructure the Lifetime Mortgage portfolio cash flows using a special purpose vehicle (“SPV”). This involves selling a portfolio of Lifetime Mortgages to a SPV.

The SPV would fund the purchase by issuing a Note A which pays investors a fixed cash flow profile with a specified final maturity date. The default risk associated with the debt cash flows could be mitigated by the SPV entering into a decrement swap with a 3rd party where the 3rd party guarantees the fixed cash flow schedule, except for NNEG risk, in return for the actual portfolio cash flows arising. Alternatively, the debt cash flows could be reduced in order to reduce the default risk of the portfolio cash flows being insufficient to meet the debt payments. Under this structure the SPV would issue a Note B parri passu with Note A that would entitle the holders of Note B to receive the residual portfolio cash flows. Subject to meeting the Prudent Person Principle, Note A would meet the eligibility criteria under Article 77b for matching adjustment.

Such risk transformation structures will lead to higher costs for the purpose of meeting regulatory requirements. The following running cost estimates are provided for indicative purposes.

- Implementing new structure 5 - 10bps
- Decrement swap 30-50bps

The actual cost will depend on the individual portfolio characteristics and product features. These additional costs will have to be met or incurred by firms and / or customers which may lead to higher product costs, less product choice and reduced policyholder security.

8.4 Solvency Capital Requirements

The standard formula SCR as stated in the most recent EIOPA technical specifications (EIOPA, 2014) applied to Lifetime Mortgages may lead to stress scenarios which are not appropriate and inconsistent with how firms assess the risk capital required under Solvency I Pillar 2 (“ICA”) or potentially in the Solvency II Pillar 2 (“ORSA”).

Under standard formula, If Lifetime Mortgages are treated as a bond or loan then the spread risk module would apply. Bonds are not classed as technical provisions and therefore the insurance risks inherent in Lifetime Mortgages would be ignored.

The counterparty default risk SCR may not apply to Lifetime Mortgages as they do not meet the criteria for residential mortgages, in particular that:

“The risk of the borrower does not materially depend upon the performance of the underlying property, but on the underlying capacity of the borrower to repay the debt from other sources”
(EIOPA, 2014)

The spread risk module may be inappropriate for Lifetime Mortgages approach to measuring SCR of Lifetime Mortgages. The spread risk SCR approach is flawed in that it does not value NNEG risk directly by stressing residential property values and insurance risks.

For collateralised bonds or loans the spread risk SCR is reduced to be equal to the difference between the market value of the bond and the risk-adjusted value of the collateral. Residential properties secured under Lifetime Mortgages are not recognised as collateral for Solvency II

purposes as there is no credit event in relation to these mortgages. The technical specifications state that for collateral to be recognised it must:

“(a) the insurance or reinsurance undertaking transferring the risk shall have the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event of the counterparty;” (EIOPA, 2014)

Given these deficiencies in the standard formula firms may need to consider alternative approaches to determining the risk exposure arising from Lifetime Mortgages. Potential options include:

Firms adopt appropriate stress and scenario testing in their full or partial internal models,;

Firms apply the standard formula stresses for the relevant modules that reflect the risks inherent in the firm’s portfolio of Lifetime Mortgages;

Both of these alternative approaches will require firms to seek regulatory approval from the PRA.

9. Conclusions

Using simplified examples we have demonstrated some of the key factors to consider and possible advantages and disadvantages of investment in lifetime mortgages to back annuity liabilities.

Lifetime Mortgages are a long term, fixed rate, illiquid asset with some unique risks which meet many of the criteria for matching annuity liabilities.

The current UK equity release market is largely funded by annuity providers.

The asset has characteristics which are likely to be helpful to many funds in terms of diversifying risk.

Current risk adjusted yields look attractive compared to traditional alternatives, based on the assumptions we have used in this paper.

The nature of the asset means there are a number of additional considerations when determining asset strategy for annuity liabilities, such as NNEG valuation and additional operational risks.

Under Solvency II Lifetime Mortgages is not an ineligible asset class for matching adjustment. Firms and regulators will assess eligibility on case by case basis. Lifetime Mortgages can meet these eligibility criteria provided firms can evidence the mismatch risk that arises as a result is not material.

Bibliography

- Department of Health; ABI. (2014, January). Social Care Funding: Statement of Intent.
- EIOPA. (2013, June 14). Technical Findings on the Long-Term Guarantees Assessment.
- EIOPA. (2014, March 11). Omnibus II.
- EIOPA. (2014, April 30). Technical Specification for the Preparatory Phase (Part I).
- Equity Release Working Party. (2005). EQUITY RELEASE REPORT 2005.
- Institute of Actuaries and Faculty of Actuaries. (2007). PRICING AND RISK CAPITAL IN THE EQUITY RELEASE MARKET.
- PRA. (2014, June). Solvency II – Matching Adjustment Asset Eligibility Letter.

APPENDICES

I Bases (Central, Pillar I, Pillar II) for Lifetime Mortgage and Annuity

II Valuation regulations – mark to model

APPENDIX I – Bases and Assumptions

In producing the examples and case studies in this paper we have made a number of assumptions

This is not a recommended basis, and is not necessarily suitable for any specific company or portfolio. However in the view of the working party the assumptions for each element of the basis are within the range of assumptions used by companies operating in the market today.

Key Assumptions are as follows:

Lifetime Mortgage - Product & Portfolio

<i>Product Portfolio / Model Points</i>	Lump Sum roll up mortgage Central basis - male Single Life, age 70 at entry, 30% LTV, £200k property value, £60k loan.
<i>Mortgage Interest rate</i>	6.00% (Monthly, equivalent to c6.20% annual effective, assumed net of any discounts or other sales incentives)
<i>Purchase price</i>	105% of loan amount
<i>Early Repayment charges</i>	Marked to Market
<i>Drawdown facilities</i>	None
<i>Additional Borrowing facilities</i>	On request, subject to lending criteria at the time (not considered further in this paper)

Lifetime Mortgage – Assumptions

	<i>Central</i>	<i>Pillar I</i>	<i>Pillar II (1/200 stresses)</i>
<i>Mortality</i>	PNXA00	120% of Central (may be too high)	+/- 20% of Central
<i>Mortality Improvement</i>	Medium Cohort factors from 2000 onwards	As central – no stress applied	As central – no stress applied
<i>Morbidity</i>	IoA Working Party basis (2007)	As central – no stress applied	As central – no stress applied [TBC]
<i>Early Repayment</i>	2% p.a.	2.5% p.a.	+/- 50% of Central
<i>House Prices</i>	Current market value	Current market value	-30%
<i>House Price Inflation</i>	RPI + historic HPI over RPI spread, assumed to be 4-5% p.a.	3% p.a.	3% p.a.
<i>HPI volatility (index + specific)</i>	12%	15%	15%

<i>Property – other</i>	2.5% haircut on sale price	5% haircut on sale price	As central
<i>Interest Rate Risk Expenses – Administration</i>	TBC	TBC	TBC
<i>Expenses - inflation</i>	No expense included in model at this stage	No expense included in model at this stage	No expense included in model at this stage
<i>Expense – Initial</i>	3% p.a.	4% p.a.	4% p.a.
	Assume covered by 5% purchase premium	Assume covered by 5% purchase premium	Assume covered by 5% purchase premium

Lifetime Mortgage – Asset Valuation basis and Liability Valuation Rate

	<i>Central</i>	<i>Pillar I</i>	<i>Pillar II (1/200)</i>
<i>Asset valuation basis</i>	Acquisition cost	As central	As central
<i>Risk free rate</i>	Gilt curve (model assumes flat 3% p.a.)	As central	2% parallel stress
<i>Spreads</i>	See table below	See table below	See table below
<i>Deductions from yield</i> - NNEG	Option value calculated by summing Black-Scholes put option values at each future year. Results are used to adjust cash flows and calculate revised yield. See table below.	As central, based on prudent assumptions	As central based on stress assumptions
- <i>Other risks?</i>	TBC	TBC	TBC
<i>Regulatory haircut</i>	Nil	2.5%	Nil
<i>Illiquidity premium</i>	Customer rate – risk free – risk deductions, see table below	Customer rate – risk free – prudent risk deductions, see table below	Customer rate – risk free – risk deductions, see table below
<i>Liability valuation discount rate</i>	Risk free plus illiquidity premium	Risk free plus prudent illiquidity premium x 97.5%	Risk premium plus illiquidity premium

Corporate Bonds – Asset Valuation basis and Liability Valuation Rate

Assume 'A' rated

	Central	Pillar I	Pillar II (1/200)
<i>Asset valuation basis</i>	Market Value	Market Value	Market Value
<i>Risk free rate</i>	Gilt curve (model assumes flat 3% p.a.)	As central	+2% parallel stress
<i>Excess yield over risk free</i>	See table below	See table below	+3% spread widening
<i>Deductions from yield</i>	25% spreads	50% spreads	50% spreads
<i>Regulatory haircut</i>	Nil	2.5%	Nil
<i>Illiquidity premium</i>	See table below	See table below	See table below
<i>Liability valuation discount rate</i>	See table below	See table below	See table below

Annuity - Product & Portfolio

<i>Product Portfolio / Model Points</i>	Conventional life annuity Male, aged 60, single life, nil guarantee period, 0% escalation,

Annuity - Assumptions

	Central	Pillar I	Pillar II (1/200)
<i>Mortality</i>	PNXA00	90% central	+/- 120% of Central
<i>Mortality Improvement</i>	MC	As central	As central
<i>Expenses – Administration (see also fees)</i>	No expenses included	No expenses included	No expense included

Investment Return and Discount Rate Assumptions

<i>'A' Corporate Bond</i>	<i>Realistic / IFRS / Pillar II</i>	<i>Pillar I</i>	<i>Pillar II stress</i>
<i>Yields</i>	4.50%	4.50%	7.50%
<i>Spreads</i>	1.50%	1.50%	4.50%
<i>Credit risk deduction</i>	0.50%	0.75%	2.25%
<i>Illiquidity premium</i>	1.00%	0.75%	2.25%
<i>Effective yield</i>	4.00%	3.75%	5.25%
<i>Lifetime Mortgage Male 70, 30% LTV, 6.00% interest rate, 5% purchase premium</i>	<i>Realistic / IFRS / Pillar II</i>	<i>Pillar I</i>	<i>Pillar II stress</i>
<i>Customer rate</i>	6.00% Monthly (6.20% annual)	6.00% Monthly (6.20% annual)	6.00% Monthly (6.20% annual)
<i>Yields</i>	5.82%	5.78%	
<i>Spreads</i>	2.82%	2.78%	
<i>Credit risk deduction</i>	0.08%	0.35%	
<i>Illiquidity premium</i>	2.74%	2.43%	
<i>Effective yield</i>	5.74%	5.43%	

APPENDIX II – Valuation Regulations

Investments, derivatives and quasi-derivatives

GENPRU 1.3.41

31/12/2011

PRA

(1) For the purposes of GENPRU and INSPRU, an insurer or a UK ISPV must apply GENPRU 1.3.14 R to GENPRU 1.3.34 R (Marking to market, Marking to model, Independent price verification, 1Valuation adjustments or, in the case of an insurer or a UK ISPV, valuation adjustments1 or reserves) to account for:

(a) investments that are, or amounts owed arising from the disposal of:

(i) debt securities, bonds and other money- and capital-market instruments;

(ii) loans;

(iii) shares and other variable yield participations;

(iv) units in UCITS schemes, non-UCITS retail schemes, recognised schemes and any other collective investment scheme falling within paragraph(1)(A)(d)(iv) of GENPRU 2 Annex 7 R8; and

(b) derivatives and quasi-derivatives

(2) In the case of an insurer, (1) is subject to GENPRU 1.3.43 R.

General requirements: Marking to model

GENPRU 1.3.17

31/12/2011

FCAPRA

Where marking to market is not possible, a firm must (in the case of a BIPRU firm, conservatively) 1 use mark to model in order to measure the value of the investments and positions to which this rule applies under GENPRU 1.3.13 R and GENPRU 1.3.38 R to GENPRU 1.3.41 R. Marking to model is any valuation which has to be benchmarked, extrapolated or otherwise calculated from a market input. GENPRU 1.3.18 R to GENPRU 1.3.25 R apply when marking to model.

GENPRU 1.3.18

31/12/2006

FCAPRA

When the model used is developed by the firm, that model must be:

- (1) based on appropriate assumptions which have been assessed and challenged by suitably qualified parties independent of the development process;
- (2) independently tested, including validation of the mathematics, assumptions, and software implementation; and
- (3) (in the case of a BIPRU firm) developed or approved independently of the front office.

GENPRU 1.3.19

31/12/2006

FCAPRA

A firm must ensure that its senior management are aware of the positions which are subject to mark to model and understand the materiality of the uncertainty this creates in the reporting of the performance of the business of the firm and the risks to which it is subject.

GENPRU 1.3.20

31/12/2006

FCAPRA

A firm must source market inputs in line with market prices so far as possible and assess the appropriateness of the market inputs for the position being valued and the parameters of the model on a frequent basis.

GENPRU 1.3.21

31/12/2006

FCAPRA

A firm must use generally accepted valuation methodologies for particular products where these are available.

GENPRU 1.3.22

31/12/2006

FCAPRA

A firm must establish formal change control procedures, hold a secure copy of the model, and periodically use that model to check valuations.

GENPRU 1.3.23

31/12/2006

FCAPRA

A firm must ensure that its risk management functions are aware of the weaknesses of the models used and how best to reflect those in the valuation output.

GENPRU 1.3.24

31/12/2006

FCAPRA

A firm must periodically review the model to determine the accuracy of its performance.

GENPRU 1.3.25

31/12/2006

FCAPRA

Examples of periodical review are assessing the continued appropriateness of the assumptions, analysis of profit and loss versus risk factors and comparison of actual close out values to model outputs.

General requirements: Independent price verification

GENPRU 1.3.26

31/12/2006

FCAPRA

In addition to marking to market or marking to model, a firm must perform independent price verification. This is the process by which market prices or model inputs are regularly verified for accuracy and independence.

GENPRU 1.3.27

31/12/2006

FCAPRA

For independent price verification, where independent pricing sources are not available or pricing sources are more subjective (for example, only one available broker quote), prudent measures such as valuation adjustments may be appropriate.

GENPRU 1.3.28

31/12/2006

FCAPRA

In the case of the trading book positions of a BIPRU firm, while daily marking to market may be performed by dealers, verification of market prices and model inputs must be performed by a unit independent of the dealing room, at least monthly (or, depending on the nature of the market/trading activity, more frequently).