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## Lifetime mortgages – a good and appropriate investment for life companies with annuity liabilities?

Equity Release Member Interest Group -  
Scott Robertson / Gina Craske

15 November 2013

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the ER Member Interest Group and the presenters.



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## Background & Introduction

- Equity Release MIG active since 2004
- Current members - Ged Hosty, Gina Craske, Scott Robertson, Colin Murray, Mikir Shah, Steve Groves
- Institute papers in 2005 and 2007
- Market has undergone huge changes during financial crisis - post crisis Lifetime Mortgage market predominantly funded by life companies' annuity funds
- MIG currently looking at the implications for an annuity fund of investing in Lifetime Mortgages



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## In this presentation

- Lifetime mortgages as assets
- Suitability for matching annuity liabilities
- Valuation
- Impact on the insurer's balance sheet
- Additional Considerations
- Summary and Questions



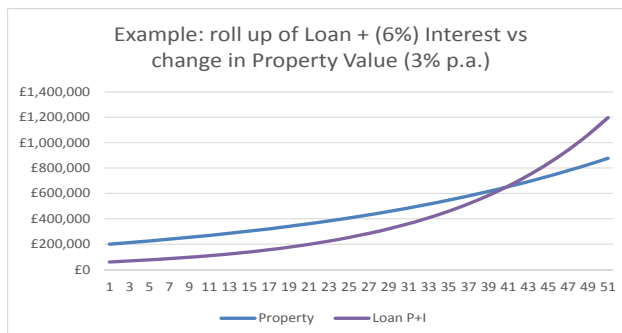
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## What are Lifetime Mortgages?

- Security
- Yield
- Term
- Marketability
- Expenses
- Key Risks
- House price inflation risk - "NNEG"



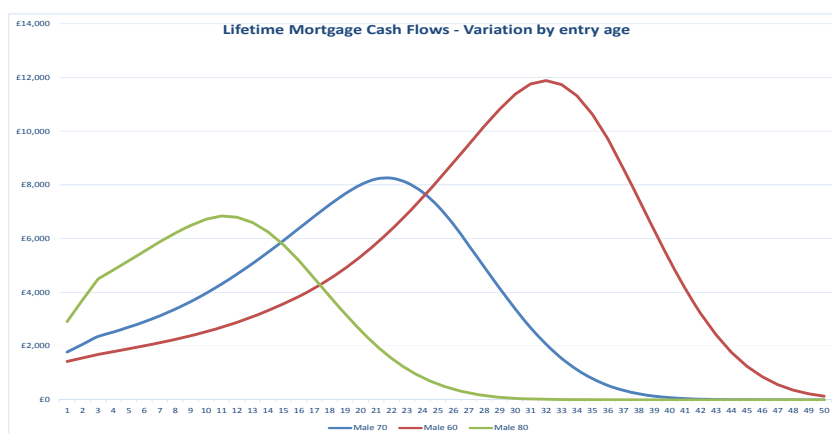
*Long, illiquid, zero coupon, fixed interest assets with uncertain timing of repayment and unique interest rate and property risks.*



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## Example cash flow profile



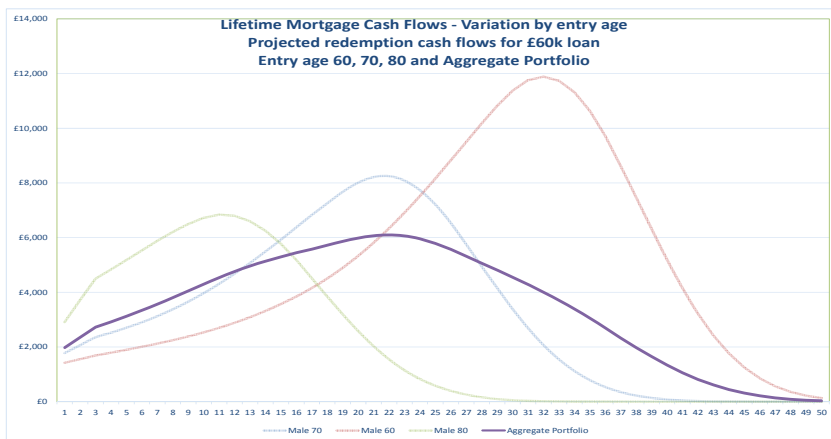
Variation cash flows also arises from other factors such as gender, house price inflation etc.



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## Aggregate portfolio - smoother cashflows



Aggregate portfolio – weighted average of individual model points – 25% age 60, 50% age 70, 25% age 80.



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## Characteristics of Annuity Liabilities

Characteristics	Liabilities	Suitable Assets
Security	Typically fixed payments, guaranteed by provider	Secure cash flows in terms of timing and amount
Yield	Fixed yield on assumed longevity	Fixed income
Term	Uncertain duration dependent on longevity	Long-dated
Marketability	Highly illiquid	Liquidity not an absolute requirement
Key risks	Exposure to fall in interest rates, longevity risk	Capital efficient in terms of risk / return trade-off

***Traditional fixed income assets do meet these characteristics however investment is constrained by lack of supply and leads to large concentration of credit risk.***



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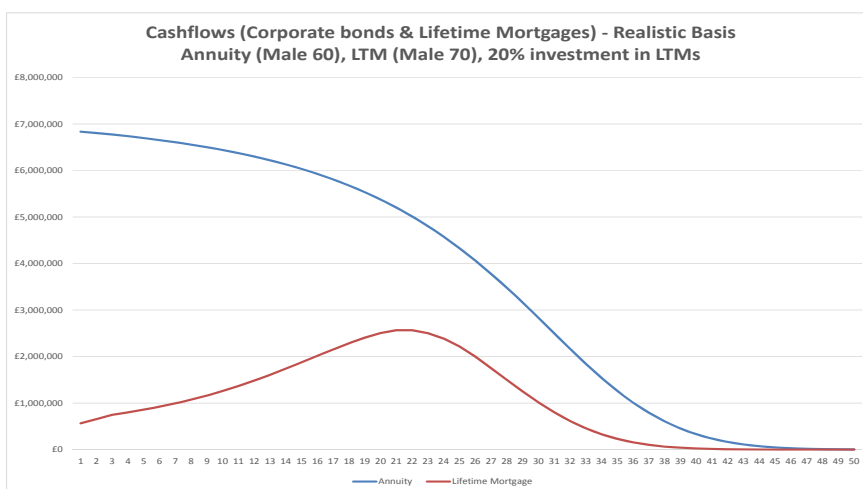
## Suitability of Lifetime Mortgages

Characteristics	Suitable Assets	Lifetime Mortgages
Security	Secure cash flows in terms of timing and amount	<p>✓</p> <p>Security of cash flows linked to out of the money NNEG. Cash flows can be "lumpy" in small portfolios due to fluctuations in mortality and early repayments</p>
Yield	Fixed income	<p>✓</p>
Term	Long-dated	<p>✓</p> <p>Dependent on longevity</p>
Marketability	Liquidity not an absolute requirement	<p>✓</p>
Key risks	Capital efficient in terms of risk / return trade-off	<p>✓</p> <p>Additional operational risks</p>

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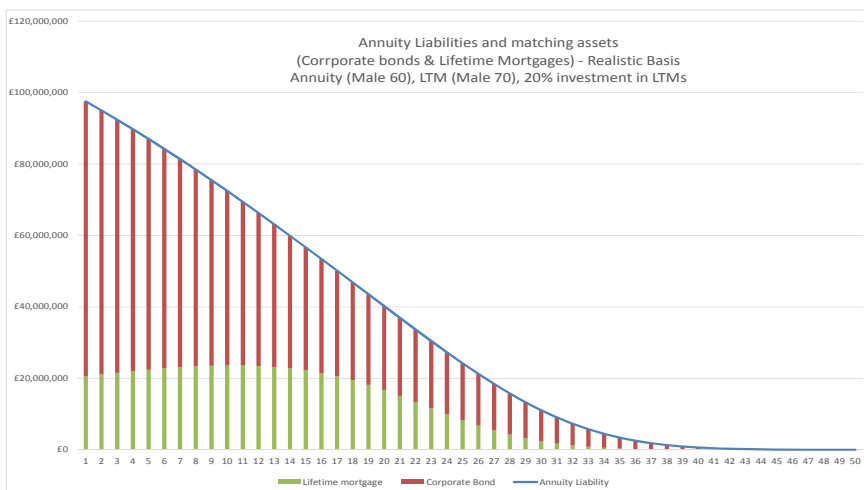
## Example - Backing Annuity Liabilities with Lifetime Mortgages – Cash Flows



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## Example - Backing Annuity Liabilities with Lifetime Mortgages – Assets



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## Typical matching assets - comparison

Various investment strategies are used in the UK market, including gilts, corporate bonds, commercial mortgages as well as lifetime mortgages - the liability characteristics and availability and nature of suitable assets present ongoing challenges for providers.

	Corporate Bonds	Commercial Mortgages	Lifetime Mortgages
Timing of Cash Flows	Fixed	Fixed	Linked to borrower behaviour
Probability of default	Variable	Variable	Low-medium varies by LTV
Loss on default	Medium	Medium	Low-medium varies by LTV
Skewness of losses	Medium	Low	Low
Diversification achievable	Limited	Limited	High
Liquidity	Medium	Low	Low
Degree of longevity hedge for annuity liabilities	None	None	Some
Operational Risk	Low	Low	Medium

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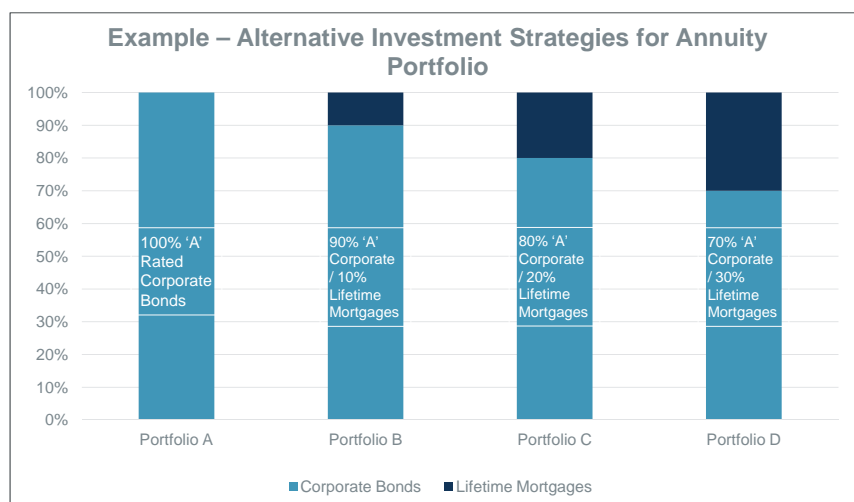
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## Asset Valuation

- Lifetime Mortgages are Level 3 assets requiring the holder to mark to model the asset on the IFRS & regulatory balance sheets
- Each holder must determine a mark to model methodology & assumptions.
- This has led to a number of valuation approaches being adopted in terms of:
  - Valuation of NNEG (stochastic / Black & Scholes)
  - House Price assumptions
  - Decrement rates (fixed / dynamic)
  - Determination of rate to discount asset cash flows (risk-free / risk-free + risk premium)
  - Determination of liquidity premium



## Illustrative Example



## Illustrative Example – Key Assumptions

### General

- Simplified model and balance sheet for an annuity monoline insurer
- Investment of c20% of annuity liabilities in Lifetime Mortgages (LTM),
- Remaining cash flows matched exactly by 'A' rated corporate bonds
- One model point each used for annuity and LTM portfolios
- Pillar I basis assumes MADs in decrements and valuation of NNEG
- Risk free rates 3.00% p.a.
- 'A' Corporate spreads 1.50%, zero investment expenses
- Corporate default risk deductions 0.50% (realistic), 1.0% (Pillar I)

### Annuity

- Single life annuities, Male aged 60, non-escalating

### Lifetime Mortgage

- Loan details - Single life, Male aged 70, £60k loan, 30% LTV at outset, 6.00% mortgage interest rate (monthly), 5% acquisition costs, zero expenses
- Cash flows adjusted for NNEG risk using Black Scholes.
- Realistic basis assumptions
  - Property risk – HPI 4.5%, volatility 12.5%, 2.5% sales costs
  - 2% p.a. early repayments
  - Mortality PNMA00 (MC) (also for annuities)
- Mark to model value of LTMs at outset assumed equal to acquisition cost (but note practices vary in the market)

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## Impact of switch to LTMs – Pillar II

### Portfolio A

Assets	£m	Liabilities	£m
LTM pre NNEG	0.0	Annuity Liabilities	105.9
NNEG	0.0		
Corporate Bonds	105.9	ICA	15.4
Other Assets	16.6	Surplus Capital	1.2
Total Assets	122.5	Total	122.5

- 100% Corporate Bonds
- VRoI = 4.0%
- ICA 14.5% of Liabilities driven by credit risk
- Small surplus capital assumed in fund
- Balance Sheets at t=0

### Portfolio C

Assets	£m	Liabilities	£m
LTM pre NNEG	20.2	Annuity Liabilities	100.0
NNEG	-0.2		
Corporate Bonds	80.0	ICA	11.3
Other Assets	22.5	Surplus Capital	11.2
Total Assets	122.5	Total	122.5

- Sell £20m Corporate Bonds, buy £20m LTMs
- Risk adjusted yield on LTMs 5.74%
- VROI 4.50%, ICA 11.3% of liabilities

**£10m release of capital through investment in higher yielding asset where key risk of liquidity is not material given liabilities**



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## ICA shows diversification effect of LTMs

Risk Driver	Assumed Stress (Illustrative *)	Portfolio A 100% Corporates	Portfolio C 80% Corporate / 20% LTM
Property Values	-30%	-	0.7
HPI	3% p.a.	-	0.6
HPI volatility	+3%	-	0.4
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% Liquidity Premium)	14.8	10.2
<b>Total Risk Capital</b>		<b>19.0</b>	<b>16.2</b>
	Correlation: 50% Property / Credit		
<b>Diversification benefit</b>		3.6	4.9
<b>ICA</b>		<b>15.4</b>	<b>11.3</b>

\* Assumed basis for illustration purposes only



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## Impact of switch to LTMs – Pillar I

### Portfolio A

Assets	£m	Liabilities	£m
LTM pre NNEG	0.0	Annuity Liabilities	112.4
NNEG	0.0		
Corporate Bonds	112.4	RCR Req'd Margin	5.6 4.5
Other Assets	10.1	Surplus Capital	0.0
<b>Total Assets</b>	<b>122.5</b>	<b>Total</b>	<b>122.5</b>

- 100% Corporate Bonds
- VRoI = 3.66%
- RCR estimated at 5.0% of liabilities

### Portfolio C

Assets	£m	Liabilities	£m
LTM pre NNEG	20.9	Annuity Liabilities	107.5
NNEG	-0.9		
Corporate Bonds	87.5	RCR Req'd Margin	4.7 4.3
Other Assets	15.0	Surplus Capital	6.0
<b>Total Assets</b>	<b>122.5</b>	<b>Total</b>	<b>122.5</b>

- Sell £20m Corporate Bonds, buy £20m LTMs
- Risk Adjusted Yield on LTMs 5.43%
- VRoI 4.03%, RCR 4.4% of liabilities
- £6m release of capital



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## Similar impact for portfolio B

### Portfolio A

Pillar II Balance Sheet at t=0			
Assets	£m	Liabilities	£m
LTM pre NNEG	0.0	Annuity Liabilities	105.9
NNEG	0.0		
Corporate Bonds	105.9	ICA	15.4
Other Assets	16.6	Surplus Capital	1.2
Total Assets	122.5	Total	122.5

- 100% Corporate Bonds
- VRoI = 4.0%
- ICA 14.5% of Liabilities driven by credit risk
- Small surplus capital assumed in fund

### Portfolio B

Pillar II Balance Sheet at t=0			
Assets	£m	Liabilities	£m
LTM pre NNEG	10.1	Annuity Liabilities	103.0
NNEG	-0.1		
Corporate Bonds	93.0	ICA	13.3
Other Assets	19.5	Surplus Capital	6.2
Total Assets	122.5	Total	122.5

- Sell £10m Corporate Bonds, buy £10m LTMs
- VROI increases to 4.25%
- ICA assumed at 12.9% of liabilities
- £5m release of capital

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## Similar impact for portfolio D

### Portfolio A

Pillar II Balance Sheet at t=0			
Assets	£m	Liabilities	£m
LTM pre NNEG	0.0	Annuity Liabilities	105.9
NNEG	0.0		
Corporate Bonds	105.9	ICA	15.4
Other Assets	16.6	Surplus Capital	1.2
Total Assets	122.5	Total	122.5

- 100% Corporate Bonds
- VRoI = 4.0%
- ICA 14.5% of Liabilities driven by credit risk
- Small surplus capital assumed in fund

### Portfolio D

Pillar II Balance Sheet at t=0			
Assets	£m	Liabilities	£m
LTM pre NNEG	30.4	Annuity Liabilities	97.1
NNEG	-0.4		
Corporate Bonds	67.1	ICA	9.4
Other Assets	25.4	Surplus Capital	16.0
Total Assets	122.5	Total	122.5

- Sell £30m Corporate Bonds, buy £30m LTMs
- VROI increases to 4.77%
- ICA assumed at 9.6% of liabilities
- £15m release of capital

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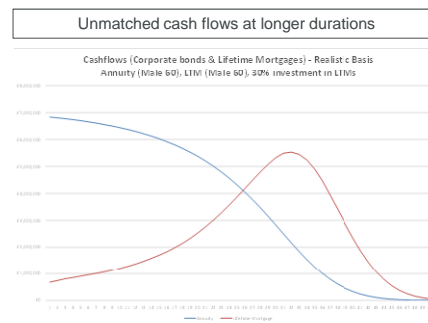
## The reward for illiquidity

- Investment in Lifetime Mortgages “works” because liquidity risk is not material in respect of annuity fund
- The illiquid nature of the liabilities hedges asset liquidity risk
- What if annuity liabilities were in fact liquid and wholly backed with LTM?
- Leads to material liquidity risk capital which diminishes the attractiveness of LTM



## Lifetime Mortgages – Additional Considerations

- The size and mix of the LTM allocation can influence:
  - Mis-matching (see chart right)
  - Uncertainty over asset cash flows
  - Liquidity risk
  - Reinvestment risk
- The extent to which LTM hedges longevity risk
- Operational and customer requirements



## Summary of key points

- 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
- The nature of the asset means a number of additional considerations when determining asset strategy for annuity liabilities



Questions

Comments

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