Is Equity Release a Second Equitable Life?

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Introduction to Equity Release

- ER loan = loan to older homeowner collateralised by their home

- Loan repaid when homeowner dies or goes into care, typically by selling the property

- Most ER loans come with a NNEG – a guarantee that amount owed cannot exceed value of the property when loan repaid

- Owes minimum of [house price, rolled up loan value]

- 'Minimum of two values' implies an option

- How to value this option?

- Correct approach vs. approach firms are using

Key Points (I)

- Correct ("Market Consistent") approach is based on a sound application of option pricing theory

- But firms using a flawed ("Real World") approach that leads to *much lower* NNEG valuations than the MC approach

- ER sector nursing a major NNEG undervaluation problem

 – Suggests firms carrying unrealised losses

Key Points (II)

- This under-valuation issue is *not* based on a hypothetical stress test

- A major stress (e.g., HP fall) would lead NNEG values to increase *further*

- This is a problem for ER firms and their investors, *not* for borrowers

- Under-valuation of opaque long-term option guarantees is reminiscent of Equitable Life

Typical case
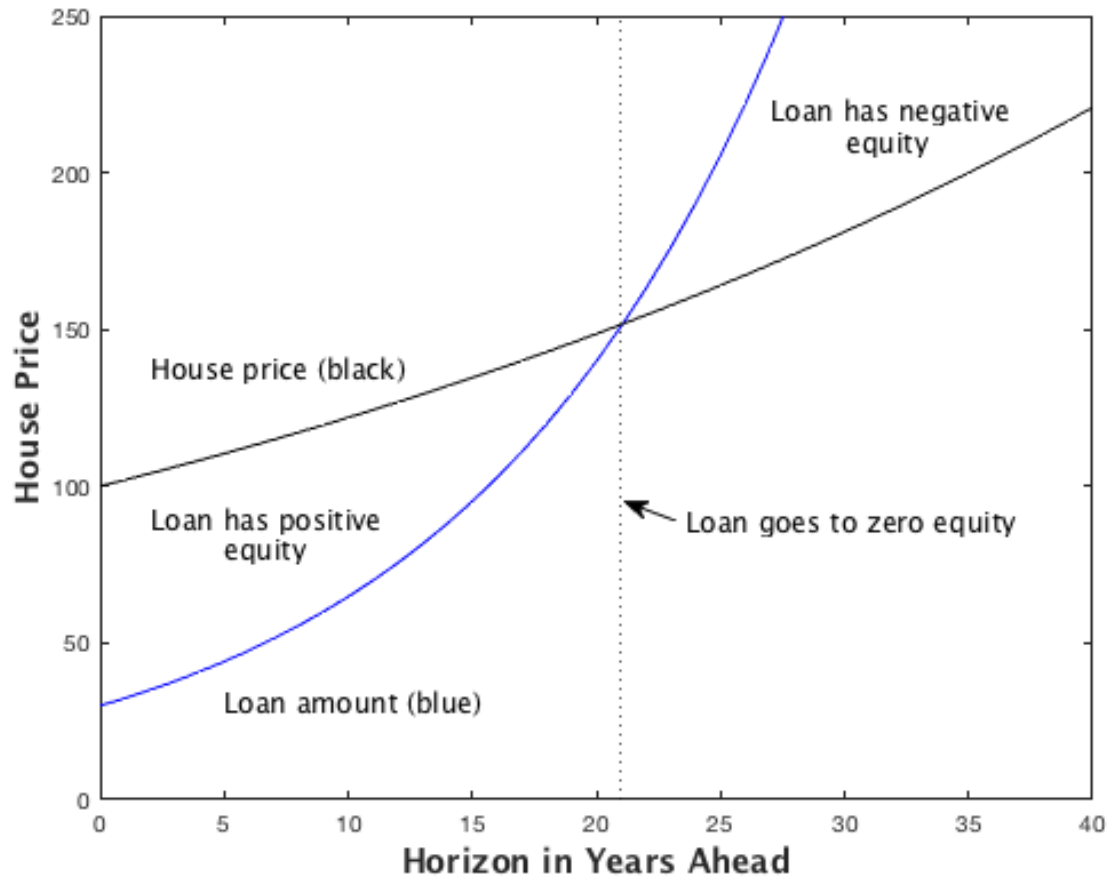
Expires in Negative Equity
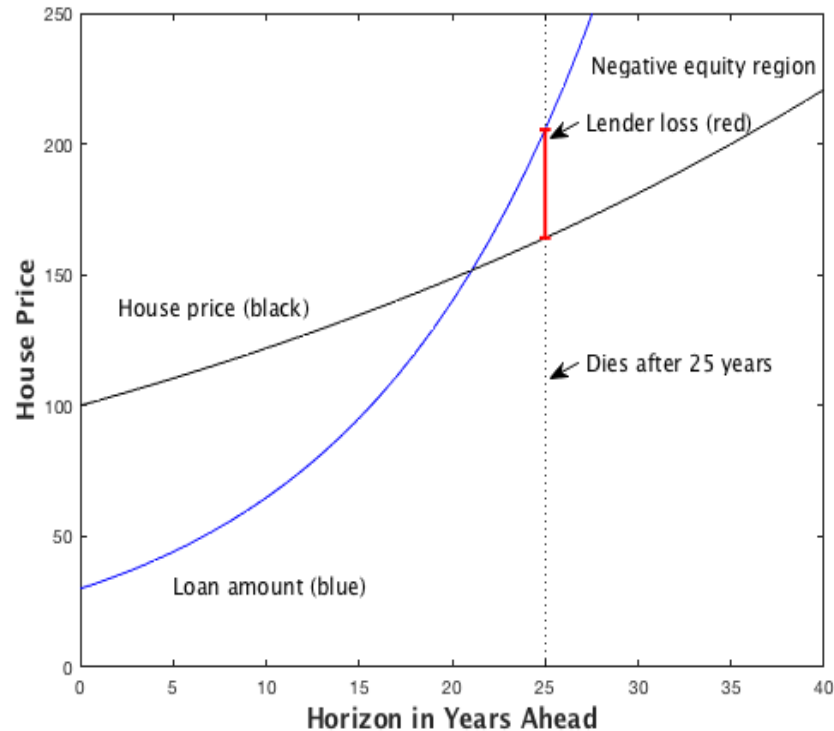
- HP curve and time of death are random
- Lender loss rises if HP falls or borrower lives longer
- NNEGs are **costly AND risky** to lender

Valuation Mechanics

ERM = PV of Equity Release Mortgage loan

L = PV of a risk-free loan ignoring NNEG

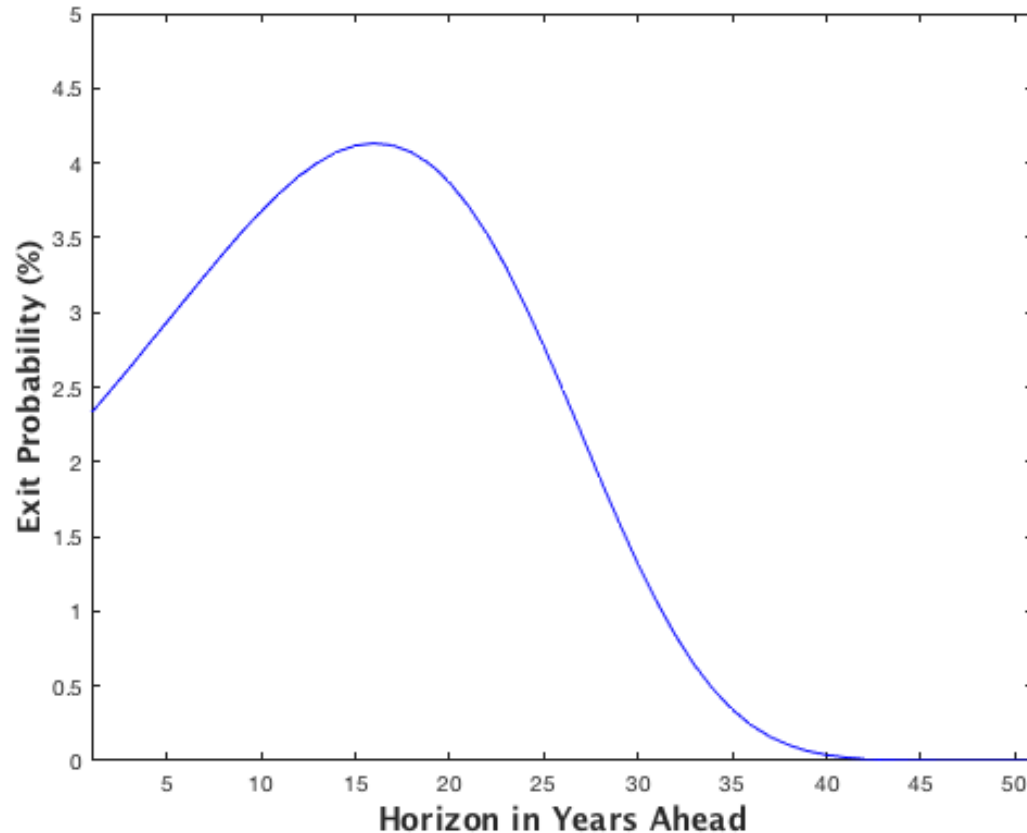$NNEG$ = PV of the NNEG guarantee

(1) $$ERM = L - NNEG$$

(2) $$L = \sum_t [exit\ prob_t \times current\ loan\ amount \times e^{(l-r)t}]$$

where l = loan rate, r = risk-free rate

(3) $$NNEG = \sum_t [exit\ prob_t \times NNEG_t]$$

where $NNEG_t$ is PV of the NNEG guarantee for period t

Exit Probs Driven by Proj Mortality Rates

Exit probs are based on Cairns-Blake-Dowd model projections of male mortality rates using CMI data

Use Black '76 Option Price Model

(4) $\qquad p_t = e^{-rt}[K_t N(-d_2) - F_t N(-d_1)]$

where K_t is strike price for period t, F_t is the forward house price for period t

(5) $\qquad d_1 = [ln(F_t/K_t) + \sigma^2 t/2]/(\sigma\sqrt{t}$

(6) $\qquad d_2 = d_1 - \sigma\sqrt{t}$

σ = volatility of the forward house price

(7) $\qquad K_t = current\ loan\ amount \times e^{lt}$

(8) $\qquad F_t = current\ house\ price \times e^{(r-q)t}$

where q is the house net rental rate

Put Model Cont.

Must **NOT** confuse forward and expected future prices, i.e., must not input an expected HPI rate into (8) instead of forward rate $r - q$!

Helpful to substitute out F_t and replace with S_0:

(9) $p_t = e^{-rt} K_t N(-d_2) - S_0 e^{-qt} N(-d_1)$

$S_0 e^{-qt}$ is the *deferment house price*, the price we would agree and pay now for possession at future time *t*

Deferment house price $< S_t$ because net rental rate $q > 0$

Baseline Valuation Example

Assume: borrower is 70, LTV = 30%, r = 1.5%, l = 6%, q = 2.5%, σ = 13%

Gloss over: fees/charges, impaired lives, morbidity, earlier redemption, male vs. female, joint lives ….

Current HP	Loan Amount	L	NNEG	ERM
£100	£30	£65.3	£19.2	£46.1

Stress Tests

Recall (1) $\qquad ERM = L - NNEG$

Now stress one of the inputs e.g. *r, q, HP,* etc.

Outcome of the stress test is described by:

(10) $\qquad \Delta ERM = \Delta L - \Delta NNEG$

Consider 6 stress tests:

Stress Tests (II)

ST #1: The risk-free rate falls to 0.5%

ST #2: Net rental rate rises from 2.5% to 4%

ST #3: Volatility rises from 13% to 15%

ST #4: House prices fall by 30%

ST #5: House prices fall by 40%

ST #6: Expected longevity increases by 2 years

Stress Test Results

Base estimate	L	NNEG	ERM
	£65.3	£19.2	£46.1
Stress Test	Change in L	Change in NNEG	Change in ERM
Stress test #1	£13.6	£10.8	£3.0
Stress test #2	£0	£6.2	-£6.2
Stress test #3	£0	£1.3	-£1.3
Stress test #4	£0	£7.4	-£7.4
Stress test #5	£0	£10.9	-£10.9
Stress test #6	£5.4	£5.2	£0.2

Consider, e.g., #4: NNEG rises from £19.2 to £26.6, i.e., from 64% to 89% of loan amount

PRA's Good Practice Principles

- SS 3/17 (July '17) set out good practice principles relating to ERM portfolios

- Principle II: "The economic value of ERM cash flows cannot be greater than either the value of an equivalent loan without an NNEG or the present value of deferred possession of the property providing collateral."

- Principle III: "The present value of deferred possession of a property should be less than the value of immediate possession."

Visual Illustration
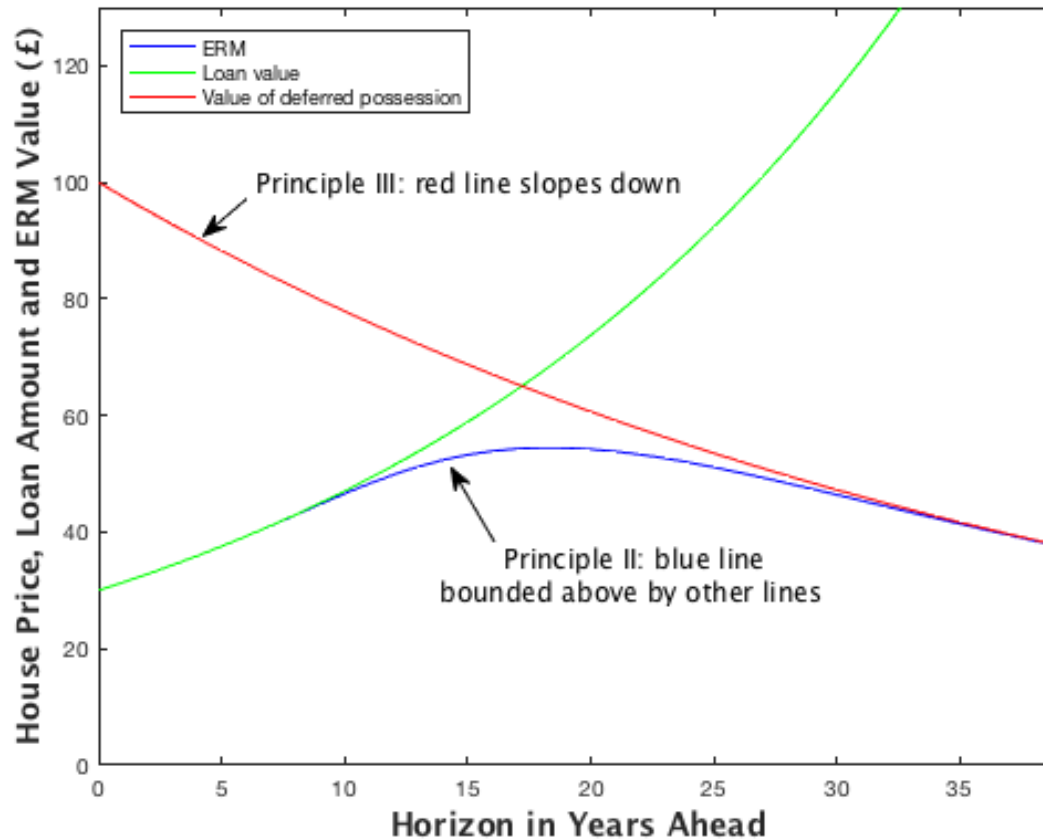
A Model-Free Lower Bound on the NNEG Valuation

- Since $ERM = L - NNEG$, an upper bound on ERM implies a lower bound on NNEG

- This is useful – even if we don't have an option pricing model, can still obtain a lower bound on the option value

- In illustrative cases, LB value about 80% of Black '76 value

IFoA Misconceptions About the Good Practice Principles

- In June 2016, IFoA issued its response to DP 1/16:

- "For [Principle III] to hold, in theory, *there needs to be a deep and liquid market*."

- No!

- Principle III is elementary economics. We pay less to get less!

Deloitte Misconceptions

- Deloitte made the same mistake:

- "In our view, [Principle III] is *likely to attract the most future debate*. … We would expect firms investing in ERMs and other direct investments to see an increased level of scrutiny and questioning from the PRA, with the *bar set very high for management's understanding of the valuation of such investments*. (Bulley *et alia*, 2017)

- Good luck on that

PRA Concerns About ER

- For an asset class that represents just 1.4% of insurers' asset holdings, equity release mortgages (ERMs) have *consumed a remarkable amount of firm and supervisory time*." (Bulley *et al*., 2017)

- ERM books "*could face difficulties in scenarios of flat*, as well as falling, nominal house prices." (David Rule, April 2018)

- PRA has been concerned since at least 2014: DP 1/16, CP 48/16, CP 23/17, CP 24/17, SS 3/17, CP 13/18 etc

CP 48/16

"[There is] a wide variety of practice regarding valuation of the embedded guarantee, with suggestions that sometimes diverged from conventional approaches to the valuation of guarantees in incomplete markets. …

[But there] was *consensus that property assumptions (growth and volatility) were most significant* [in the valuation of the NNEG]." (CP 48/16)

Consensus Misconception

- This consensus is a bigger concern, because (expected) property growth is *irrelevant* to option pricing

- Use of an irrelevant variable indicates that they *cannot* be valuing their NNEGs properly

- We are not aware of a *single firm* that has *demonstrated* it is valuing its NNEGs correctly

Where Do Industry Misconceptions Come From?

- Industry NNEG manual is Hosty *et alia* 2007

- Hosty *et alia* not like the MC approach because it may not generate enough profit and "is of limited academic value"

- They do not challenge the intellectual integrity of the MC approach

- They prefer the (supposedly) more profitable "Real World" approach instead

The "Real World" Approach

- "RW" approach appears to be B'76 with expected future HPs replacing forward HPs as underlying

  - In "RW" approach expected HPI is a key input in its own right

  - This is an egregious intellectual error

- Do not cite any independent verification for this approach

MC vs. "RW" Approaches

- In RW, expected HPI (EHPI) replaces forward rate f in $f = r - q$

- E.g., $EHPI = 4.25\% = r - q$ so implied $q = r - 4.25\% \approx -2.25\%$

- Correct (MC, B'76 with forward HP) approach uses e.g., $q = 2.5\%$ i.e., $q \gg 0$

- "RW" approach uses impossibly low $q \ll 0$

- "RW" approach produces NNEGs about an order of magnitude lower than correct approach

Impact of *q* Rates on NNEGs
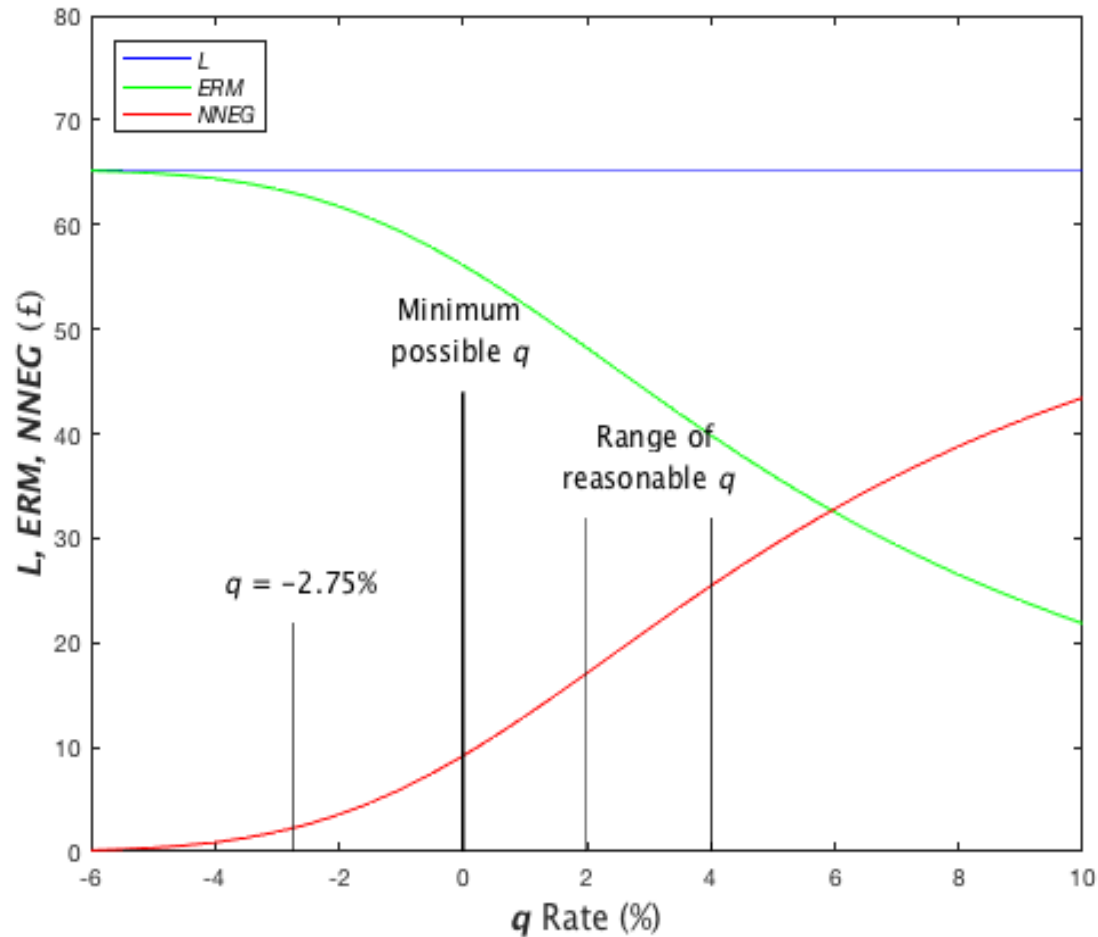
NNEG vs. Age
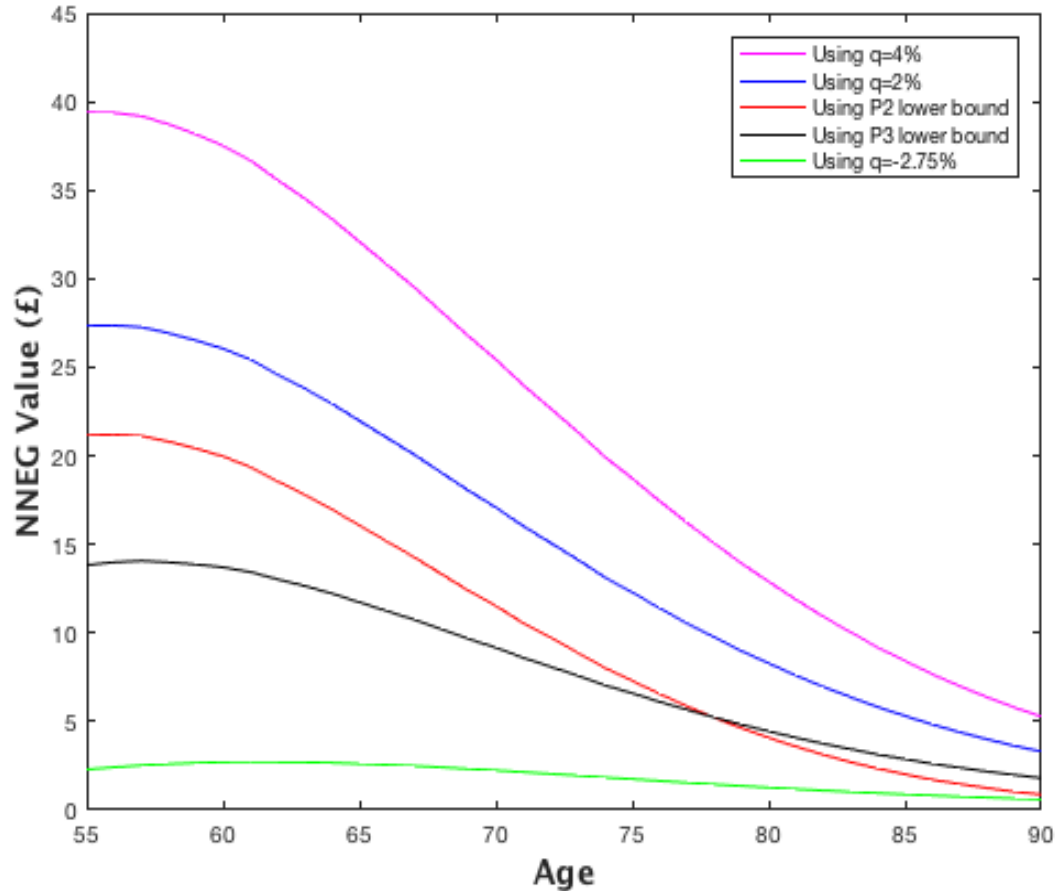
NB: LTV determined under 'age – 40' rule

Lessons from the Equitable

- Undervaluation of opaque long-term options was the central issue in Equitable Life

- There was a lot of gnashing of teeth after that!

- "the perceived failure [by actuaries] to adopt latest developments in financial economics and financial markets *was seen in large part to stem from the role played by entrenched commercial interests"* (Sir Derek Morris, 2005)

- IFoA response (Dec 2004): "A lot of the events described in this report took place in the late 1980s and we are now almost in 2005 so we are a different profession."

Kingman Review

- Independent review recently ordered by the Government after a number of high profile corporate collapses

- Salient points from IFoA submission to Kingman (6 August 2018):

  - "The actuarial profession in the UK and the IFoA have developed significantly since the Morris Review in 2005."

  - "The IFoA believes that the model of professional self-regulation subject to effective independent oversight remains the most appropriate arrangement for the regulation of actuaries in the UK."

  - "There is **no evidence to suggest that the current arrangements are not serving to protect the public interest** …"

- So no concerns about dodgy put valuation models or professional standards being influenced by commercial interests?

Regulatory Issues

- PRA knew about this NNEG valuation problem since at least 2014

- So why then did the PRA take so long to act?

- CP 13/18 proposing minimum q standards/expectations only appeared in July this year

  - And are these high enough?

- PRA was heavily lobbied/captured by the industry

- But (the vastly expensive) Solvency II regime was designed to prevent another Equitable Life!

- Therefore Solvency II has already failed.

TREASCOM botches it too

- TREASCOM issued a report on UK life industry in October 2017

- The Committee was heavily lobbied by the industry and swallowed the industry line – hook, line and sinker

- Criticised the PRA for excessively 'gold-plating' regs

- Suggested ERMs were a poster child that PRA should be promoting

- Showed no inkling of the NNEG undervaluation problem, despite the PRA's concerns having been on record for years

Conclusions

- Equitable Life taught us about dangers of under-valuing opaque long-term guarantees

  – Good for business in the short-term but lethal long-term

- In the aftermath we were assured that lessons had been learned and the hugely expensive Solvency II apparatus was introduced to prevent a similar fiasco in the future

- Twenty years on, the same problem has re-emerged in the ERM sector and on a bigger scale

- As before, under-valued guarantees imply overstated profits and raise awkward questions …

Conclusions (II)

- Same ingredients as before: poor valuation practices in the actuarial profession, commercial pressures and regulatory failure

- Practitioners in the ERM sector still wedded to a bogus approach that has no scientific justification

- Analogy with those who persisted with astrolabes post Copernicus, Galileo, etc, because they did not like the scientific results

- There are lessons to be learned – the same lessons that weren't learned before.

Fixing a Hole (Dean)

- Actuarial incompetence

- Regulatory vs. statutory balance sheet

- Matching adjustment

Thank You!

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