The Potential Impact of 2014 VBT On Life Settlement Pricing/Valuation

European Life Settlements Association
Seminar – 8th December 2014

Chris Stuart, Director
Mark Venn, Managing Director
ClearLife Limited

Introducing ClearLife

- Developer of ClariNet™, the leading business management platform for life settlements.
- Provides consulting and valuation services for US life settlements market and UK longevity products.
- Formed in November 2007.
- Based in United Kingdom.
- Customers in US, UK, Europe, Asia, Australia.

ClearLife Team

- Mark Venn – CEO
  - Formerly with Mizuho International/Credit Suisse/CSFP
  - Set up life settlements investment business at Mizuho (US$1.25bn portfolio)
  - Founded Institutional Life Markets Association (ILMA)
  - Co-author “Life Settlements and Longevity Derivatives” (John Wiley, August 2009)
  - Author “A Guide To Life Settlements” (May 2010)
- Chris Stuart – Pricing/Modeling/Analysis
  - Formerly with Mizuho International/Credit Suisse/CSFB
  - 8 years’ experience of software development and modeling for life settlements
  - 11 years’ prior experience in derivatives financial modeling/software development
- Thierry Suzanne – CTO
  - Formerly with AXA Investment Managers and Thomson Financial
  - 18 years’ experience in software development

2014 VBT Status

- Preliminary report published for SoA member comment in August.
- Some preliminary tables included with that report:
  - Aggregate select and ultimate experience tables
  - NS/SM/Unismoker
  - M/F
  - ANB/ALB
- Relative Risk (RR) tables, Composite Smoking table still outstanding.
- Expected to be delivered with final report in Spring 2015.

Source: NAIC LATF Meeting Presentation August 14, 2014

Changes in Experience

- 2014 VBT tables draw on SoA's Individual Life Experience Committee data from 2002-2009.
- Significant areas of increase include:
  - **Exposure for older issue ages**
  - Females
  - Number of claims
  - Number of contributing companies
  - **Amount of preferred experience**
  - Amount of business that has been blood-tested
  - Amount of business issued with non-tobacco vs non-smoker classification

Source: NAIC LATF Meeting Presentation August 14, 2014

VBT Source Data: Changes in Company Experience

Table	Study	Exposure (USD)	Exposure (Lives)	Death Claims	Contributing Companies
2001 VBT	1990-1995	5.7 trillion	175 million	~1.25 million	21
2008 VBT	2002-2004	6.9 trillion	75 million	0.7 million	35
2014 VBT	2002-2009	30.7 trillion	266 million	2.5 million	51
'14 Increase from '01VBT		439%	52%	100%	143%
'14 Increase from '08VBT		345%	255%	257%	46%

Source: NAIC LATF Meeting Presentation August 14, 2014

Mortality Improvement (Company Experience)

- Common company experience demonstrates overall mortality improvement from 2008 VBT.
- Table below shows actual mortality experience.
  - Expected basis is 2008 VBT RR100 Table.
  - Row 3 shows common companies only, i.e., those contributing to both 2002-2004 and 2002-2009 studies.
  - *Source data: SoA Individual Life Expectancy Reports (2002-2009 Preliminary)*

Study Period	Male	Female	Aggregate	Exposure ($ Trillion)	Death Claims
2002-2004	101.1%	100.5%	100.9%	7.4	699,890
2002-2009	94.2%	94.7%	94.3%	30.7	2,549,490
2002-2009 vs 2002-2004	92.3%	94.3%	92.8%	19.2	1,940,403
2002-2009 $100k+	88.3%	89.2%	88.5%	26.9	162,095
2002-2009 $250k+	84.1%	85.4%	84.4%	20.6	46,570

Source: NAIC LATF Meeting Presentation August 14, 2014

A2E Company Experience confirms Wealth Effect

Face Amount Band ($)	A2E Ratio
50,000 – 99,999	105.6%
250,000 – 499,999	88.6%
1,000,000 – 2,499,999	81.9%
5,000,000 – 9,999,999	74.1%
Aggregate	94.3%

Source: NAIC LATF Meeting Presentation August 14, 2014

Select Period

Issue Age	Male	Female	Issue Age	Male	Female
66-69	18 (22)	16 (21)	84-85	8 (9)	8 (9)
70-72	17 (21)	15 (20)	86	7	7
73-74	16	14	87	6	6
75	15 (19)	14 (19)	88-89	5	5
76	14	14	90	4 (4)	4 (4)
77-78	13	13	91	3	3
79	12	12	92-94	2	2
80-81	11 (14)	11 (14)	95	1	1
82	10	10	96+	0	0
83	9	9			

Figure in brackets represent observed select periods used in developing 2008 VBT for approximate equivalent ages

Sources: 2008 VBT Research Report/NAIC LATF Meeting Presentation August 14, 2014

2014 Preliminary VBT: Mortality Improvement

- Table Date: 2014.
- 2002-2009: Apply actual mortality improvement.
- 2009-2014: Apply average annual improvement rates by attained age/gender, based on general population data (SSA).
  - Averages SSA intermediate level projections and historical data for most recent 10-year period.

Attained Age	Male	Female
25	0.4%	0.4%
35	1.5%	0.8%
45	0.7%	0.0%
55	1.1%	1.2%
65	1.8%	1.2%
75	1.4%	0.8%
85	1.0%	0.4%
90	0.5%	0.1%

Source: NAIC LATF Meeting Presentation August 14, 2014

2014 Preliminary VBT: Male Improvement vs 2008 VBT

- Solve for constant annual mortality improvement rate which when applied to 2008 VBT minimises delta across given select period(s).

Issue Age	MNS 1 to 5	MNS 6 to 10	MNS 11 to 15	MNS 16 to 25	MS 1 to 5	MS 6 to 10	MS 11 to 15	MS 16 to 25
65	2.64%	1.96%	1.09%	0.02%	0.81%	0.58%	0.55%	0.59%
70	3.24%	2.07%	0.52%	0.07%	1.08%	0.53%	0.74%	0.76%
75	4.08%	1.23%	0.18%	0.22%	0.86%	0.78%	1.05%	0.91%
80	5.66%	2.35%	0.27%	0.24%	0.98%	1.93%	1.30%	0.71%
85	7.18%	1.20%	0.39%	0.03%	5.85%	2.35%	1.34%	0.18%
90	3.73%	1.20%	0.30%	-0.26%	5.58%	1.85%	0.76%	-0.26%

- *2008 VBT ANB vs 2014 Preliminary VBT ANB.*
- *Formula: q_x * (1-ImpRate)^(Date-TableDate).*
- *Table Date is assumed to be Jan 1, 2008 for 2008 VBT and Jan 1, 2014 for 2014 Preliminary VBT.*
- *Improvement is assumed to be cumulative.*
- *Sums deltas for annual q_x rates across stated period only.*

Source: ClearLife analysis

2014 Preliminary VBT: Female Improvement vs 2008 VBT

- Solve for constant annual mortality improvement rate which when applied to 2008 VBT minimises delta across given select period(s).

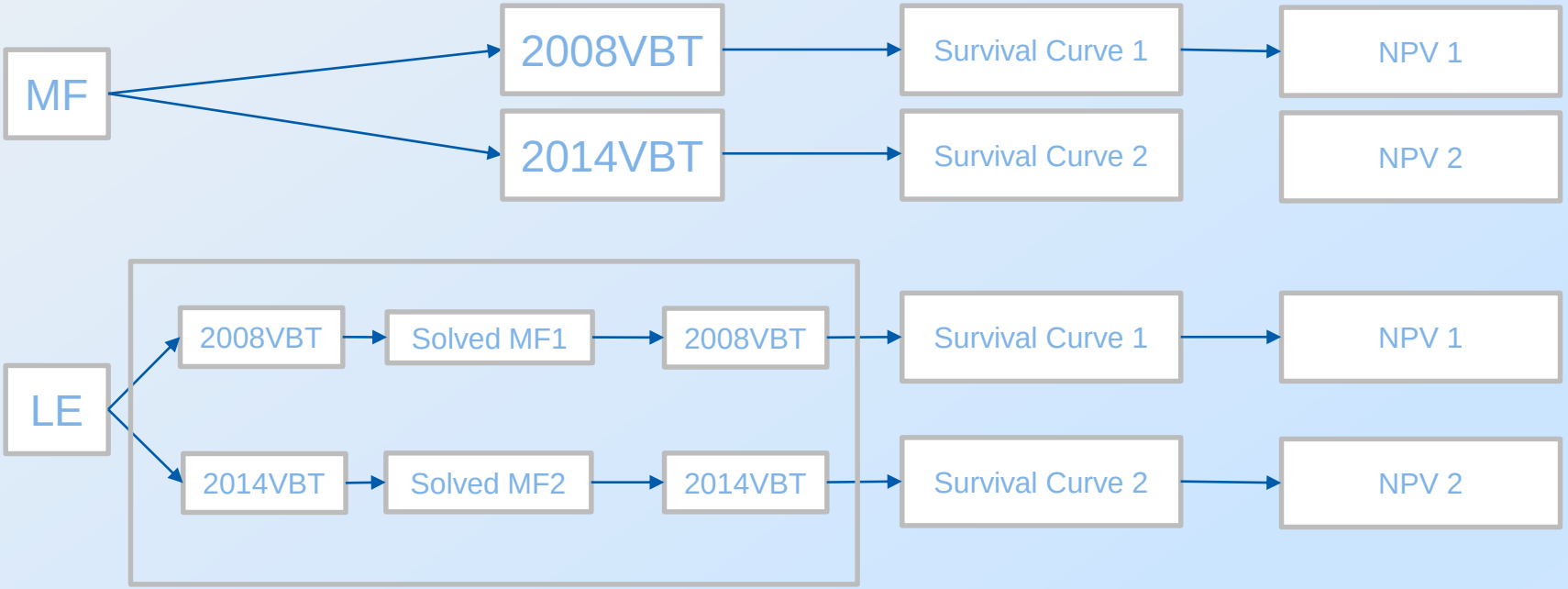
Issue Age	FNS 1 to 5	FNS 6 to 10	FNS 11 to 15	FNS 16 to 25	FS 1 to 5	FS 6 to 10	FS 11 to 15	FS 16 to 25
65	1.29%	1.64%	0.40%	0.09%	0.55%	-0.41%	-0.16%	-0.11%
70	3.83%	0.87%	-0.14%	-0.06%	-0.63%	-0.72%	-0.79%	-0.12%
75	4.18%	0.66%	0.22%	-0.27%	-1.56%	-1.65%	-0.32%	-0.06%
80	3.64%	1.91%	-0.05%	-0.27%	-3.61%	-0.32%	-0.08%	0.07%
85	7.30%	0.73%	-0.56%	-0.22%	2.74%	0.40%	-0.07%	-0.06%
90	2.25%	-0.77%	-0.29%	-0.32%	2.40%	-0.10%	0.21%	-0.32%

- *2008 VBT ANB vs 2014 Preliminary VBT ANB.*
- *Formula: q_x * (1-ImpRate)^(Date-TableDate).*
- *Table Date is assumed to be Jan 1, 2008 for 2008 VBT and Jan 1, 2014 for 2014 Preliminary VBT.*
- *Improvement is assumed to be cumulative.*
- *Sums deltas for annual q_x rates across stated period only.*

Source: ClearLife analysis

LE50 versus Mortality Factor

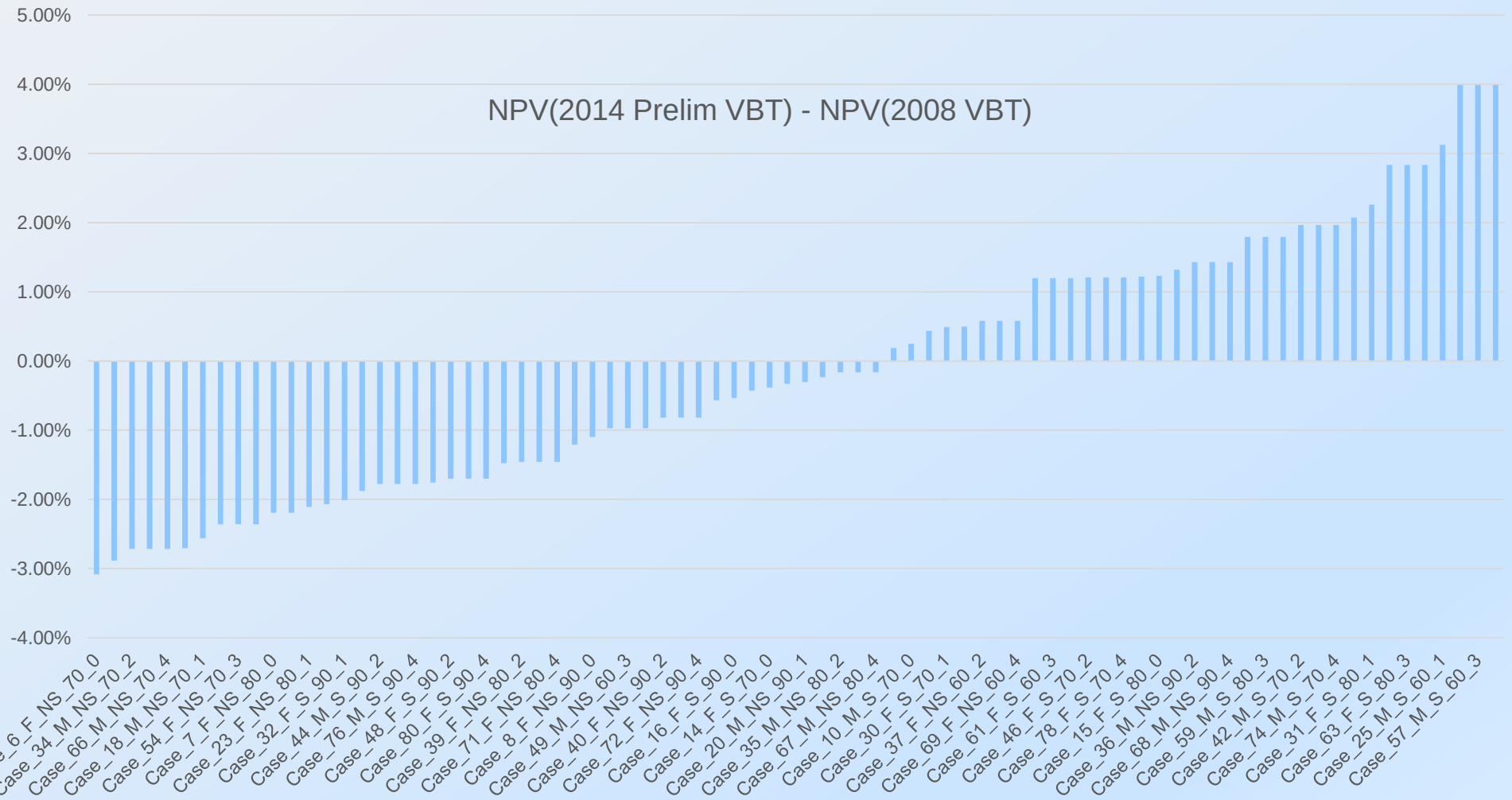
Two of the methods of pricing from underwriting information



Factors Impacting NPV Calculations

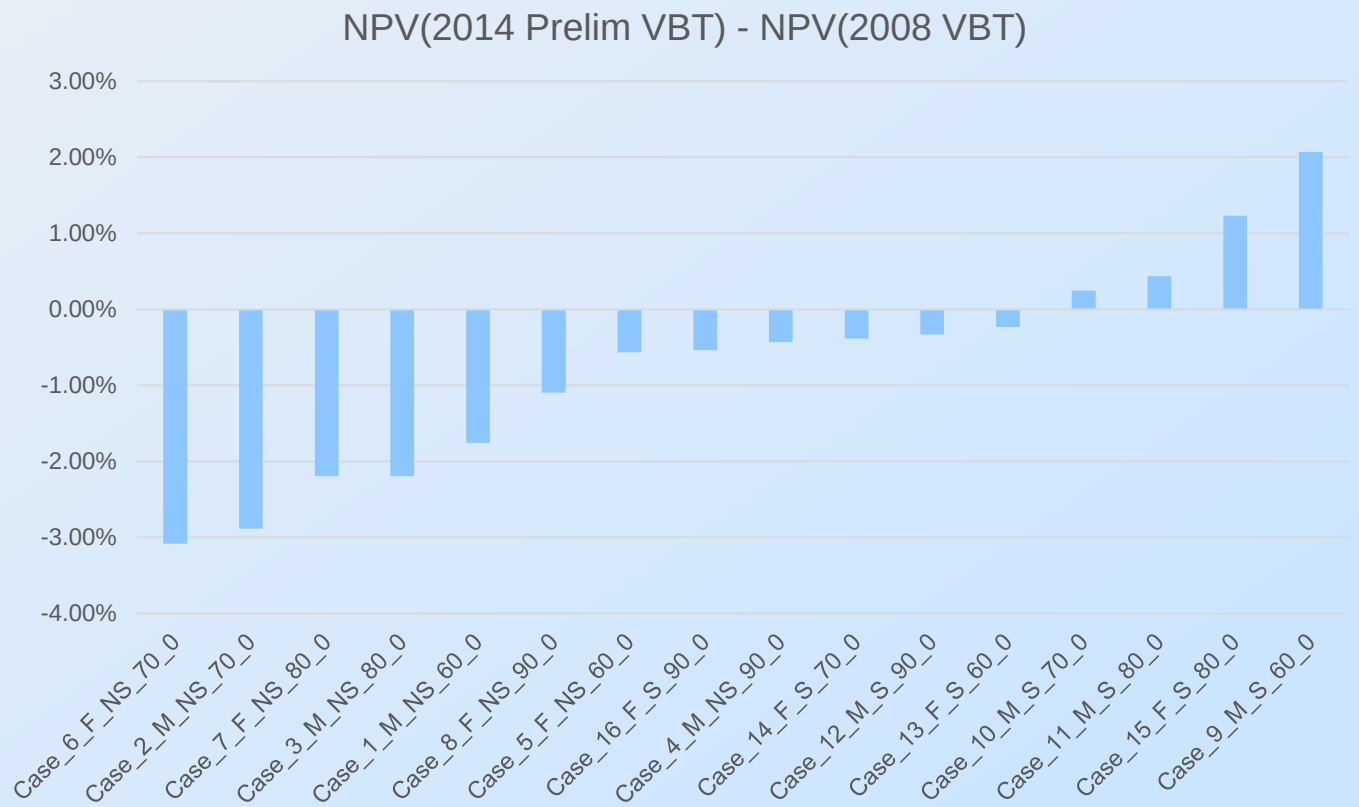
- Generated a portfolio of insured lives with a range of characteristics (80 cases):
  - Age 60, 70, 80, 90
  - Male and Female
  - Select period 1, 2, 3, 4, 5
  - Smoker, Non-smoker
- Built survival curves using method 2 (with LE50s based on 150% MF 2008 VBT).
- Looked at the NPV of the death benefit stream, discounted at 12% and compared 2008 VBT to 2014 Preliminary VBT.
- Characteristics of cases that benefit (i.e., higher NPV):
  - Young
  - Smokers
  - 90+ year old
  - Higher select period (older LE reports)

Factors Impacting NPV Calculations



Factors Impacting NPV Calculations

Drilling down to a subset of cases with recent underwriter reports



Factors Impacting NPV Calculations

Looking at 3 cases:

F_NS_70 (-3%): 2014 Prelim VBT gives lower value

M_S_60 (+2%): 2014 Prelim VBT gives higher value

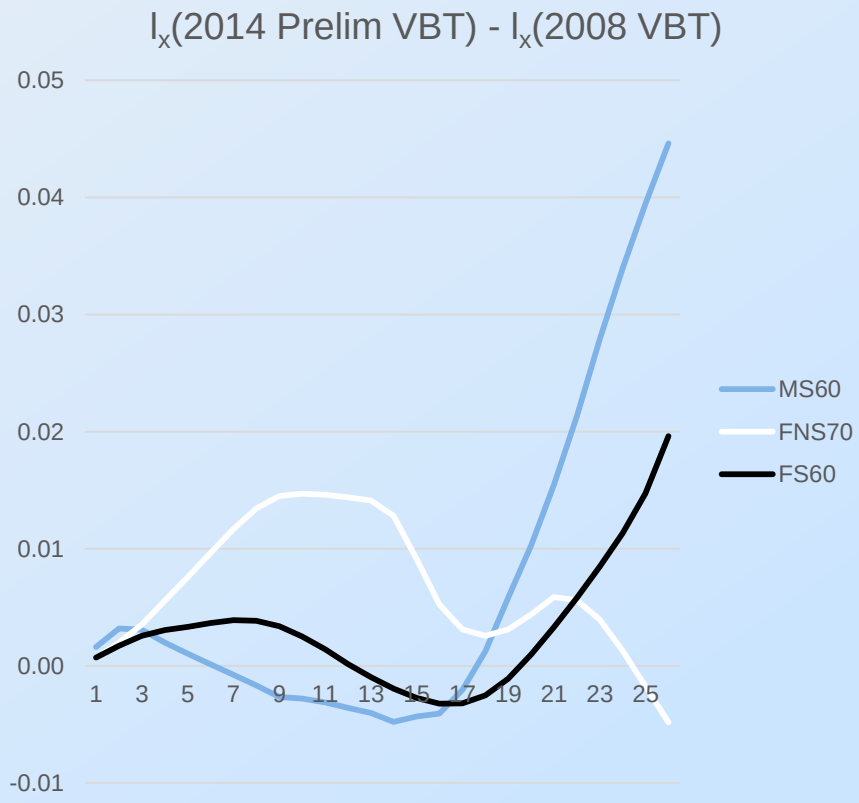
F_S_60 (0%): 2014 Prelim VBT makes little difference

Observations:

F_NS_70 has higher early l_x (less mortality) in 2014 Prelim VBT

M_S_60 has lower early l_x in 2014 Prelim VBT

F_S_60 is in-between

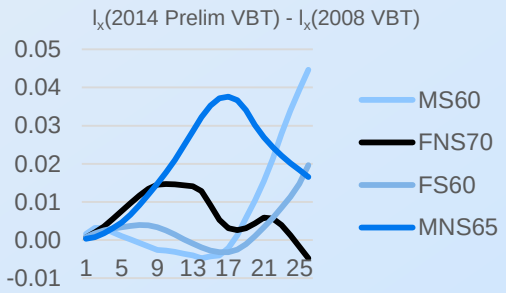


The Impact of Mortality Improvement

Table/Improvement	NPV
2008 VBT	$79,000
2008 VBT + 0.5%	$81,000
2008 VBT + 1.00%	$83,500
2014 Prelim VBT	$73,000

M_NS_65 Case

Discount rate 12%



- Back-solving for an implied mortality factor from an underwriter's LE50 only considers the total area under the survival curve.
- In this case, 2014 Preliminary VBT has lower early mortality than 2008 VBT, so back-solving results in a higher implied mortality factor.
- Fewer early deaths => More late deaths (still prior to the LE50!). Higher discount rate, ergo lower NPV.
- Improved 2008 => more improvement at back of curve BUT higher mortality factor to match LE50, ergo higher NPV due to earlier cashflows.

Portfolio Valuation: Comparing LE to MF

- $43.3M Face Amount across 82 policies.
- Originated between 2009 and 2014.
- 88 surviving lives with attained age between 55 and 98 (average 82).
- LE50 between 12 months and 152 months (average 81 months).
- Old underwriter reports.

Backsolving from LE50

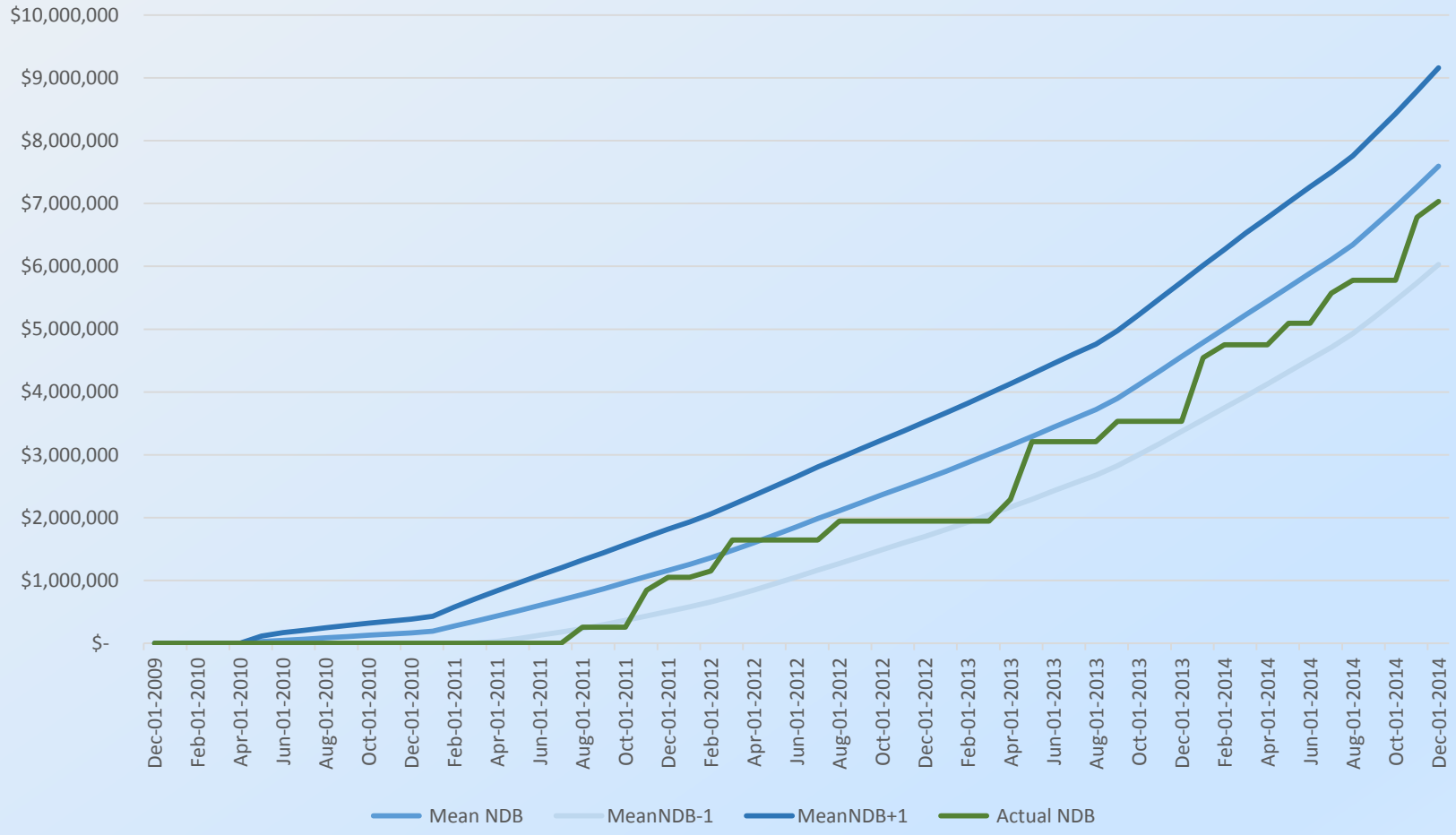
Table/Improvement	NPV	Delta %
2008 VBT	$16,503,122	
2008 VBT + 1.00%	$16,433,511	-0.42%
2008 VBT + 2.00%	$16,366,858	-0.83%
2014 Prelim VBT	$17,070,435	3.44%

Constant Mortality Factor (215%)

Table/Improvement	NPV	Delta %
2008 VBT	$16,475,618	
2008 VBT + 1.00%	$15,069,198	-8.54%
2008 VBT + 2.00%	$13,549,872	-17.76%
2014 Prelim VBT	$13,274,823	-19.43%

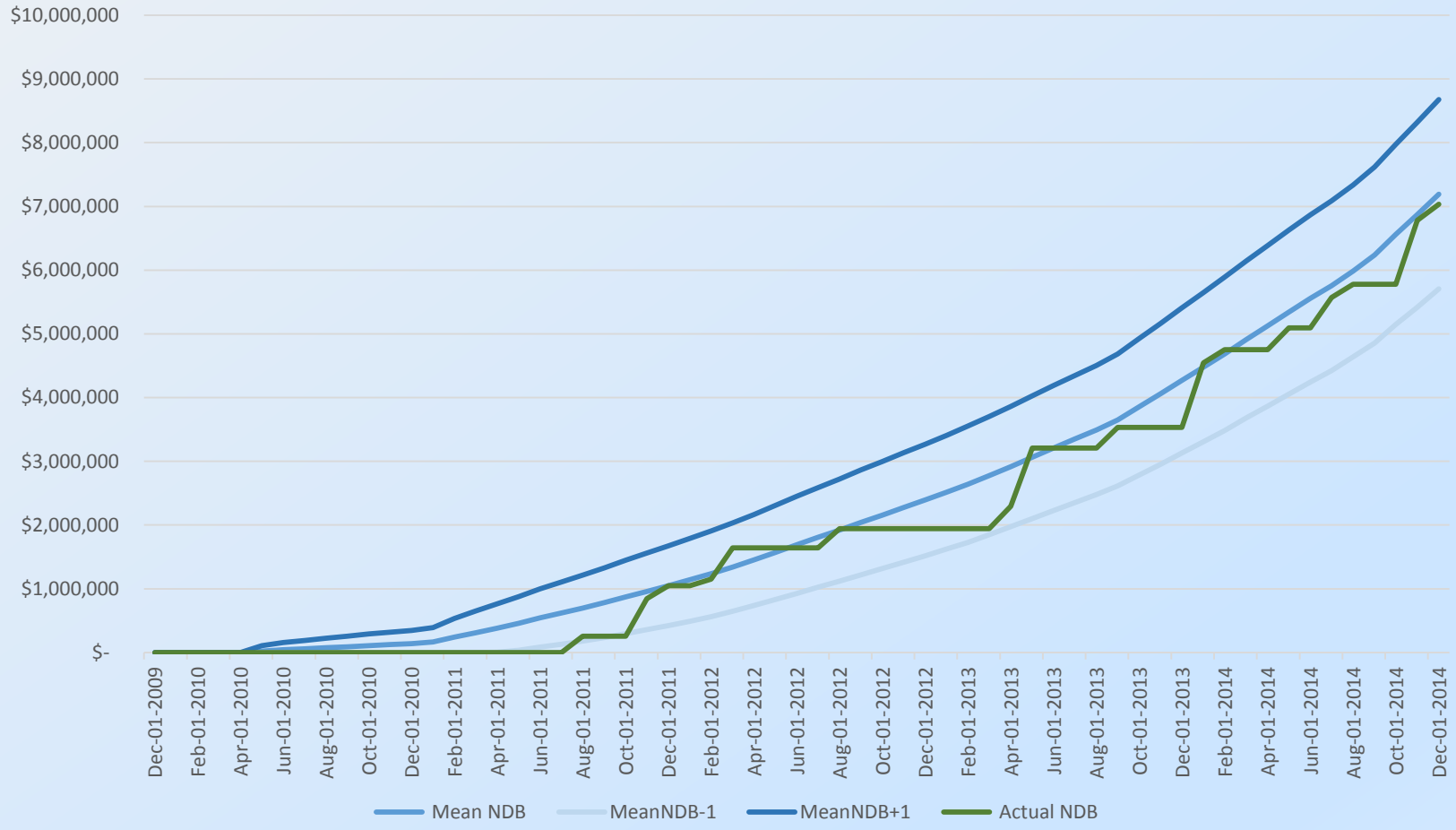
Source: ClearLife analysis

Actual vs Expected using 2008 VBT



Source: ClearLife analysis

Actual vs Expected using 2014 Preliminary VBT



Source: ClearLife analysis

Conclusions

- If pricing is done using LE50, the specific characteristics of each case will determine the change in PV (between 2008 VBT and 2014 Preliminary VBT) as well as its magnitude.
- Changes can be negative or positive!
- Table improvement will often lead to an increase in NPV. Making the assumption that having used improvement with 2008 VBT reduces the impact of 2014 Preliminary VBT may not be correct.
- Will impact new acquisition pricing more than established portfolios because of early select period delta.
- Curve appears to fit actual LS performance (slightly) better.
- Underlying data set from the 2002-2009 study is a better fit for the LS market but still far from perfect.

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