Paying for long term care insurance: The pros and cons of different payment methods

Les Mayhew

Ben Rickayzen

David Smith

Caring for an ageing UK population

% of population age **65** and over
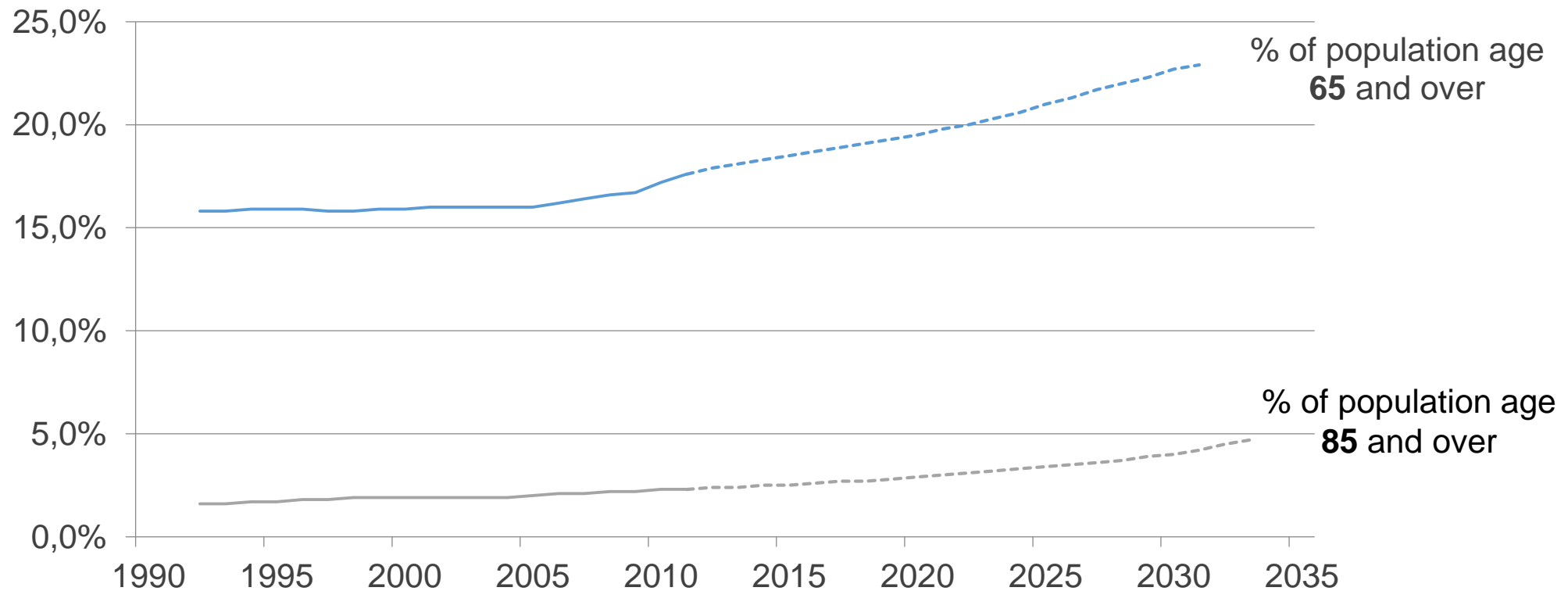
% of population age **85** and over

Cass Business School
CITY UNIVERSITY LONDON

Social care in crisis

- Very few people have prepared for the costs of long term care (LTC)

- Most people assume NHS will provide - but it won't!

- New savings incentives are urgently required

- Inadequate planning for demographic realities

Cass Business School
CITY UNIVERSITY LONDON

Insuring the risk

- As people perceived that the government would take care of them there has been little demand to insure care risk

- This is changing due to people experiencing friends and/or family needing to finance their care needs

- To fully indemnify care costs is high risk due to the uncertainty of demographic changes, the development of new treatments and their cost

- Instead, we propose a product that pays two amounts, linked to price inflation, when a person requires care at home or residential care

Valuing the benefits

- We envisage four possible pathways that a policyholder may take

- Pathway 1 : The person dies requiring no care

- Pathway 2 : Before the person dies they require care to help live in their own home, but never need residential care

- Pathway 3 : The person spends time requiring care to help them live in their own home and also spends time in a residential care home

- Pathway 4 : The person goes from an independent state to requiring residential care before dying

Assumptions/Notation

- Assume everyone has same mortality rate (but that rate is still age dependent) regardless of pathway
- Assume annuity paid continuously
- Assume discount rate is i % pa
- Assume annuity increases in payment (continuously) at k % pa
- Let Y be the current annual annuity paid while needing moderate care (assumed to remain in home)
- Let Z be the current annual annuity paid while needing severe care (assumed to move into residential care home)
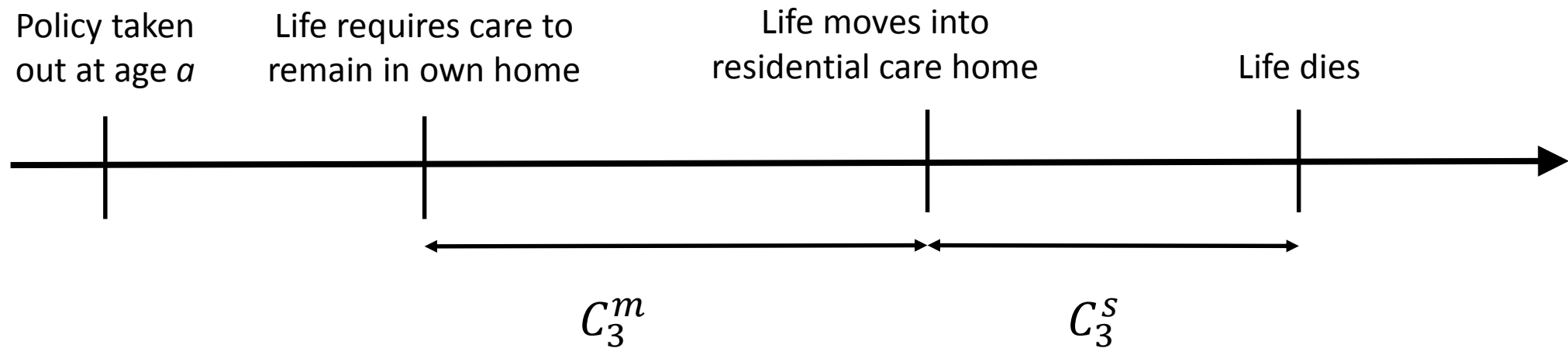
Assumptions/Notation

- Let a = age at commencement of policy
- C_2^m = length of time spent in moderate care with pathway 2
- C_3^m and C_3^s = length of time in moderate and severe care, respectively, with pathway 3
- C_4^s = length of time in severe care with pathway 4
- assuming p_f % of people are in pathway f where f = 1, 2, 3, 4

Cass Business School
CITY UNIVERSITY LONDON

Illustration of pathway 3

Policy taken out at age a — Life requires care to remain in own home — Life moves into residential care home — Life dies

C_3^m — C_3^s

Calculation of benefits

$$= p_1.0 + p_2.pv_2 + p_3.pv_3 + p_4.pv_4 \qquad \text{where } pv = \text{Present Value, and}$$

$$pv_2 = \sum_{t=a+c_2^m}^{\omega} \frac{d_t}{\ell_a} \cdot \bar{s}_{c_2^m}^{j\%} v^{t+\frac{1}{2}-a} \times Y$$

$$pv_3 = \sum_{t=a+c_3^m+c_3^s}^{\omega} \frac{d_t}{\ell_a} \left(\bar{s}_{c_3^m}^{j\%} \times Y \times (1+i)^{c_3^s} + \bar{s}_{c_3^s}^{j\%} \times Z \right) \times v^{t+\frac{1}{2}-a}$$

$$pv_4 = \sum_{t=a+c_4^s}^{\omega} \frac{d_t}{\ell_a} \times \bar{s}_{c_4^s}^{j\%} \times Z \times v^{t+\frac{1}{2}-a} \qquad \text{where} \quad \frac{1}{1+j} = \frac{1+k}{1+i} \Rightarrow j = \frac{1-k}{1+i}$$

Adjustment to formulae

- We assume that no matter what age a person is the probability of going down a particular path is the same

- However, for a person to go down path 2, for example, they must survive C_2^m years as we assume this is the time they spend in care

- For old lives, this means the proportion who go down any sickness path is reduced as early deaths cannot be in care

- We thus adjust the formula to gross up the number going down each sickness path. For example, the probability of path 2 becomes

$$pv_2 = \sum_{t=a+c_2^m}^{\omega} \frac{d_t}{\ell_a} \cdot \bar{s}_{c_2^m}^{j\%} v^{t+\frac{1}{2}-a} \times Y \times \frac{\ell_a}{\ell_{a+c_2^m}} = \sum_{t=a+c_2^m}^{\omega} \frac{d_t}{\ell_{a+c_2^m}} \cdot \bar{s}_{c_2^m}^{j\%} v^{t+\frac{1}{2}-a} \times Y$$

Paying for the cover

- To allow people at different stages of life and with different mixes of assets and income we see a number of variations in paying for this cover
    - Single premium
    - Regular premium (can be inflation-linked) until care required or death
    - Regular premium (can be inflation-linked) until care required or death or a maximum age is reached. We refer to this as the 'capped' premium
    - Equity release where a percentage of the home is ceded to pay for cover and the house is sold when the person dies or moves into residential care
    - A loan is secured on the home and is recovered on the sale of the house when the person dies or moves into residential care

Cass Business School
CITY UNIVERSITY LONDON
EST 1894

Formulae for regular premium

- The most complex formulae is for regular premium. Again we need to think about the different sickness pathways

- Assume *P* = level annual premium paid annually in advance

$$pv^p = p_1 . pv_1^p + p_2 . pv_2^p + p_3 . pv_3^p + p_4 . pv_4^p$$

$$pv_1^p = \sum_{t=a}^{\omega} P . \frac{\ell_t}{\ell_a} v^{t-a}$$

$$pv_2^P = \sum_{t=a+c_2^m}^{\omega} P . \frac{d_t}{\ell_a} \left(a_{t-a-c_2^m} + 1 \right) \times \frac{\ell_a}{\ell_{a+c_2^m}} = \sum_{t=a+c_2^m}^{\omega} P . \frac{d_t}{\ell_{a+c_2^m}} \left(a_{t-a-c_2^m} + 1 \right)$$

Formulae for regular premium (cont.)

$$pv_3^p = \sum_{t=a+c_3^m+c_3^s}^{\omega} P.\frac{d_t}{\ell_a}\left(a_{t-a-c_3^m-c_3^s}+1\right) \times \frac{\ell_a}{\ell_{a+c_3^m+c_3^s}} = \sum_{t=a+c_3^m+c_3^s}^{\omega} P.\frac{d_t}{\ell_{a+c_3^m+c_3^s}}\left(a_{t-a-c_3^m-c_3^s}+1\right)$$

$$pv_4^p = \sum_{t=a+c_4^s}^{\omega} P.\frac{d_t}{\ell_a}\left(a_{t-a-c_4^s}+1\right) \times \frac{\ell_a}{\ell_{a+c_4^s}} = \sum_{t=a+c_4^s}^{\omega} P.\frac{d_t}{\ell_{a+c_4^s}}\left(a_{t-a-c_4^s}+1\right)$$

Premium calculation assumptions

- Inflation = 2% p.a.
- Investment Return = 4% p.a.
- House Price Inflation = 3.5% p.a.
- Mortgage on Home = 4.5% p.a.
- Maximum age when premiums cease for capped version = 85
- Current value of benefit when cared for at home = £10,000 p.a.
- Current value of benefit when in residential care = £25,000 p.a.

Cass Business School
CITY UNIVERSITY LONDON
EST 1894

Premium calculation assumptions (cont.)

Care Route	Proportion going via routes	Time Spent in care states (years)	
		Home	Residential
No care	70%	0	0
Only home care	10%	4	0
Home and residential	10%	3	2
Only residential care	10%	0	2

Premiums (£) for selected ages

Age	Single premium	Regular premium	Regular IL premium	Capped premium	Capped IL premium	Equity Release	Mortgage on home
50	9,298	508	383	525	406	10,923	7,900
55	10,109	597	464	625	499	11,621	8,780
60	10,958	713	571	760	627	12,335	9,722
65	11,831	869	718	952	813	13,052	10,712
70	12,706	1,087	925	1,249	1,106	13,753	11,728
75	13,546	1,400	1,227	1,773	1,630	14,409	12,727

Annual premium when premiums cease at 85
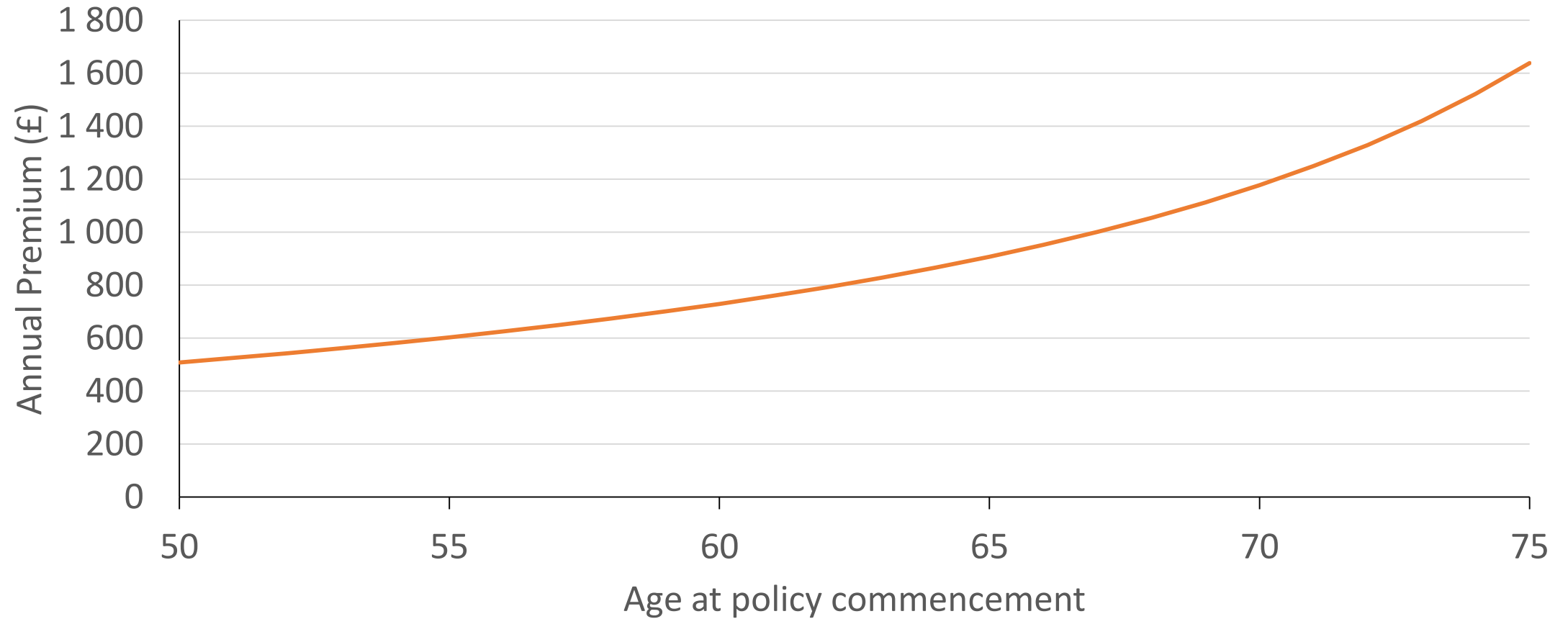
Factors determining choice of funding method

- Which funding method is 'optimal' will change through a person's lifetime and will depend on
  - Income now vs. future income
  - Do they have a spouse?
  - Do they have children?
  - Do they own their own home?
  - How important leaving a bequest is

Age 50, no children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1						X	✓	X
2	✓			✓		X	✓	X
3		✓		✓		✓	✓	X
4			✓	✓		X		✓
5	✓	✓		✓			✓	X
6		✓	✓	✓		✓	✓	✓
7	✓		✓	✓		X	✓	✓
8	✓	✓	✓	✓			✓	✓

Age 50, young children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1				✓	X	X	X	X
2	✓			✓	X	X	X	X
3		✓					✓	X
4			✓		X	X	X	✓
5	✓	✓					✓	X
6		✓	✓				✓	✓
7	✓		✓	X	X	X	X	✓
8	✓	✓	✓				✓	✓

Age 50, independent children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1				✓		X	✓	X
2	✓			✓		X	✓	X
3		✓		✓		✓	✓	X
4			✓	✓		X		✓
5	✓	✓		✓			✓	X
6		✓	✓	✓		✓	✓	✓
7	✓		✓	✓		X	✓	✓
8	✓	✓	✓	✓			✓	✓

Age 65 (at retirement), no children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1				✓	X	X	X	X
2	✓			✓	X	X	X	X
3		✓		✓	✓	✓	✓	X
4			✓		X	X	X	✓
5	✓	✓			✓		✓	X
6		✓	✓	✓				✓
7	✓		✓		X	X	X	
8	✓	✓	✓	✓	✓	✓	✓	

Age 65 (at retirement), independent children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1				✓	X	X	X	X
2	✓			✓	X	X	X	X
3		✓			✓	✓	✓	X
4			✓	✓	X	X	X	✓
5	✓	✓			✓	✓	✓	X
6		✓	✓		✓			✓
7	✓		✓	✓	X	X	X	
8	✓	✓	✓		✓	✓	✓	

Cass Business School
CITY UNIVERSITY LONDON
EST 1894

Age 75 (during retirement), no children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1				✓	X	X	X	X
2	✓			✓	X	X	X	X
3		✓		✓			✓	X
4			✓	X	X	X	X	✓
5	✓	✓					✓	X
6		✓	✓				✓	✓
7	✓		✓	X	X	X	X	✓
8	✓	✓	✓				✓	✓

Age 75 (during retirement), independent children

Person type	Spouse	Pension savings	Mortgage – free home owner	No Action	Single Premium	Regular Premium	Age capped premium	Equity Release
1				✓	X	X	X	X
2	✓			✓	X	X	X	X
3		✓					✓	X
4			✓		X	X	X	✓
5	✓	✓					✓	X
6		✓	✓				✓	✓
7	✓		✓	X	X	X	X	✓
8	✓	✓	✓				✓	✓

Cass Business School
CITY UNIVERSITY LONDON
EST 1894

Impact on net present value of different outcomes

- The 'correct' choice can also be viewed by net present value of the policy
- This will be determined by actual events which will, of course, not be known at the start
- Assuming that no care is needed, then the best choice was to forgo insurance
- Assuming that insurance was purchased then early deaths mean that single premiums and capped premiums are worse whereas regular premiums that are inflation-linked are best
- Conversely, a late death would mean that single and capped premiums are best whereas inflation-linked regular premiums are worse

Impact on net present value of different outcomes (cont.)

- If care is needed then, generally, if more than one year of home care is required, the policyholder 'wins'
- The win becomes bigger the longer they need care and the higher the level of care required
- However, as the policy may not cover all costs this 'win' can be deceiving
- The best choice of funding depends on when care is first required and follows similar arguments to before

Impact on net present value of different outcomes (cont.)

- The true cost of equity release will also depend on the increase in the value of the home compared to that assumed in the pricing basis

Conclusions

- This type of insurance will never be a popular sell as it forces people to think about events they wish to ignore

- However, as society ages, this ignorance will be harder to maintain

- While insurance companies may want to focus on net present values it is probably more important to view how cash-flows will affect the lifestyle of the policyholder i.e. we need to consider utility rather than just costs

- Making the purchase of long term care insurance as painless as possible is likely to be the way forward