

# IAA Risk Book

## Chapter 18— Policyholder Behaviour and Management Actions

Jari Niittuinperä

### 1. Executive Summary

Business planning is based on assumptions about the future. In practice these assumptions involve many sources of uncertainties. A key example is policyholders' future behaviour that can have a significant effect on the amount and timing of insurable risks and costs of the company. To the extent that policyholder<sup>1</sup> behaviour (or because of other reasons) will lead to adverse results, the company may have to take measures to change its strategies and policies accordingly. A company needs to anticipate the potential range of policyholder behaviour and its financial impact.

The utilization of options embedded in insurance contracts may affect both the cash inflows and cash outflows of the company. Actions taken by management to mitigate policyholder action (or inaction) are called management actions. This chapter addresses only those management actions that can influence policyholder behaviour or its effects, both through the design of the products and subsequently.

Key messages of this chapter include:

1. The companies have traditionally understood the existence of policyholder behaviour and taken it into account in product design and business planning. However, due to change of business environment and new solvency and accounting regulation it has become more important to understand the behaviour better.
2. Policyholder behaviour depends on the type of insurance. There are for example differences in behaviour of life and non-life policyholders.
3. The exercise of certain policyholder options can significantly affect the insurer's solvency. Proper risk management of these options can impact pricing, valuation hedging and solvency in a material manner.
4. Managing policyholder behaviour risks requires co-ordination within the company from actuaries, risk managers, investment personnel and lawyers, as well as those in marketing and who have day-to-day contact with policyholders and their advisors.
5. Policyholder behaviour affects both the quantity and quality of the company's liabilities resulting that the liabilities become less-profitable. In some cases it affects the capital requirements, relating to the insurance portfolios and the claims payable. This behaviour may affect the company in either a positive or negative manner.
6. Legal requirements should be taken into account when anticipating policyholder behaviour in certain situations, such as when calculating technical provisions. Policyholder behaviour should be taken into account during the entire policy cycle as well as in the product design phase.

---

<sup>1</sup> Policyholder in this chapter refers not only to policyholders but in some cases also to the insured and the beneficiaries.

7. Actuarial modelling is often required to estimate the impact of policyholder behaviour and to understand its impact on cash flows. The models can be simple ones, having only one parameter; they can also be complicated stochastic models. Effective modeling requires statistical analysis and understanding the drivers of policyholder behaviour.

This chapter, rather than concentrating on alternative modeling techniques, focuses on the dynamics of policyholder behaviour and related management actions, as well as tools that can be used by the company's management and board and its supervisors to better understand the sensitivity of company results to policyholder behaviour and to challenge the assumptions made.<sup>2</sup>

## 2. Identification of Policyholder Behaviour

Policyholder behaviour should be considered during the product design phase. The assumptions made during this phase should be assessed and verified later during the product management cycle. In product development, it is not essential to design products so that policyholder behaviour does not impact profitability. However, it should recognize and estimate its potential impact so as to avoid options which could be too costly relative to the product's price and market.

To this end, the company should identify the options available in the policies and the range of expected outcomes of both rational and irrational behaviour of the policyholders.

There is normally a trigger that results in the exercise of rational behaviour. If a mathematical model includes the same trigger, then the expected exercise can be incorporated in the assumption used.

Rational behaviour can arise, for example, when a policyholder terminates his motor insurance policy because he is able to obtain the same cover from another insurance company at a lower price. It also occurs where a policyholder surrenders her life insurance policy when the surrender value is greater than the value of continuing the policy in force to the policyholder at the end of the policy period.

The first example above illustrates the competitive pressure companies face. However, it may be difficult to forecast the extent of this occurring, policyholders' reaction and any consequential adverse effect on the renewing in-force business of potential anti-selection. The second example illustrates an example that companies have even now normally taken into account in determining the premiums and designing the terms and conditions of their policies.

Policyholders can also exhibit what appears to be irrational behaviour. This can occur when a policyholder terminates a policy, even though the guaranteed interest is higher than the expected yield from alternative investments. Irrational policyholder behaviour is common. This has been studied by actuaries and behavioural economists which will be discussed later in this chapter. When modelling policyholder behaviour, also irrational behaviour should be anticipated and modelled.

One reason irrational behaviour arises is that policyholders often do not have enough information available to make rational decisions. Irrational behaviour in general reduces as market information regarding the option and other market data becomes well known. It also arises when factors such as convenience or value of a brand exist. Seemingly irrational behaviour can also occur as a result of

---

<sup>2</sup> Discussion of modeling techniques can be found in IAA: Stochastic Modeling - Theory and Reality from an Actuarial Perspective, pp. 145 – 147.

*To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)*

policyholder circumstances independent of the contract itself (e.g., a need for cash, or reaction to media coverage of the company).

Moral hazard, anti-selection and insurance fraud will impact policyholder behaviour. The effect of moral hazard and insurance fraud can also represent operational risks.

### 3. Recognition of Policyholder Behaviour

The effect of the use of policyholder options should be assessed during the product design and pricing phases of product development because they can affect the profitability of the product and the business decision-making. For instance, their impacts on the expected cost of guarantees and the cost and feasibility of proposed hedging arrangements should be analyzed. Special attention to terms and conditions is needed in order to reduce the effect of moral hazard and anti-selection.

Policyholder behaviour should be taken into account when projecting future cash flows. This applies not only to the calculation of premiums and technical provisions, but also to the development of stress tests, sensitivity tests, ALM calculations, replicating portfolios and market consistent economic values.

When calculating technical provisions for accounting and solvency requirement purposes, there may be rules regarding whether policyholder behaviour can be or has to be taken into account in the estimation of cash flows; for example, whether policy lapses can be incorporated in these calculations. In some jurisdictions these rules include the anticipation of policyholder behaviour.

For example, Solvency II regulation<sup>3</sup> requires explicitly that policyholder behaviour has to be taken into account: "When determining the likelihood that policy holders will exercise contractual options, including lapses and surrenders, insurance and reinsurance undertakings shall conduct an analysis of past policyholder behaviour and a prospective assessment of expected policyholder behaviour."

IFRS ED 4 mentions in the article 22 (d) that the estimates of cash inflows and cash outflows shall "incorporate, in an unbiased way, all of the available information about the amount, timing and uncertainty of all of the cash inflows and cash outflows that are expected to arise as the entity fulfils the insurance contracts in the portfolio". Further, the IFRS application guidance states in paragraph B63 that "the measurement of an insurance contract shall reflect, on an expected value basis, the entity's view of how the policyholders in the portfolio that contains the contract will exercise options available to them, and the risk adjustment shall reflect the entity's view of how the actual behaviour of the policyholders in the portfolio of contracts may differ from the expected behaviour". It is anticipated that the IASB will require recognition of policyholder behaviour in IFRS 17.<sup>4</sup>

Accounting and regulatory rules also include provisions relating to contract boundaries<sup>5</sup>. The contract boundary is the point after which premium cash flows associated with insurance coverage may not be recognized. It is a contract level boundary between existing and future business. Current contract boundary regulations usually take into account both policyholder behaviour and eventual

---

<sup>3</sup> See Commission Delegated Regulation (EU) 2015/35, art 26 (implementing measures on Solvency II)

<sup>4</sup> Insurance Contracts – Exposure Draft ED/2013/7, IFRS – IFRS 17 will be published in the second half of 2017.

<sup>5</sup> E.g. IFRS ED 4 art. 22 (e), 23, 24 and B62 – 64 and Commission Delegated Regulation (EU) 2015/35 art 18 (implementing measures on Solvency II)

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***

management actions. For example, if the company can terminate a contract, reject premiums or amend the premiums or benefits, then the expected reactions of the policyholder must be anticipated and reflected.

In the case of some ORSA scenarios, ALM models and calculations of market consistent economic value, it may be appropriate to ignore regulatory or accounting based contract boundary limitations and apply assumptions of policyholder behaviour until the risks have expired. Especially when the contract boundary is one year or less and the company wants to include the new sales in the scenarios, other contract boundary definitions may be used.

#### **4. Typical Policyholder Options**

Policyholder options affect the policyholder behaviour.

Policyholder options depend on the terms and conditions of the products involved. The longer the guaranteed coverage period of the contract, the more likely that the contract contains options that need special attention.

In insurance lines where the contracts are renewed regularly (usually annually), the main concern is the extent to which the policyholders renew or continue their contracts.

The following is a non-exhaustive list of common options in life insurance and annuity policies:

1. lapses and surrenders
2. changes of insurance cover or change in other features
3. changes or payments of premiums/contributions to the policy
4. alternative indemnities (lump sum/annuities)
5. loyalty bonuses (within a company or a group)
6. paid-up policy options
7. taking out or repaying policy loans
8. continued insurance
9. flexible pension start and end age
10. at end of savings period, payment as lump sum or as an annuity
11. selection and change of funds in unit linked policies
12. switch-option (reallocation of underlying assets between funds and with profit reserves)
13. options embedded in variable annuities
14. settlement options at death, maturity or surrender.

Many options are of great financial importance for the companies because of the guarantees embedded in the future premiums of a policy. Such options are especially the switch-option and option to continue the policy after the original maturity date.

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***

## 5. Triggers Affecting Utilization of Options Embedded in the Policies

The following are some of the reasons why a policyholder exercises options:

1. Change in need for coverage: The policyholder sells his car or after a divorce there is no need for a mutual (joint) life insurance policy.
2. Mortality anti-selection: The policyholder chooses between alternative indemnities, e.g. pension and lump sum.
3. Immediate need for money: The policyholder builds a house or her financial situation deteriorates.
4. An increase in premium or decrease of benefits, especially when compared to significant guarantees by competitors.
5. Change in economic environment: The policyholder alters his choice of the economic options available in the contract based on a perception of improved economic value (e.g. an increase or decrease in rate of contributions).
6. It is beneficial to use the option: Expectation of projected future development of the surrender value is less than the current surrender value, e.g. the case in variable annuities.
7. Change in regulation, tax-deductibility, or state or employer benefit provisions.
8. Influence of the distribution channel: influence and recommendations of the sales agent affect the decisions of the policyholders.
9. Change in competition: Competitors start selling the cover at a lower premium; newcomers offer more competitive premiums or contractual features; or substitute investment products become available.
10. Claims practices: Rejection of a claim may cause dissatisfaction, leading to switches in company.
11. Change in insurer's reputation: news of unethical practices of the company or poor financial situation.

To model the potential cost of these options it is necessary to understand the underlying triggers. Sometimes the primary trigger can be quite unexpected. For example, SARS (severe acute respiratory syndrome) caused people to cancel trips to Singapore which caused an economic downturn with lay-offs. As a result, laid-off employees then lapsed their policies. While the reason for the massive number of lapses was the change in the economic environment, the trigger was SARS.

A health insurance example is where a company could give policyholders a company card for paying health-related expenses. This made it easier for the policyholders to see a doctor, which increased the number of claim events. In this special case the change in behaviour of the doctors caused an increase in claim expenses because the doctors knew that the patients did not need cash to make additional medical appointments and examinations. This option increased claims paid as a whole; as a result, the company took the management action to terminate the use of company cards.

*To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)*

It should be noted that the use of an option can result in either positive or negative financial results. For example, in a low interest rate environment lapsation of a policy may benefit the company because it loses an unprofitable contract. However, quite often the use of the option is adverse.

## 6. Lessons Learned

Some options have turned out in the long run to be quite costly for insurers. Here we present some examples:

- Long term guarantees

During the current low interest rate environment some companies have found out that interest guarantee provided in some of their long-term life and annuity products with profit participation features was too aggressive. For example, ten years ago 4 – 5 % interest guarantees were not considered unusual, while currently even a 0 % guarantee represents a guarantee with value and possible cost. Even though the companies may have hedged their interest rate risks, the policies may have had options that allow future premiums and deferred annuities to be entitled to the same guarantees. Also, an option to amend the annuity period by postponing the timing of annuitization has proven costly. Many companies no longer offer such investment risks and sell unit linked products instead.

- Universal Life

Highly flexible universal life policies have created the situation where premiums combined with remaining funds have been insufficient to cover the mortality costs of the insurance and the policies have lapsed.

- Variable annuities

Another set of products that may become costly have been variable annuity products with special rider guarantees. The following set gives a good picture of the many products in the market:

GMDB	Guaranteed Minimum	Death Benefit
GMWB	Guaranteed Minimum	Withdrawal Benefit
GMAB	Guaranteed Minimum	Accumulation Benefit
GMIB	Guaranteed Minimum	Income Benefit

The guarantee itself varies by product, such as a return of paid premiums with/without loadings or with bonuses and possibly with a ratchet provision.

Because policyholders can make decisions regarding the type of assets invested and the guarantees provided result in the companies bearing some of the investment risks for these assets, the products can be costly for the companies. There is also an eventual

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***

possibility for anti-selection if the value of the linked investments is below the guaranteed minimum.

Managing the risks of variable annuity products quite often requires stochastic calculations. However, e.g., the death cover of GMDB product may be charged annually and its annual premium equals the economic cost to the company. This aspect of the contract can be compared with annual term life insurance.

- Health insurance

The claims ratio of health insurance can become higher than expected if the premiums are fixed and the policyholder has the option to renew the policy. In other similar cases, premium increases have not kept up with the claims (sometimes resulting in an “assessment spiral”). Those whose health has declined tend to automatically renew the policy while healthier insured may be able to obtain less expensive, freshly underwritten contracts, leaving the remaining policies to be of less than expected health.

- Household insurance

Policyholders can't always value the risks they are exposed to properly. For example, after a flood people recognize their need for insurance covers that reimburse losses due to flooding; in contrast after ten years without such a flood, those who live further away from the water may underestimate the risk and terminate their insurance contracts.

## **7. Management of Policyholder Options Before the Policy is In Force**

The effects of use of policyholder options, as well as any resultant management actions, should be considered during the product design and pricing phases or product management.

Once policyholder options have been identified, their utilization and impact on expected cash flows and capital requirements should be estimated. If they are exercised in an adverse manner from the perspective of the insurer, the need for, feasibility of, and desirability of additional charges (including such actions as asset reallocation or amendment of annuity period) should also be considered.

Limiting the available options may also be possible in setting the terms and conditions of the policy. However, competitive reasons may also need to be considered. For example, in variable annuity products, funds available in variable annuities may be managed by the insurance company itself rather than being outsourced to asset managers. Another option would be to reduce the level of or type of guarantees provided in the initial product design.

Many actions especially for non-life insurance occur prior to the issuance of the contract. These actions can include:

1. Changing the contract terms to restrict coverage or to require certain policyholder actions for the insured, including:
  - a. Timely notice of an event that may lead to a claim
  - b. Timely remediation to limit the size of a loss (e.g., covering up a hole in a roof)
  - c. Required duty of care prior to a loss

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***

- d. Required purchase commensurate with the value of a property (for property insurance) or face mandatory co-insurance to the extent the property is underinsured
2. Investigating the exposure before writing the policy (e.g., seeing if the house or car to be insured actually exists and is currently undamaged)
3. Buying facultative reinsurance
4. Underwriting (e.g. to evaluate the likelihood of moral hazard with a particular client).

Some companies have experienced problems when allowing switches into funds whose performance cannot be easily hedged. This has resulted in onerous costs resulting from the guarantees.

## 8. Typical Management Actions

Management action is conceptually linked to calculation of best estimates. In order to be able to calculate the effect of management actions, assumptions as to what management actions are possible or probable have to be made. However, there are also some other measures that the management should consider as described below.

In addition, the company management needs to consider whether current terms or management behaviour as to claims practices (such as claim expenses) and/or renewal rights impacts policyholder behaviour.

Though the management of the company has to consider in each case what would be most appropriate action, for calculation purposes a realistic management action plan is needed. The management action plan should be revisited regularly, especially where such actions have or are expected to deviate from the plan. This management action plan is the basis for the cash flow calculations.

Examples of the types of management action referred to here include:

- Annual bonuses determination. Companies may have a bonus (policyholder dividend) policy or practice which can be modelled. In some countries there is a requirement to have a written bonus policy.
- Significantly adverse policyholder behaviour can trigger management actions. For example, if the policies become unprofitable, some jurisdictions permit the amendment of premiums and terms of the policies. Sometimes this action requires the consent of the supervisor. How to take into account in the calculation of solvency requirements depends on the jurisdiction.
- A reallocation of assets. For example, there can be legal restrictions regarding how large an equity exposure the company can have in its asset portfolio or a company might hedge certain assets.
- Changing reinsurance strategies.
- Companies can change its approach to settling including the type of claims that should be rejected under the terms of a contract. Some claims practices are very liberal with regards to contract terms while others are very restrictive. A change in claims management or

*To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)*

claims policy may be a possibility, but policyholder expectations at time of sale need to be considered as well.

- Change in selling strategies can also be considered. Expenses can be cut, especially if the volumes of the product decrease. Some product lines can be put into run-off position.
- If the policyholder behaviour has been affected by the distribution channel, management may consider restructuring the commission policy.

## 9. Assumptions

Modeling policyholder behaviour and management actions is based on assumptions that require expert judgment.

For example, Solvency II requires that the assumptions used for calculating the best estimate shall be based upon up-to-date and credible information and realistic assumptions<sup>6</sup>. The delegated acts have additional provisions regarding assumption setting.

There are many drivers that affect the policyholder behaviour simultaneously that affect assumptions. For example, lapsation may depend on the age of the insured, type of policy and duration in force. Some findings show that lapsation of investment products has a peak approximately at the age of 30 and then at the retirement age. On the other hand, lapsation in general may slow down gradually over the policy term.

Age dependence suggests that policyholders have competing needs for money during their life cycle, although lapsation in general tends to decrease after age 30. At the age of 30 the young families buy or build their houses; after retirement age, people may prefer travel. Quite often the option to withdraw money from the policy is used as a selling argument. Other drivers for lapses are given in the list in Section 5.

As shown in this lapsation example, the challenge is to determine the different drivers and quantify the sensitivity of policyholder behaviour. Both statistical methods and expert judgement can be used for this purpose. In order to better assess policyholder behaviour for the purpose of setting assumptions and modeling cash flows, surveys targeted to the policyholders and questionnaires in the event of claims can provide valuable information. Useful are also retrospective studies of past behaviour under different circumstances where available. Because of the many drivers of the use of policyholder options, predictive modeling, using big data approaches and advanced algorithms might be prove useful.

Possible adverse effects of policyholder behaviour should be assessed and reflected. One approach is taken by Solvency II which has laid a separate solvency capital requirement for mass lapsation.<sup>7</sup>

---

<sup>6</sup> Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II), art 77 (2) (<http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32009L0138>)

<sup>7</sup> See Commission Delegated Regulation (EU) 2015/35 art 142 (6) (implementing measures on Solvency II)

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***

## 10. Application of Behavioural Economics

In modelling it is necessary to understand policyholder behaviour. In this process history data and also methods of behavioural economics may be used.

Utilizing policy options constitutes a part of a personal decision-making process. Behavioural economics studies the problem of the factors behind people's financial decisions. The application of behavioural economics helps to better understand policyholder behaviour. Useful references to this subject are Daniel Kahneman's and Richard H. Thaler's books. From an insurance industry point of view there is also a paper on this topic published by Society of Actuaries<sup>8</sup>. The following describes a few findings from behavioural economics.

Behavioural economics questions whether people always act rationally. Insurance companies should ask the same question in regard to their policyholders. Some but not all policyholders behave irrationally.

Behavioural economics has found that people tend to be risk-averse for gains and risk-seeking for losses. Risk aversion is often in fact the ultimate incentive to purchase insurance coverage. When having to make a choice between a sure gain and an uncertain higher gain, people tend to choose the sure gain. If a choice has to be made between a sure loss and uncertain bigger loss with a possibility to reduce the loss, people tend to choose the riskier option. In other words, if at all possible they try to avoid a loss. As a result, people tend to sell those investments from where they gain profits rather than those from where they make losses.

Because of the so-called anchoring effect people may value the loss by comparing it to the purchase price or a later higher value. People tend to consider that there they make a loss if the value of shares has once been 400 though it was bought at 300 and the current price is 350.

This behaviour also affects lapsation of different types of savings policies and deferred annuities.

Not all people are risk and loss averse to the same extent. The mixture of types of policyholders affects the size and quality of the insurance portfolios, as will be discussed in the next paragraph.

Also the existence of an endowment, which is basically inertia, reduces lapsation rates. When people have bought insurance, most tend not to want to lapse it, even when lapsation represents financially rational behaviour, though some of this inertia may be due to different products not easily compared. In addition, in life and health insurance surrendering a policy may be irrational if it is not possible to agree on another contract in another company due to health reasons.

Products may be bought to ensure continuation of coverage (and hence, "peace of mind"), not necessarily for an investment. Thus although rationality is valid, it takes into account broader considerations than just looking at the financial impacts.

There are some findings that in financial conglomerates that manage the same funds in mutual fund companies and life insurance companies, the customers of life insurance companies tend to be more inertial.

---

<sup>8</sup> Daniel Kahneman: "Thinking, fast and slow", 2011, Farrar, Straus and Giroux;  
Richard H. Thaler: "Misbehaving", 2015, W. W. Norton & Company, Inc.  
Society of Actuaries: Modeling of Policyholder Behavior for Life Insurance and Annuity Products

*To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)*

It is also worth noting that those who are wealthy do not react as strongly to the loss of equivalent amount of money as do those who are not. Thus, the characteristics of the policyholders also affects the extent of lapsation.

## 11. Modeling Dynamic Policyholder Behaviour

Dynamic lapsation models can be used to model policyholder behaviour, as addressed in the IAA's book on Stochastic Modeling.<sup>9</sup> The book proposes to link the lapsation rate to a dynamic factor which depends on the product in concern and one or more external factors, like changes in investment markets and bonus rates.

In life insurance the dynamic factor is often more complicated because there are several drivers that simultaneously affect lapsation, including policyholders' health condition, changes in competitive position (including in some cases products offered by non-insurance companies), age, size of the policy, policy duration, guaranteed interest and extent of surrender charge, if any. Some life companies have not found a significant correlation between lapsation rates and economic cycles. Possibly some auto-correlation exists so that in the start of economic cycles there are more lapses than normal. The dynamic factor also often depends on the terms of the policy. For example, in a low interest rate environment, the guaranteed interest rate and possible bonus policy should be taken into account.

Policyholders can be classified into those who are risk-averse and loss-averse and those who are not.<sup>10</sup> Depending on the mix of policyholders, the effect of the aggregate behaviour between two groups of policyholders may go in opposite directions. It is relatively easy to show that under some assumptions the lapsation rate of the whole portfolio may vary in an unexpected way and also that aggregate behaviour can change from year to year.

Thus, policyholder behaviour depends not only on the products involved and the financial markets, but also on the economic and personal situations. As a result, testing the validity of the assumptions and models used should be conducted on an ongoing basis, using alternative assumptions.

## 12. Summary

Policyholder behaviour and management actions are important factors to be considered by an insurer. They should be taken into account not only during the product design phase, but through the entire policy cycle. Modeling is often required, especially in life insurance and deferred annuities.

Modeling and estimating policyholder behaviour is challenging and requires a thorough understanding of the company's policyholders and their behaviour for each contract type. If relevant data are not available, the actuaries may use simpler methods and expert judgement, but should test results using a range rather than only a single set of policyholder behaviour assumptions. Even here, those methods need to lay the groundwork for better understanding of the drivers of the policyholder behaviour so that the company management and the insurance supervisors can

---

<sup>9</sup> IAA: Stochastic Modeling - Theory and Reality from an Actuarial Perspective, pp. 145 – 147

<sup>10</sup> See: Daniel Kahneman: "Thinking, fast and slow", Prospect Theory, pp. 278 – 288, 2011, Farrar, Straus and Giroux; Richard, H. Thaler: "Misbehaving", Value Theory, pp. 25 – 34, 2015, W. W. Norton & Company, Inc.

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***

challenge the assumptions used in actuarial calculations and the degree to which the modeled behaviour are validated by emerging experience.

There are multiple heterogeneous set of policyholder behaviours. In addition, behaviour and actions vary geographically and by distribution systems.

Cash in a policyholder's pocket and certainty have great value. Policyholders and shareholders may not be economically rational in the classical sense and may act on other reasons including inertia, suspicion, misinformation, short term horizons of self-interest or longer term tax and/or estate need.

An increase in the rate of lapsation used to value insurance liabilities (notably life insurance and annuities) may increase the value for some contracts and decrease it for others at the same time.

Providing for adversity in the valuation of insurance liabilities frequently requires consideration of the direction of the lapse adversity at the contract and duration level. A mass lapse assumption (as part of stress testing or a solvency shock test), triggered perhaps as a result of a loss of confidence in the insurer, will therefore affect the value of insurance liabilities in an uneven and possibly unexpected fashion. The value of insurance liabilities (notably life insurance and annuities) can be very sensitive to the policyholder behaviour assumption, especially in the presence of significant policyholder options.

---

Jari Niittuinperä, M.Sc, LL.M., FASC, is the Chief Actuary in the Financial Supervisory Authority in Finland where he is responsible for life insurance companies. He can be contacted at [jari.niittuinpera@gmail.com](mailto:jari.niittuinpera@gmail.com).

***To submit comments about this paper or to report any problems with the website, please send an email directly to [riskbookcomments@actuaries.org](mailto:riskbookcomments@actuaries.org)***