



Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem

2010

Requirements on Reserving and Risk Governance for Variable Annuities



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1 Introduction

In May 2010, the Central Bank of Ireland (“Central Bank”) released CP42 “Investment Guarantees – Guidance on Reserving and Risk Governance”. Responses were received from a number of undertakings and industry bodies. Following analysis of these submissions, the Central Bank requested more specific quantitative information from Variable Annuity (“VA”) undertakings. Having considered the information received, the following requirements are now being issued and will apply from 1 January 2011.

The Central Bank also issued a letter to CEO’s and Appointed Actuaries of VA undertakings on 8 November 2010. This letter set out qualitative disclosure requirements with respect to year end 31 December 2010. This paper formalises the requirements of that letter for future periods and sets out enhanced capital requirements.

2 Requirements on Reserving and Risk Governance

2.1 Applicability

All insurance and reinsurance undertakings authorised to transact life insurance and reinsurance business in Ireland are required to consider and report whether they believe they are transacting VA business and on the level of such activity. This declaration must be approved by the Board and should be submitted to the Variable Annuities Examination Team at the Central Bank by 31 March 2011.

Undertakings which are transacting such business must meet the General Requirements listed below.

2.2 Legal Basis

These requirements are conditions to which insurance undertakings are subject pursuant to Section 24 of the Insurance Act 1989 and in the case of reinsurance undertakings pursuant to Regulation 12 of the European Communities (Reinsurance) Regulations, 2006 (S.I. No. 380 of 2006). Requirements to provide information or reports to the Central Bank are imposed pursuant to Section 24(2) of the Insurance Act 1989 (in the case of insurance undertakings) and Regulation 71 of the European Communities (Reinsurance) Regulations, 2006 (S.I. No. 380 of 2006) (in the case of reinsurance undertakings). References to “undertaking” shall be taken to mean insurance undertaking and reinsurance undertaking.

2.3 General Requirement

All undertakings which transact VA business must:

- Adhere to Minimum Capital and Reserves (“CAR”) standards;
- Submit an Actuarial Report annually with the Regulatory Returns; and
- Have Independent Oversight.

2.4 Timescale

The requirements as per Section 6 of this paper (as communicated in the letter to VA undertakings on 8 November 2010) apply as at 31 December 2010. The paper in its entirety is to apply from 1 January 2011.

3 Variable Annuity Business

This is defined as any form of life (re)insurance business where the undertaking potentially bears any investment risk i.e. any business other than pure unit linked business or pure protection business. All undertakings transacting VA Business must inform the Central Bank in writing or via email at variableannuities@centralbank.ie as to which of the following applies to them:

- a) The undertaking is a VA undertaking; or
- b) The undertaking has no investment guarantee business in force; or
- c) The undertaking writes investment guarantee business but is of the opinion that it should not be classified as a VA undertaking due to the fact that:
 - i. Amount of business in force is not material (give details); or
 - ii. The guarantees are of some traditional form which is well covered by existing practice (give details); or
 - iii. Any other reason (Give details);

The undertaking must make this submission to the Central Bank no later than 31 March 2011. The Central Bank will in due course confirm the undertakings assertion or engage in discussions with a view to resolving differences.

4 Independent Oversight

The Corporate Governance Code for Credit Institutions and Insurance Undertakings has recently been issued. This requires that Independent Non-Executive Directors with sufficient experience of complex financial products will be able to understand and assess the risks of VA business.

Until such time as the transitional period ends and undertakings meet this standard, an acceptable alternative mechanism to ensure a sufficient standard of Independent Oversight is a Peer Review of the Actuarial Report by a firm of independent consultants in advance of its submission with the Regulatory Returns. The Peer Review must be reviewed and approved by the Board. Such Consultants must have no other involvement in the management or design of the products or any hedging process.

5 *Minimum Capital & Reserves Standards*

It is essential that the sum of the solvency reserves and the technical provisions should be sufficient. The allocation between the two is of lesser importance. It is frequent practice to hedge investment guarantees with derivatives. These may either be assets or liabilities according to the circumstances. In this note the term Capital and Reserves ("CAR") is used to represent the total.

Undertakings must calculate the CAR as per 5.1 which sets out minimum standards of acceptable practice for undertakings to comply with in meeting their existing obligations under the SI No. 360 of 1994 / European Communities (Life Assurance) Framework Regulations 1994, SI No. 380 of 2006 / European Communities (Reinsurance) Regulations 2006 and Actuarial Standards of Practice as issued by the Society of Actuaries in Ireland, as applicable.

5.1 **Minimum CAR**

The principles to be applied to actuarial reserving by Appointed Actuaries and Signing Actuaries are set out in Actuarial Standards of Practice ("ASP") issued by the Society of Actuaries in Ireland. Appointed Actuaries and Signing Actuaries are required to confirm that they have complied with these standards in their annual submission.

However, undertakings must ensure that the following minimum standard is applied to the calculation of reserves included in regulatory returns:

- a) For business written on or before 31 December 2010, the reserves must be calculated using an appropriate stochastic model to a Conditional Tail Expectation ("CTE") 90 basis, while for business written after this date, the reserves must be calculated to a CTE 95 basis. This is then to be subject to a minimum of a CTE 65 basis plus the required solvency margin plus resilience test assuming instantaneous change of values with no rebalancing of assets;
- b) Equivalent Value at Risk ("VAR") measures may be used instead of CTE;
- c) For direct insurers, no policy may be treated as an asset; no lapsation or surrender is to be assumed unless it increases reserves;

Future Trading Offset (in respect of dynamic hedging) is permitted in the calculation subject to limitations set out under section 6.1.

6 *Actuarial Report*

Existing actuarial practice (ASP LA 3, ASP LA 11 & LA 12) calls for the production of an annual Actuarial Report. This report should be to the Board of the undertaking. Undertakings must submit a copy of this report plus a copy of minutes of the Board meeting at which it was discussed to the Central Bank along with the regulatory returns. This report must cover and quantify the following:

- a) Analysis and justification of the impact of Dynamic Hedging (also known as Future Trading Offset). Please refer to 6.1 for more detail;
- b) Analysis and justification of basis risk (where necessary, this should be included in technical provisions). Please refer to 6.2 for additional detail;
- c) Sufficiency of model and modelling process. This requires numeric justification. Please refer to 6.3, 6.4 and 6.5 for additional detail;
- d) Examination of the Economic Scenario Generator ("ESG"). Please refer to 6.3 for additional detail;
- e) Justification of all assumptions made but with particular attention to risk premia and volatility;
- f) Operational and model risk. See 6.6;
- g) Liquidity Risk: during periods of market turbulences, extensive derivative trading may require significant liquidity for possible margin calls;
- h) Path dependency: VA's may include features such as ratchets, which are path dependent. Policyholder actions or management actions may also be path dependent;
- i) Demographic risk, with particular reference to longevity risk;
- j) Lapse risk - policyholder behaviour: See 6.8 for details;
- k) Counterparty risk. Please refer to 6.9 for additional detail; and
- l) Solvency II.

If any of these pose significant risk that is not covered in the CAR, then the CAR must be increased to an appropriate level.

Where existing actuarial guidance does not call for the inclusion of some or all of the points a) to l) above in the annual Actuarial Report, the undertaking must commission a report from the Signing Actuary or Appointed Actuary as appropriate which covers and quantifies all of the above.

6.1 Dynamic Hedging

The terms dynamic hedging, hedge effectiveness and Future Trading Offset are all used interchangeably. In using these terms, the Central Bank is referring to the overall reduction in reserves which is assumed by undertakings arising out of the use of financial risk mitigation techniques.

The formula as set out in CP42 is just one of a number of approaches that undertakings may adopt to reflect the impact of financial risk mitigation techniques. Undertakings will, as part of the Internal Model approval process, be engaging in a dialogue with the Central Bank to agree a basis for the Future Trading Offset calculation which better reflects their respective businesses.

In the interim, undertakings must adhere to the following high level principles:

- a) Credit for dynamic hedging strategies may only be permitted where there is a clearly defined hedging strategy in place;
- b) The credit for hedging must not exceed the level that has been justified by actual experience and must have regard to the results of the Profit and Loss Attribution exercise;
- c) In deriving the credit for hedging, undertakings must also consider the likely hedge effectiveness in a wide range of investment conditions with special reference to more extreme investment conditions, particularly where these are not captured in the historical reference period of the Profit and Loss Attribution exercise;
- d) The credit for hedging must reflect the extent to which the dynamic hedging is adequately captured by the model;
- e) Simplistic reflection of the hedge cash-flows in the model must result in a low credit for hedging; and
- f) Undertakings must also consider the impact on future hedge effectiveness of changes in volatility including jumps.

Overall, the credit for hedging must be determined on a prudent basis in light of the inherent uncertainties involved with dynamic hedging.

6.2 Basis Risk

Undertakings must carefully examine basis risk. Basis risk can arise in different forms in VA business. This arises due to the fact that a VA programme may involve use of instruments in traded markets to hedge risks in specific funds which may not perform exactly as the markets do. Undertakings must examine and assess any differences in the correlations between assets actually held and assets theoretically required. This difference in performance may vary more dramatically in stressed conditions than in benign conditions. Concentration on one stock, even one apparently well correlated to the market poses risk.

6.3 Model of Sufficient Prudence

In making stochastic projections an ESG is required. It is important that this reflects market instability in a sufficiently strong manner. However it is accepted that there can be interaction between complexity of runs and run times. Therefore to carry out a sufficient number of runs may require some simplicity of models. Therefore it is acceptable to supplement stochastic analysis with well investigated supplementary calculations. This can be performed using more sophisticated models or other more appropriate techniques.

Undertakings must apply the following principles when using an ESG:

- a) Where the ESG is calibrated for real-world valuations, the model output must be benchmarked to a wide range of investment conditions, including special reference to more extreme investment conditions with justification for the margins assumed in the valuation basis;
- b) If a Gaussian model is used, then compensating prudence must be demonstrated;
- c) If constant volatility is assumed, compensating prudence must be demonstrated. This applies whether the model is calibrated to perform real world or risk neutral valuations. We would expect that the ESG would in time evolve to include stochastic volatility capability. In the interim, there are a number of indirect methods which may be used to incorporate the impact on valuations of changes in volatility including jumps and volatility between jumps;
- d) The impact on future hedge effectiveness of changes in volatility (including jumps and volatility between jumps) must also be considered;
- e) Risk premia, where used must be prudent. It has been suggested that risk premia should be best estimate in nature and that this would permit a better overall assessment of the levels of prudence in the ESG. This will be considered acceptable subject to paragraph (a) above.

Generally speaking, where ESG models are used, the board of directors of the undertakings must ensure that the undertaking has a sound understanding of the features, strengths and weaknesses of the ESG model and that effective challenge has been provided to the methodology and parameterisation adopted. This must extend to understanding the key assumptions which are driving the results and the justification for those assumptions. In doing so, undertakings must have regard to the Internal Model tests as prescribed under Solvency II Directive (2009/138/EC).

6.4 Sufficient Number of Runs

For purposes of accuracy in making calculations from stochastic methods it is important that a sufficient number of runs are undertaken. It would not be appropriate to set a minimum number of scenarios for the entire industry. Instead the undertaking must include quantitative analysis in the

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Actuarial Report to demonstrate convergence (that is, stability of results) at the chosen number of runs.

6.5 Modelling Accuracy

Stochastic models should have sufficient model points to be a sufficiently accurate representation of the portfolio in force. If the modelling is not on a per policy basis then as part of the Actuarial Report, detailed examination and justification of the modelling accuracy must be made.

6.6 Operational and Model Risk

There are always going to be differences between the world as modelled in the technical provisions, in hedging and in reality. Undertakings must analyse and quantify in the Actuarial Report the following causes of this, since their effects tend to be greater than the operational risk that exists for more traditional undertakings:

- a) Turbulence: the risk that normal relationships between market parameters may break down in extreme financial conditions;
- b) Delay Risk: the risk that in the time that is necessary to carry out hedging analysis, make hedging decisions and then make trades prices move sufficiently to make those trades incorrect;
- c) Model Risk: No model is perfect and models that reflect behaviour at some periods may cease to have validity as markets change;
- d) Granularity: Market prices are not smooth functions when looked at in close detail but move as jumps from moment to moment;
- e) Error in Operation of hedging programs: running hedging programs is complex. It is often done across several locations and in different time zones and possibly across different first languages; and
- f) Legal risk: if products are marketed into areas where the undertaking lacks drafting expertise or are drafted in a foreign language, there is a risk that the ultimate outcome may be different from that the undertaking expects.

It is not expected that many of these risks have been incorporated into existing models. Where their immediate inclusion presents significant difficulties, it may be acceptable to adopt a more high-level approach to deal with these risks and move towards a more sophisticated approach, subject to an agreed timetable with the Central Bank.

6.7 Profit & Loss Attribution

Undertakings must to carry out a profit and loss attribution at least monthly as part of the process of reviewing hedge effectiveness and also as part of the process of identifying additional risks that are

not currently considered. The analysis should be sufficiently granular to demonstrate the efficiency or otherwise of the hedging strategy.

6.8 Behavioural Risk and Dynamic Lapsation

Policyholder behavior can have a substantial impact on the value of the VA guarantees. This characteristic is not possible to hedge and it makes the hedging of basic financial risk harder. The unknowns of policyholder behavior (lapse rates, asset allocation, withdrawal elections, etc.) are the greatest uncertainties regarding pricing and risk management of variable annuity guarantees. If the contract is of long duration, then even small changes in policyholder behaviour each year can make a substantial difference in the number of policyholders expected to be subject to a maturity guarantee.

Therefore dynamic lapse functionality should normally be used. Where this is a feature, this may be replaced by the assumption of very low lapse rates provided this does not reduce reserves. Such rates should be no more than 2%p.a.

The Central Bank has recently become aware of the possibility of hedge fund activity in the secondary VA market. The impact of such activity must be reflected by the undertakings in the derivation of lapse and premium cessation rates.

The impact of other dynamic policyholder behaviour (for example asset allocation, withdrawal elections and option take up rates) also needs to be assessed. This can be assessed by dynamically modelling the behaviour as with lapses or by the application of shocks to the relevant take up rate.

The impact on the hedging program of changes to persistency assumptions also needs to be quantified.

6.9 Counterparty Risk

Undertakings ceding significant risks to third party undertakings, must have investigated the counterparty's exposures, provisions and capital very carefully. In examining the credit risk exposure of the cedant, the question of whether the undertaking accepting the risks can withstand adverse experience across its full VA book must be considered by the cedant.

For variable annuities cessions in particular, exposure to the counterparty's credit risk becomes critical only in adverse investment conditions. Therefore, the models adopted by the cedant must take into account the link between investment market risks and reinsurer credit risk.

In some cases, the (re)insurance undertaking might buy an ad-hoc structured financial product (static/semi-static hedge) from an investment bank. As is the case for reinsurance cessions, the link between markets and default of that asset must be taken into account by the cedant.

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6.10 Solvency II

The Central Bank hereby requires that undertakings submit to the Central Bank, in either a section of the Actuarial Report or a separate report details of the following:

- a) What technical provisions and Solvency Capital Requirement ("SCR") of the undertaking would be under Solvency II, both standard formula and internal model; and
- b) If the SCR required under either method is more than under Solvency I, analysis and justification of the reasons why and a timetable for bringing up the strength of reserves to Solvency II standards.

7 *Reinsurance Undertakings*

These requirements apply equally to reinsurance and insurance except where stated otherwise.

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