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Research Update

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Solvency II unit matching & capital management

FRS Research Series

George McCutcheon MSc FIA
discusses Solvency II unit matching

Overview

In the Solvency II world, efficient capital management will be crucial for life insurers. In this research update, George McCutcheon describes how an appropriate unit matching policy would release cash; minimise volatility of Solvency II own funds and reduce market risk solvency capital requirement (SCR).

Key messages for life insurers

Issues

- In the Solvency II world, life insurers will have more choice about how to operate their unit matching business process
- For life insurers with large unit-linked portfolios, choosing an appropriate unit matching process will be an important part of their capital management programme as it can deliver capital efficiencies
- Life companies will use different criteria to select their optimal unit matching strategy and those will vary by life insurer

> *Adopting a new unit matching business process can deliver capital efficiencies*

Benefits

- Key capital efficiencies such as minimising volatility of Solvency II basis own funds, reducing market risk SCR and releasing cash from the unit-linked funds can be delivered
- Elimination of unnecessary forced investment into the unit-funds – a very welcome development for finance directors of life insurers

> *Greater complexity in the business process but technology solutions are available*

Challenges

- The new unit-matching process will be more complex than the existing business process
- New systems capabilities are required to support the new approach and this might appear a bit daunting to some life companies but technology solutions are available
- The technology solution must have good analytical functionality to display the size of the underfunding positions and the gains or losses on those positions and to control and report on the revised business process
- The big picture perspective is that the resultant capital efficiencies warrant overcoming the practical implementation challenges

Next steps

- The PRA perspective on the definition of technical provisions for unit matching is the next crucial step

This research update details the practical issues involved and the systems required to operate the business processes with appropriate risk management and reporting.

Background

The introduction of Solvency II will result in fundamental change to how life companies operate their unit-linked matching processes, because they will no longer be required by regulations to match to the full face value of unit-linked liabilities. The regulatory criteria for unit matching are as per Article 132(3)[1] of the Solvency II directive, which requires that the technical provisions for unit-linked contracts are matched by units. However under Solvency II, the investment policy for the amount ('excess value amount') representing the excess of the face value of the unit-linked liabilities over the Solvency II technical provisions is not prescribed by regulation.

Disruptive effects of Solvency II

Is Solvency II disruptive? Is new technology required to meet revised business processes?

Solvency II will be disruptive in that some existing business processes that have remained relatively unchanged for many years in the Solvency 1 world will require fundamental revisions to be fit for purpose in the Solvency II world. An example is unit matching where the existing business process is based on matching exactly to the number of units allocated to customers whereas the Solvency II business process will require the capability to match to a proportion of those amounts and therefore manage a special type of box position.

Regulatory Perspective

Differences between Solvency I and Solvency II technical provisions

Under Solvency I, unit matching in the UK currently operates based on the close matching rules (COBS 21.2.2R). In effect this means that life insurers match to the face value of unit-linked liabilities.

However the technical provisions under Solvency II will differ from their Solvency II equivalents. Consequently the interaction between the close matching rules and Article 132(3) will bring increasing focus on the Prudential Regulatory Authority (PRA) definition of technical provisions for the close matching rules.

Consider an example where:

Gross assets	**1,000**
Face value of liability	**1,000**
Net income items proportional to unit values	**40**
Net income items not proportional to unit values	**30**

Questions

- What is the optimum unit matching approach to adopt and is that consistent with Article 132(3)?
- Is the excess value amount 10 or 40?

More clarity required from the Prudential Regulatory Authority on the definition of technical provisions for close matching rules

Under Solvency II, the required technical provisions in this example are 990 but it is arguable that for the purposes of applying Article 132(3) the technical provisions could be interpreted as 1,000-40 = 960, based on the face value of units less present value in force (PVIF) of future management charges. The rationale is that without regulatory restrictions, the optimum matching approach ('immunisation matching') could be considered as where the value of unit-linked assets changes by the same amount as technical provisions when unit values change i.e. no change in net assets (subject to changes in the risk margin). Whether the excess value amount is 10 or 40 depends on how the Prudential Regulatory Authority (PRA) defines technical provisions for close matching purposes under Solvency II.

[1] 'Where the benefits provided by a contract are directly linked .....to the value of assets contained in an internal fund held by the insurance undertakings, usually divided into units, the technical provisions in respect of those benefits must be represented as closely as possible by those units or, in the case where units are not established, by those assets'.

The effect on Solvency II own funds (assuming no change in the risk margin and that cash is held in respect of amounts not invested in the unit-linked funds) is shown below for various alternative unit matching approaches.

% change in unit values		-10%	Base	10%
Unit matching policy	**Matching U/L assets**	**Own Funds**	**Own Funds**	**Own Funds**
Face value basis	1,000	6	10	14
Technical provisions basis	990	7	10	13
Items proportional to unit values basis	960	10	10	10

Note: Because the asset/liability mismatch is the excess of the matching U/L assets over 960, the effect on Solvency II own funds is the % movement in unit values applied to that mismatch e.g. 10% of 40 if using the face value matching basis.

If a life company wishes to minimise the volatility of Solvency II basis own funds (subject to changes in the risk margin), the optimum unit-matching approach is based on 960 i.e. the excess value amount is 40 and is not invested in the unit funds. By definition, this would minimise the market-risk SCR on unit-linked assets (unless the life insurer chooses to hold more unit-linked assets – e.g. in respect of the risk margin or to match the SCR for lapse risk).

The PRA have received submissions from the Institute and Faculty of Actuaries and from industry on this issue. The outcome of the PRA deliberations is eagerly awaited.

Technology

The new unit matching business process is more complex

To maximise capital efficiencies, a new unit matching approach would be required.

Whilst the unit-matching process would be more complex than the existing business process, it could be handled by an appropriately configured fund administration system with box management functionality.

The life insurer would operate unit matching based on proportions of the face value of units where the proportions vary by fund and over time. Rebalancing capabilities are thus also required because the required proportions vary over time.

Quantify gains and losses on IFRS basis arising from underfunding

The fund administration system would need to separately record the two components of the unit-matching by firstly matching the face value of units and secondly the underfunding in respect of the PVIF of future management charges, and then calculate the profit/loss on the underfunding for IFRS reporting purposes. This means life company fund administration systems running a special type of negative box position to accurately account for this process in the Solvency II environment.

Technology solution requires data analytics to display size of underfunding positions

Good analytical functionality would provide the ability to access the size of the underfunding positions and the gains or losses on those positions at any given time. Such reporting and analytical capabilities are a fundamental element of the system, for validation purposes and cross-reporting to the actuarial function.

Criteria for unit matching approach

Life companies will decide the investment policy for the excess value amount by taking into account a number of criteria including:

- Capital efficiency e.g. avoiding unnecessary forced investment into the unit funds
- Is the unit-matching process driven by Solvency II reporting or IFRS reporting considerations?
- Is there an objective to minimise volatility in Solvency II net assets arising from variations in unit-linked values?
- Is there an objective to minimise market risk SCR?
- Is there an objective to minimise volatility in the SCR coverage ratio?
- Is there an objective to match the SCR for lapse risk?

Market risk SCR

According to Article 84 of the Implementing Measures insurers in calculating the SCR have to apply the look-through approach to collective investment undertakings and other investments packaged as funds.

Per Article 84(3), where the look-through approach cannot be applied to CIUs or investments packaged as funds, the SCR may be calculated on the basis of the target underlying asset allocation of the CIU or fund, provided

- Such a target allocation is available to the undertaking at the level of granularity necessary for calculating all relevant sub-modules and scenarios of the standard formula, and
- The underlying assets are managed strictly according to this target allocation.

For the purposes of that calculation, data groupings may be used, provided they are applied in a prudent manner, and that they do not apply to more than 20 % of the total value of the assets of the undertaking. Otherwise they are classified (2) as type 2 equities with adverse consequences. The capital requirement for type 2 equities referred to in Article 168 of the Regulation is equal to the loss in the basic own funds that would result an instantaneous decrease equal to the sum of 49 % and the symmetric adjustment as referred to in Article 172.

Higher capital requirement for non-compliance

Thus if life insurers can't apply look-through for SCR calculations, they will have to hold higher levels of capital as their SCR will be unduly inflated by having to treat their holdings in CIUs as type 2 equities i.e. a form of punishment for non-compliance.

For those life insurers where capital efficiency and availability is critical, a compelling motivation to implement the data management systems required to fulfil the look-through principle would be the resulting reduction in SCR and MCR.

Appropriate unit matching can minimise market risk SCR and avoid need for complex SCR calculations

The requirement to compute the market risk SCR on a look-through basis is a much less consequential issue for unit-linked life companies with matched unit positions. Life insurers wouldn't need to apply the complexity of look-through in the SCR calculation (if the unit matching approach already ensured that the answer was effectively zero).

(2) 'Type 2 equities shall also comprise all assets including the assets and indirect exposures referred to in Article 84(1) and (2) where a look-through approach is not possible and the insurance or reinsurance undertaking does not make use of the provisions in Article 84(3).'

Fund level proportions

To give practical effect to this, the life company would need to apply unit-matching based on proportions of the face value of units where the proportions vary by fund and over time.

The relevant proportion at fund level is {[Face Value] – [PVIF]} / [Face Value].

Periodic calculations would need to be carried out separately for each fund or group of funds to determine the relevant proportions and to determine the PVIF of future management charges.

A key question would be the extent to which the relevant proportion for a fund would vary over time as variability arises because:

- The relevant proportions for a fund might vary between existing business and new business because of different product mix
- The relevant proportion for a fund for existing business would be an aggregate figure across multiple products (e.g. products linked to different unit series of the fund) and inflows/outflows for a fund wouldn't be uniformly distributed over the products

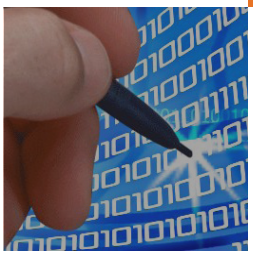
In this instance, the relevant proportion of a fund at a calculation date across aggregate products could be used as the relevant proportion until the following recalculation date.

In practice the proportions would only be recalculated every 3, 6, or 12 months depending on the frequency of calculation of technical provisions. At each calculation date, sensitivity analysis would need to be carried out to determine the sensitivity of the relevant proportion to various parameters such as the size of inflows/outflows to the funds, the product mix, etc. For example the calculation process could determine the relevant proportion for a fund by product group to help understand the potential consequences of its large inflows/outflows.

The fund administration system would therefore need a risk management framework to monitor these parameters between calculation dates and to produce alerts if they were to fall outside a specified range.

It's important not to lose sight of the big picture objective when considering such practical issues. There are approximations involved so a life company will never be perfectly matched at any time to the face value of units less PVIF of future management charges. However adopting this approach and having a robust fund administration system to manage the process would minimise the extent of mismatching, with the resultant important capital efficiencies. Separately it is vital that the life company accurately knows the mismatch by percentages and amounts for the funds by using automated box management functionality.

In summary, for life insurers with large unit-linked portfolios, the elimination of unnecessary forced investment into unit-funds, offers significant opportunity to release cash for other purposes. However it is crucial that the functionality and reporting capabilities of their fund administration system - for validation purposes and cross-reporting to the actuarial function – provide the ability to accurately manage the unit-linked matching process and ensure a successful and compliant capital management programme.



Biography; George McCutcheon MSc FIA:

Mr. McCutcheon is a graduate of University College Dublin in Mathematical Science and is a Fellow of the Institute of Actuaries. He is a director and co-founder of Financial Risk Solutions (FRS). He has presented a number of papers at the Life Convention of the Institute of Actuaries and has co-authored a number of papers for the Society of Actuaries in Ireland.

About Financial Risk Solutions (FRS)

Financial Risk Solutions Ltd (FRS) is a leading provider of unit pricing and fund administration software to the life assurance and pensions industries. Its Invest|Pro™ product family is a recognised leading benchmark in the investment fund administration area and customers in life assurance and third party administration include MetLife, Zurich, Aegon, SEB, Charles Taylor, IFDS, and Accenture Managed Services.

Invest|Pro™ manages unit pricing and portfolio valuations, asset/liability unit matching, box management, trade order management, investment accounting, tax, financial reporting and compliance with investment mandates in a single application. Product types covered include unit linked funds, portfolio bonds, self-invested/directed pensions, shareholder funds and with-profit funds. Invest Pro™ was specifically designed to securely automate complex fund administration processes.

Invest|OPS™ (Outsourcing Partner Supervision) automates the validation of operational activity performed by outsourcing partners. It provides methods for assessing the standard of performance of the service provider; enables the investment firm to supervise the outsourced functions and to manage the risks associated with outsourcing. It also provides the firm with effective access to the data associated with the outsourced activities.

Invest|GRC™ (Governance, Risk & Compliance). This is an asset reporting product that can consume data from the company's primary investment and financial system, outsourcers and from other external data sources. It empowers senior finance, risk, audit, ops and admin staff to monitor risks and mandates, do rules management, see breach occurrences assist corrections and importantly produce asset reports (both regulatory reports including for insurance clients and also risk management function reports). There are three main strands: 1. Solvency II asset QRTs, 2. Risk management metrics, rules monitoring, breach management and compliance and 3. Analytics.

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