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Article

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Ekonomický časopis

Provided in Cooperation with:
Slovak Academy of Sciences, Bratislava

Reference: Zelinová, Silvia/Blahušiaková, Miriama et. al. (2022). Proposal for the measurement of reinsurance contracts under IFRS 17. In: Ekonomický časopis 70 (3), S. 284 - 304. https://www.sav.sk/journals/uploads/0617143403%2022%20Zelinova%20+%20SR.pdf. doi:10.31577/ekoncas.2022.03.04.

Proposal for the Measurement of Reinsurance Contracts under IFRS 17[1]

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Abstract

The paper introduces the proposal of the measurement model for insurance and reinsurance contracts in accordance with the new standard IFRS 17 Insurance contracts that will be effective as of January 1, 2023. The Standard does not contain formulas, but it is principle-based, which is why the selected method of general model measurement is a scientific benefit for the measurement of the insurance product. The application of the GMM method is not the same as that of the insurance company and the reinsurance company perspective, despite the same chosen actuarial assumptions. The scope of changes, which the new Standard offers, is comprehensive and brings new challenges, even for scientific purposes.

Keywords: *International Financial Reporting Standard 17, reinsurance contracts, general model measurement, contractual service margin, risk adjustment*

JEL Classification: G22, M48

DOI: https://doi.org/10.31577/ekoncas.2022.03.04

Introduction

The insurance market in the European Union is regulated by various national and international methodologies and regulations, to which belong, especially Solvency II and International Financial Reporting Standards (IFRS), particularly

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[1] This paper has been supported by the VEGA project 1/0410/22 *Analysis of Insurance Risks in Relation to the Economy of the Life Insurance Company,* VEGA 1/0166/20 and the VEGA project 1/0121/21 *The Analysis of Impact of Crises Related to COVID-19 on Financial Health of Entities in the Slovak Republic.*

International Financial Reporting Standard 4 – Insurance Contracts (IFRS 4), which is effective since January 1, 2005. Insurance companies in the Slovak Republic shall also present their financial statements in accordance with IFRS in order to increase the comparability and transparency of their financial statements.

In May 2017, a new standard IFRS 17 – Insurance Contracts (IFRS 17) was issued with the purpose of establishing principles for insurance contracts in particular (IFRS Standards, 2019). The objective of IFRS 17 (IASB, 2017b) is to ensure that an entity provides relevant information that faithfully represents the nature of insurance contracts. The preparation of this new standard started immediately after the release of IFRS 4. The International Accounting Standards Board (IASB), as the issuer of IFRS, sent a draft of a new standard concerning insurance contracts to insurance companies for discussion in 2010. There have been various comments, e.g. from Altenburger (2011, p. 672), which compared the IASB proposals with the solutions derived from different accounting principles and theories. Altenburger concluded that the IASB proposals do not follow one of these theories homogeneously and contain several additional inconsistencies.

According to the first version of IFRS 17 (IASB, 2017a), entities should have applied IFRS 17 to annual reporting periods beginning on or after January 1, 2021. Several institutions, such as the European Insurance CFO Forum[2] and the European Financial Reporting Advisory Group (EFRAG), addressed the IASB requirements regarding changes in standard (Rider, 2020, p. 1). They also requested comments on their draft endorsement advice on IFRS 17 that would support their preliminary conclusions regarding the application of the requirements of annual cohorts (EFRAG, 2020a). The European Commission later approved the exception for the insurance companies in the member states of the European Union not to apply the requirement for segmentation of insurance contracts according to annual cohorts. EFRAG (2020b) also identified 13 differences between IFRS 17 and the requirements of the Generally Accepted Accounting Principles of the United States for insurance contracts (US GAAP), in particular Financial Services – Insurance (Topic 944): Targeted Improvements to the Accounting for Long-Duration Contracts, to which belong scope, different types of insurance contracts – overall view, measurement of insurance contracts, level of aggregation, risk sharing, recognition of onerous contracts, reinsurance, deferred acquisition costs, revenue recognition, accounting treatment of income on day one, measurement of options and guarantees, separation of embedded derivatives within insurance contracts, and presentation and disclosure. This comparison was the input to the draft endorsement advice of EFRAG. Here, we state some of the identified differences:

[2] The European Insurance CFO Forum is a high-level discussion group formed and attended by the Chief Financial Officers of major European insurance companies that was created in 2002.

• Whilst IFRS 17 impacts all insurance and non-insurance companies issuing insurance contracts, the US GAAP are applicable only to insurance companies. For non-insurance companies, any issued insurance contract is accounted for under other applicable US GAAP rules.

• Insurance contracts under IFRS 17 must be divided into three groups (onerous contracts, non-onerous contracts, and contracts that may become onerous subsequently). Insurance contracts under US GAAP must be grouped according to the entity's mode of acquisition, measurement of profitability, and maintenance of insurance contracts.

• In IFRS 17, nonfinancial risk adjustment is defined as the explicit risk adjustment to address the uncertainty of the timing and amount of cash flows that arise from nonfinancial risk. In US GAAP, the nonfinancial risk adjustment is a provision for risk of adverse deviation applicable to traditional long-duration contracts but not for short-term contracts.

• Under IFRS 17, acquisition costs can be treated as expense in the year in which they were incurred, whilst, in accordance with US GAAP acquisition costs, they have to be deferred and amortized.

Therefore, EFRAG challenged the IASB to defer the effective date to 2023. Finally, the IASB approved that IFRS 17, which replaces the existing mandate under IFRS 4, will be applied to annual reporting periods beginning on or after January 1, 2023. An earlier application of IFRS 17 is permitted if IFRS 15 – Revenue from Contracts with Customers and IFRS 9 – Financial Instruments (IFRS 9) are also applied. Subsequently, a new version of IFRS 17 with accepted requirements (Trussell and Kölschbach, 2020) and relevant amendments was issued in June 2020 (IASB, 2020).

The new IFRS 17 standard establishes the principles for the recognition, measurement, presentation, and disclosure of insurance contracts, and shall be applied not only to new insurance and reinsurance contracts but even to existing contracts in the insurance portfolio. The application of IFRS 17 should provide more transparent information regarding the profitability and advantages of insurance products (Mignolet, 2017, p. 30). The insurance companies shall disclose information about amounts, judgments, and risks arising from insurance contracts. The disclosure requirements are more specific than in IFRS 4.

The main purpose of IFRS 17 should mainly be to identify profit and non-profit insurance contracts and to indicate the development trend, respectively, direction of insurance contracts. Another purpose of IFRS 17 is to defer the profit of insurance companies to several accounting periods. The profit from insurance contracts is received continuously during the coverage period. Also, at present, it is not necessary to update the actuarial assumptions in the provisions that arose at the time of measurement of the products at the time of their establishment.

The purpose of our paper is to present a proposal for reinsurance contract measurement according to the new standard – IFRS 17. Our research was carried out in the Microsoft Excel environment. It is also based on studying legislation because there are not many relevant papers on this topic at the moment.

The paper is organized as follows: after an initial clarification of the topic, we have described various studies related to the issue. The scientific contribution is a summary of the theoretical principles of IFRS 17, based on which we have proposed the methodology of General Model Measurement (GMM method). Subsequently, we have applied this methodology to the term insurance, both from the insurance company and the reinsurance company's perspective, because the reinsurance contract had been created for a part of the portfolio. The GMM method can be applied to both insurance and reinsurance contracts. In conclusion, we summarize the results achieved.

1. Review of the Literature

The current accounting standard for insurance contracts, IFRS 4, is applied to all insurance contracts and their provisions except those that do not contain the material insurance item. Insurance contracts without material insurance item, and those that do not contain the profit share at discretion, are under IAS 39 – Financial Instruments: Recognition and Measurement (IAS 39). IAS 39 requires the accounting entity to separate some of the embedded derivatives from their host contract, to measure them at fair value, and to include changes at fair value in profit or loss. IAS 39 applies to a derivative that is embedded in an insurance contract if the derivative is not itself a contract. In November 2009, the IASB published IFRS 9, which should have replaced IAS 39 with the application for annual periods beginning on or after January 1, 2018. Finally, IAS 39 remains effective but contains only requirements for hedge accounting. IFRS 9 compared to IAS 39 is better designed because it has abandoned the model based on incurred losses and adopted the model of impairment based on expected losses. This model solves the problem of deferred adoption of too weak measures within the credit loss recognition.

According to IFRS 4, the technical provisions consist of the time value of the guarantees and options, the best estimate[3] of liabilities, and several levels of margin. IFRS 17 has withdrawn the term 'technical provisions'. Instead, it uses the term 'future cash flows'. IFRS 4 is according to Palmborg, Lindholm and

[3] The best estimate expresses the statistical methods of the best estimate of the insurance companies' liabilities.

Lindskog (2021, p. 172) an interim standard, which sets some minimum requirements on the accounting policies in different jurisdictions, but apart from this, allows considerable variation in financial reporting practices. The main objectives of the new IFRS 17 are, unlike IFRS 4, to make accounting practices more consistent across different jurisdictions and to make the financial statements of insurance companies more informative.

IFRS 17 defines other new terms related to measurement, particularly the Contractual Service Margin (CSM) and the Risk Adjustment (RA). These two terms have not yet been considered in the measurement of insurance contracts' measurement. The CSM is (Domingues, 2019, p. 20) a component that reflects the unearned profit of a group of contracts. A very detailed description of the CSM is presented in the paper of Yousuf et al. (2021), where they have concluded that the determination of coverage units or the calculation of the CSM at transition have a significant impact on the final amount of the CSM. England et al. (2019, p. 75) mention the explanation of the risk margin in accordance with Solvency II in the context of risk adjustment according to IFRS 17. Sotona (2018, p. 282) deals with the analysis of mortality risk and the calculation of risk adjustment according to the requirements of IFRS 17 on the example of term insurance. He states the calculation of the RA at a confidence level of 90 %. According to Chevallier et al. (2018, p. 10) the risk adjustment is necessary to properly represent the uncertain nature of insurance liabilities.

According to the International Actuarial Association (IAA) publication 'Measurement of Liabilities for Insurance Contracts: Current Estimates and Risk Margin' (IAA, 2009, p. 2) the objective of the risk margin can be viewed from different perspectives. It can be either the reward for risk bearing, measured in terms of the inherent uncertainty in the estimation of insurance liabilities and in the future financial return from the contract, or in a solvency context, as the amount to cover adverse deviation that can be expected in normal circumstances, with capital to cover adverse deviation in more unusual circumstances.

IFRS 17 does not specify the estimation techniques the insurance company should apply to determine the risk adjustment for non-financial risk. The risk adjustment can be calculated using the Value-at-Risk (VaR) method, Cost of Capital (CoC) method, contingent value-at-risk method or as an adjustment to assumptions. Here, we state the opinion of experienced actuaries about the application of the CoC method (Chevallier et al., 2018, p. 2):

'However, in other jurisdictions, particularly in the European Union, where the Cost of Capital has become a standard for estimating the Solvency II Risk Margin, this disclosure can present a significant difficulty for companies who do not have an internal model providing the full Reserve risk distribution. It should

be particularly the case for companies using the Solvency II standard model, which provides limited information in relation to the underlying risk distributions.'

The application of amended IFRS 17 will be a great challenge for insurance companies all over the world (Gupta, 2019; Owais and Dahiyat, 2021; Al-Mashhadani, 2020) due to several reasons, such as the low level of ability to define the scope of IFRS 17, study the impact of IFRS 17 on financial reports and develop new internal monitoring methods to apply IFRS 17. Another challenge will be the necessity to design an integrated information system, which enables the accounting entities to apply the proper basis for the recognition of insurance contracts and perform detailed calculations supported by reasonable and verifiable information.

2. Theoretical Basis for Measurement of Reinsurance Contracts

The new version of IFRS 17 is applicable not only to insurance contracts, but also to reinsurance contracts.

2.1. Reinsurance Contracts

Reinsurance is known as the transfer of parts of the insurer's risk portfolios to the reinsurer. The reinsurer accepts a portion of the risk from the insurer, and the reinsurance contract is signed. The insurer presents this contract as the reinsurance contract on the asset side in the statement of financial position as the asset receivable, and the reinsurer presents this contract as the insurance contract on the liability and equity side in the statement of financial position as the liability. The insurer shall recognise reinsurance contracts from the earlier of the following:

a) the beginning of the coverage period of the group of reinsurance contracts held, and

b) the date the entity recognises an onerous group of loss underlying insurance contracts if the entity entered into the related reinsurance contract held in the group of reinsurance contracts held at or before that date.

The reinsurer shall recognise liability either from the first payment or from the beginning of insurance coverage, or when the reinsurance contract becomes loss-making. Reinsurance contracts shall be measured and presented separately from insurance contracts.

According to IFRS 17.62A, the insurer shall delay the recognition of a group of reinsurance contracts held that provide proportionate coverage until the date that any underlying insurance contract is initially recognised, if that date is later than the beginning of the coverage period of the group of reinsurance contracts held.

Reinsurance contracts shall be divided according to the same criteria as insurance contracts, except onerous (loss-making) contracts. The reinsurance contract cannot be presented as onerous contract. If some of the reinsurance contract proves to be loss-making, according to IFRS 17, it shall be presented as the contract that was on initial recognition measured as the contract with net profit.

2.2. Measurement of Reinsurance Contracts

IFRS 17 defines three methods to measure insurance and reinsurance contracts. Each has its own characteristics (Table 1). The GMM method and the Variable Fee Approach method (VFA method) shall be used for the groups of insurance contracts that are defined in IFRS 17. The Premium Allocation Approach Method (PAA method) is voluntarily applied and the insurance company is not obliged to apply it. The PAA method is also the least demanding. For reinsurance contracts, only the GMM method and the PAA method can be applied. If the insurance company applies the PAA method or the VFA method, it must state the reasons for this.

T a b l e 1

Approaches to Liabilities' Measurement

GMM	PAA	VFA
Compulsory	*Voluntarily*	*Compulsory*
Default model for insurance contracts	Liabilities from future claims for short-term contracts	Insurance contracts with direct participation features*
Traditional life insurance without DPF (discretionary participation feature)	Short-term non-life insurance contracts	Investment contracts
Traditional life insurance with a (non) guaranteed DPF	Some long-term non-life insurance contracts	* a direct link between the attributed profit share and the fair value of the underlying assets
Reinsurance contracts	Reinsurance contracts	

Source: The authors.

These methods are described in detail by Widing and Jansson (2018, p. 25), Páleš et al. (2021, p. 207). The GMM method is critically analysed by German authors Ewelt-Knauer et al. (2018, p. 193). Palmborg, Lindholm and Lindskog (2021, p. 173) demonstrate properties of the valuation and allocation method and profit-and-loss algorithm for a realistic size life insurance portfolio under IFRS 17. They suggest a computationally efficient risk-based method of valuing a portfolio of insurance contracts and an allocation of this value to sub-portfolios.

On initial recognition, an insurance company shall measure a group of reinsurance contracts from the earliest of the following:

- the beginning of the coverage period of the reinsurance contract,
- recognition of loss underlying insurance contracts, if it is before the date of insurance coverage.

As stated above, reinsurance contracts can only be measured using the GMM method or the PAA method. As reinsurance contracts are never considered investment contracts, the VFA method is not allowed to be used for the measurement of reinsurance contracts. The insurance company shall use consistent assumptions to measure the estimates of the present value (PV) of the future cash flows for the group of reinsurance contracts held and the estimates of the PV of the future cash flows for the group of underlying reinsurance contracts. The entity shall include in the estimates of the PV of the future cash flows for the group of reinsurance contracts held the effect of any risk of non-performance by the issuer of the reinsurance contracts. The risk of non-performance includes the effects of collateral and losses from disputes. The insurance company shall also determine the risk adjustment for non-financial risk so that represents the amount of risk being transferred by the holder of the group of reinsurance contracts to the reinsurance company.

The insurance company shall measure a group of insurance contracts using the PAA method if and only if at the inception of the group:

- the insurance company expects that using the PAA method would produce a measurement of the liability for remaining coverage for the group that would not differ materially from the one that would be produced applying the GMM method, or
- the coverage period of each contract in the group is one year or less.

The CSM on initial recognition is modified to reflect the fact that for, a group of reinsurance contracts held, there is no unearned profit but instead a net cost or net gain on purchasing the reinsurance. On initial recognition, the reinsurance company shall recognise any net cost or net gain on purchasing the group of reinsurance contracts held as the CSM measured at an amount equal to the sum of (IASB, 2020, IFRS 17.65):

- the fulfilment cash flows,
- the amount de-recognised at that date of any asset or liability previously recognised for cash flows related to the group of reinsurance contracts held,
- any cash flows arising at that date, and
- any income recognised as profit or loss.

If the net cost of purchasing reinsurance coverage relates to events that occurred before the purchase of the group of reinsurance contracts held, the insurance company shall recognise such a cost immediately in profit or loss as an expense.

The insurance company shall determine the adjustment to the CSM of a group of reinsurance contracts held and the resulting income by multiplying the loss recognised on the underlying insurance contracts, and the percentage of claims on the underlying insurance contracts the insurance company expects to recover from the group of reinsurance contracts held.

One of the new amendments to the measurement of reinsurance contracts included by the IASB in the new version of the standard in June 2020 is the need to establish the loss-recovery component (LRC) for the group of reinsurance contracts held. The insurance company shall establish the LRC of the asset for the remaining coverage for a group of reinsurance contracts held depicting the recovery of losses. The LRC determines (IASB, 2020, IFRS 17.66B) the amounts that are presented in profit or loss as reversals of recoveries of losses from reinsurance contracts held and are consequently excluded from the allocation of premium paid to the reinsurer. After the insurance company has established a LRC, it shall adjust the LRC to reflect changes in the loss component (LC) of an onerous group of underlying insurance contracts. The carrying amount of the loss-recovery component (IASB, 2020, IFRS 17.B119F) shall not exceed the portion of the carrying amount of the loss component of the onerous group of underlying insurance contracts that the entity expects to recover from the group of reinsurance contracts held.

According to IFRS 17.66, the insurance company shall measure the CSM at the end of the reporting period for a group of reinsurance contracts held as the carrying amount determined at the start of the reporting period, adjusted for

- the effect of any new contracts added to the group,
- interest accreted on the carrying amount of the CSM, measured at the specified discount rates,
- income recognised in profit or loss in the reporting period,
- reversals of a loss-recovery component to the extent those reversals are not changes in the fulfilment cash flows of the group of reinsurance contracts held,
- changes in the fulfilment cash flows, measured at the specified discount rates to the extent that the change relates to future service, unless:
  - the change results form a change in fulfilment cash flows allocated to a group of underlying insurance contracts that does not adjust the CSM for the group of underlying insurance contracts, or
  - the change results from applying paragraphs of IFRS 17 relating to onerous contracts, if the entity measures a group of underlying insurance contracts applying the premium allocation approach,
- the effect of any currency exchange differences arising on the CSM,
- the amount recognised in profit or loss because of services received in the period, determined by the allocation of the CSM remaining at the end of the reporting period over the current and remaining coverage period of the group of reinsurance contracts held.

The insurance company can include onerous insurance contracts and onerous reinsurance contracts in the portfolio of onerous contracts. It shall apply a systematic and rational method for determining the loss arising from onerous insurance contracts that are covered by reinsurance contracts.

3. General Model Measurement

In our paper, we will introduce the measurement of reinsurance contracts using the GMM method. We are considering a portfolio of term life insurance contracts in the number of 2,000. We will provide the calculation of the risk adjustment using the Cost of Capital method. We will reinsure the portfolio of selected insurance contracts measured by the GMM method using quota share reinsurance with a quota of 40%. We prepare the statement of financial performance from the perspective of the insurance company and the reinsurance company. We assume that both, insurance company, and reinsurance company use the same measurement methods. In both methods, we analyse the impact of new values on the profit or loss of an insurance company. Our presentation of the discount curve is based on the risk-free curve EIOPA (EIOPA, 2021) for the euro as of December 2019 (Table 2). We have used data on mortality from the Human Mortality Database for Slovakia for 2017 (Mortality, 2021). To best demonstrate the GMM method for the reinsurance contract valuation and overall overview, from both, the insurance company and the reinsurance company perspective, we have chosen only a 5-year period of term insurance.

T a b l e 2

Risk-free Curves

Year of insurance	EIOPA risk – free spot curve for the euro as of December 31, 2019	Forward curve – conversion from the EIOPA spot curve for the euro as of December 31, 2019
1	–0.525%	–0.525%
2	–0.545%	–0.565%
3	–0.545%	–0.545%
4	–0.535%	–0.505%
5	–0.505%	–0.385%

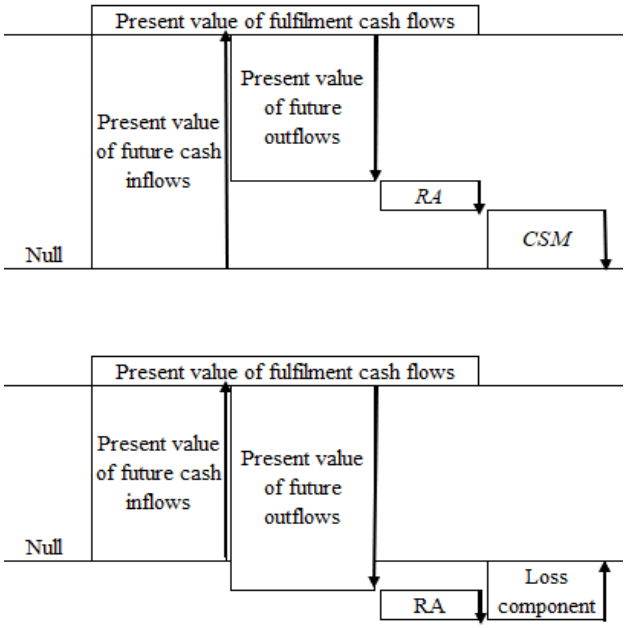
Source: The authors.

The GMM method is a basic method for the measurement of insurance contracts and shall be used in most cases for insurance contracts covering a period of more than a year. The method is usable in both life and non-life insurance. The GMM method consists of four main components, the so-called 'blocks': best estimate of future cash flows, discount effect, risk adjustment, and CSM. The measurement of the insurance contract on initial recognition is presented in Figure 1.

The first part of Figure 1 presents a profitable insurance contract, the second part presents an onerous insurance contract. The profit, which the insurance company expects, is expressed by the CSM. The sum of the losses is expressed by the LC. The CSM cannot acquire negative values. If it is negative, it will be presented as the LC in the statement of financial performance. The PV of fulfilment cash flow is defined as the difference between the PV of future cash flows arising from the insurance contract and risk adjustment.

Figure 1

Measurement of Profitable and Onerous Insurance Contract on Initial Recognition



Source: The authors based on TOOLS4F (2019).

3.1. Determining Risk Adjustment for Non-financial Risk

The Cost of Capital method is a known and transparent method within Solvency II (Solvency II, 2015; Heyes, 2021). The insurance company shall use this method to calculate the risk margin. Therefore, we have applied this method to the portfolio of insurance contracts for the term insurance product. We have applied shocks, which Solvency II determines for selected risks, to express the sum of capital needed in our modelling. Risks, which have impacts on term life insurance, are a mortality risk, a risk of life insurance costs, and a lapse risk. The correlation coefficients among these risks are shown in Table 3. The mortality risk and the lapse risk are independent of each other, whereas life expenses depend on the lapse and mortality risk.

Table 3

Correlation Matrix

Correlation matrix under Solvency II	Mortality	Lapse	Expenses
Mortality	1	0	0.25
Lapse	0	1	0.5
Expenses	0.25	0.5	1

Source: The authors based on Solvency II, p. 87.

We have worked with values of shock scenarios that Solvency II offers with a 99.5% confidence level, that is, a 15% increase in mortality, a 50% increase in lapse risk, and a 10% increase in expenses, with a further 1% increase in inflation. According to these shock scenarios, we have expressed the value of additional capital using solvency capital requirements

$$SCR_t^m = PVFCF_t^m - PVFCF_t \tag{1}$$

$$SCR_t^l = PVFCF_t^l - PVFCF_t \tag{2}$$

$$SCR_t^e = PVFCF_t^e - PVFCF_t \tag{3}$$

where

SCR_t^m – *Solvency Capital Requirements – mortality,* the value of additional capital in the shock scenario with increased mortality,

SCR_t^l – *Solvency Capital Requirements – lapse,* the value of additional capital in the shock scenario with increased lapse risk,

SCR_t^e – *Solvency Capital Requirements – expenses,* the value of additional capital in the shock scenario with increased expenses and inflation,

$PVFCF_t^m$ – *Present value of Future cash flows – mortality*, the PV of future cash flows after mortality shock application,

$PVFCF_t^l$ – *Present value of Future cash flows – lapse,* the PV of future cash flows after lapse shock application,

$PVFCF_t^e$ – *Present value of Future cash flows – expenses,* the PV of future cash flows after expenses and inflation shock application.

The present value of future cash flows can be expressed as follows (Sakálová, 2006, p. 37), using the risk-free interest rate in our case

$$PVFCF_t = \sum_{t=1}^{N} \frac{FCF_t}{\prod_{s=1}^{t}(1+i_s)} \tag{4}$$

where

$PVFCF_t$ – *Present value of Future cash flows* in the *t*-year,

FCF_t – *Future cash flows* in the *t*-year,

i_s – *Interest rate* in years from 1 to *t.*

The value of overall capital expressed by mortality shock, lapse shock, and expenses shock are determined by the formula defined in Solvency II

$$SCR_{\mathrm{t}} = \sqrt{\sum_{i,j} CorrL_{(i,j)} \cdot SCR_t^m \cdot SCR_t^l \cdot SCR_t^e} \tag{5}$$

where $CorrL_{(i,j)}$ for i-row and j-column denotes the correlation parameter for the life underwriting risk model presented in Table 3. Out of the amount of overall capital, we have defined 6% as the Cost of Capital rate. It is necessary to point out that the insurance company can choose a percentage other than 6%. The chosen percentage can be based on the internal valuation of the capital intensity. The cost of capital is expressed by the formula

$$CoC_t = SCR_t \cdot i^{CoC} \tag{6}$$

where i^{CoC} denotes the rate on the cost of capital.

The risk margin is calculated as the PV of the cost of capital, that is

$$RA_t = \sum_{j=t}^{5} \frac{CoC_j}{(1+i_t)^j} \tag{7}$$

3.2. Determining the Margin of Contractual Services

The CSM represents the future profit arising from the insurance contract. The CSM shall be presented in the statement of financial position and gradually released so that the insurance company gradually presents the profit. The amount of CSM released is presented in the statement of financial performance as an income. After the coverage period and the recognition of an insurance contract, the CSM shall be fully released and presented in the statement of financial performance.

Two components are determined for the CSM calculation, namely, the PV of future cash flows and the risk adjustment. The time value is expressed as the PV of future cash flows through discounting. The risk arising from the uncertainty of these cash flows is expressed in the risk adjustment. The CSM value at time $t = 1$ has been expressed using the GMM method as follows

$$CSM_1 = -(PVFCF_1 + RA_1) \tag{8}$$

Formula (8) relates to the calculation of the CSM in the first year of disclosure. The calculation of the CSM in the next years is as follows

$$CSM_t = CSM_{t-1} \cdot (1+i) \cdot (1 - Af_t) \tag{9}$$

Formula (8) expresses the calculation of the CSM in year t by multiplying the CSM from the previous year increased by the accrued interest and decreased by the CSM release. The amortization factor in year t (Af_t) represents the percentage in which the CSM is released so that the total amount of the CSM is completely released at the end of the covering period. We have chosen a gradual way of CSM release, at inception is Af_t zero, according to the coverage period N

$$Af_t = \frac{1}{N-(t-1)} \tag{10}$$

In our practical application of the measurement of reinsurance contracts from the insurance company's perspective, no CSM has been established because our reinsurance contract was onerous. According to IFRS 17, the insurance company determines the LRC in this case. The LRC is presented only in relation to reinsurance contracts on the asset side in the statement of financial position and is released in a similar way as the CSM.

4. Results for Measurement of Life Reinsurance Contracts

In applying the measurement requirements to the reinsurance contracts held, the insurer shall use consistent assumptions to measure the estimates of the PV of the future cash flows for the group of reinsurance contracts held and the estimates of the PV of the future cash flows for the group of underlying insurance contracts. In addition, the insurance company shall include in the estimates of the PV of the future cash flows for the group of reinsurance contracts held the effect of any risk of non-performance by the issuer of the reinsurance contract, including the effects of collateral and losses from disputes.

We have assumed that the insurer will reinsure a part of the insurance contract portfolio issued by quota reinsurance contracts with a quota of 40%. The insurer signs a contract for selected term insurance with the reinsurer, and 40% of all 2,000 insurance contracts transfers to the reinsurer.

The actuarial assumptions and the PV of the cash flows from the insurer's perspective are defined in Table 4, and from the reinsurer's perspective are defined in Table 5.

T a b l e 4

Cash Flows from the Reinsurance Contract from the Insurance Company's Perspective

Insurance company						
Year of the reinsurance contract	0	1	2	3	4	5
Interest rate (% p.a.)	–0.53	–0.53	–0.56	–0.54	–0.50	–0.38
Non-performance risk (%)		0.05	0.05	0.05	0.05	0.05
Risk adjustment (EUR)		4,191	2,868	1,731	867	291
Premium (EUR)		–62,141	–58,990	–55,975	–53,108	–50,384
Insurance claims (EUR)		18,000	26,656	27,888	27,690	28,800
Non-performance risk (EUR)		–9	–13	–14	–14	–14
Present value of premium (EUR)	–284,943	–221,306	–161,066	–104,213	–50,579	0
Present value of claims (EUR)	131,221	112,532	85,240	56,888	28,911	0
Present value of non-performance risk (EUR)	–66	–56	–43	–28	–14	0

Source: The authors.

The interest rate is the same from both the insurer's perspective and the reinsurer's perspective. The risk adjustment, premium, and insurance claim denote 40% of the total amounts of the term insurance. The only one item stated in Table 4, and not in Table 5, is the non-performance risk, which is presented only by the insurer and is calculated as the sum of 0.05% of the insurance claims. The insurer may choose the amount of non-performance risk percentage at its own discretion. The reinsurer does not present this item.

T a b l e 5

Cash Flows from Insurance Contract as from the Reinsurance Company's Perspective

Reinsurance company						
Year of the insurance contract	0	1	2	3	4	5
Interest rate (% p.a.)	–0.53	–0.53	–0.56	–0.54	–0.50	–0.38
Non-performance risk (EUR)						
Risk adjustment (EUR)		4,191	2,868	1,731	867	291
Premium (EUR)		62,141	58,990	55,975	53,108	50,384
Insurance claims (EUR)		–18,000	–26,656	–27,888	–27,690	–28,800
Non-performance risk (EUR)		0	0	0	0	0
Present value of premium (EUR)	284,943	221,306	161,066	104,213	50,579	0
Present value of claims (EUR)	–131,221	–112,532	–85,240	–56,888	–28,911	0

Source: The authors.

Table 6 presents the measurement of the reinsurance contract using the GMM method. The PV of future cash flows from the insurer perspective is equal to the sum of the PV of the premium, PV of the insurance claims, and the PV of the non-performance risk from Table 4. The PV of future cash flows from the reinsurer perspective is equal to the sum of the PV of the premium and the PV of insurance claims from Table 5.

T a b l e 6

Reinsurance Contract Measurement using the GMM Method from the Insurer's Perspective

GMM	**Insurance company**					
Year	0	1	2	3	4	5
Present value of future cash flows (EUR)	–153,788	–108,830	–75,868	–47,353	–21,682	0
Risk adjustment (EUR)	4,191	2,868	1,731	867	291	0
Amortization factor (%)	0.00	0.20	0.25	0.33	0.50	1.00
Loss-recovery component (EUR)	149,597	119,049	88,782	58,866	29,284	0
Asset Remaining Coverage (EUR)	0	13,087	14,645	12,380	7,892	0

Source: The authors.

The amortisation factor of the CSM is calculated on the basis of the expiry of the covering period, which means linearly by time. If the insurance company reinsures the group of onerous contracts, it shall present the loss recovery component

applying IFRS 17. In our case, it presents the loss recovery component on the asset side in the statement of financial position, due to the reinsurance of a portion of a group of onerous insurance contracts. Reinsurance contracts, even if they are loss-making, do not create the LC and, under IFRS 17, shall not be presented as loss-making.

In the last row of Table 6, there is an Asset of Remaining Coverage (ARC). The ARC is calculated as the sum of the PV of future cash flows, risk adjustment, and loss-recovery component in this case. The ARC is presented on the asset side in the statement of financial position, due to transfer of part of the liability and risk to the reinsurer. On the reinsurer side, the Liability of Remaining Coverage (LRC) is established in Table 7. The LRC expresses the liability arising from the reinsurance contract. The reinsurer presents these liabilities on the equity and liability side in the statement of financial position. The value of ARC and LRC is not in the same amount due to the non-performance risk involved in the measurement of the reinsurance contract on the reinsurer side. We have worked with the assumption of using the same measurement methods in the insurance company and in the reinsurance company, as well as for using the same RA value, to better describe the measurement principles under IFRS 17.

T a b l e 7

Reinsurance Contract Measurement using the GMM Method from the Reinsurer's Perspective

GMM	**Reinsurance company**					
Year	0	1	2	3	4	5
Present value of future cash flows (EUR)	–153,722	–108,774	–75,825	–47,325	–21,668	0
Risk adjustment (EUR)	–4,191	–2,868	–1,731	–867	–291	0
Amortization factor (%)	0.00	0.20	0.25	0.33	0.50	1.00
CSM (EUR)	157,913	125,667	93,718	62,138	30,912	0
Liability Remaining Coverage (EUR)	0	14,026	16,162	13,946	8,954	0

Source: The authors.

In Tables 8 and 9, there are parts of the statement of financial performance of the insurance company and the reinsurance company presented that arise from the signed reinsurance contract. The difference between an expected insurance claim and non-performance risk enters into the expected cash flows of the insurance company. These are expected insurance claims from the perspective of the reinsurance company. The release of CSM and RA (Table 9) is managed by the expired coverage period. We can see that the only value that is the same from both perspectives is the release of the risk adjustment. It is because the insurance company and the reinsurance company must include the risk adjustment in the PV of the fulfilment of cash flows in the same way, when applying the GMM method. The insurance company and the reinsurance company determine RA using various methods that do not have to be identical.

T a b l e 8

The Statement of Financial Performance of the Insurance Company

Insurance company					
Year	1	2	3	4	5
Expected cash flows (EUR)	–17,991	–26,643	–27,874	–27,676	–28,785
Release LRC (EUR)	–29,762	–29,594	–29,433	–29,284	–29,171
Release RA (EUR)	–1,301	–1,121	–854	–572	–290
Insurance claims (EUR)	18,000	26,656	27,888	27,690	28,800
Interest accretion (EUR)	0	–74	–80	–63	–30
Profit/Loss (EUR)	–31,055	–30,776	–30,353	–29,905	–29,477

Source: The authors.

Reinsurance claims are considered to be income for the insurance company, and expenses for the reinsurance company. This is because the reinsurance claims are paid by the reinsurance company to the insurance company. The insurance company can use this income to settle insurance claims for individual clients. The interest accretion represents the interest calculated from the ARC for the insurance company, and the interest calculated from the LRC for the reinsurance company.

T a b l e 9

The Statement of Financial Performance of the Reinsurance Company

Reinsurance company					
Year	1	2	3	4	5
Expected cash flows (EUR)	18,000	26,656	27,888	27,690	28,800
Release CSM (EUR)	31,417	31,239	31,069	30,912	30,793
Release RA (EUR)	–1,301	–1,121	–854	–572	–290
Insurance claims (EUR)	–18,000	–26,656	–27,888	–27,690	–28,800
Interest accretion (EUR)	0	79	88	70	34
Profit/Loss (EUR)	30,116	30,198	30,303	30,410	30,538

Source: The authors.

Under IFRS 17, the accounting entity that manages insurance and reinsurance contracts must disclose the reconciliations. Reconciliation tables are defined to provide additional information to enable financial statements users to identify changes in cash flows and amounts that are recognized in the statement of financial performance.

T a b l e 10

Reconciliation Table

Year	**1**	**2**	**3**	**4**	**5**
Present value of cash flows – insurance company (EUR)	–153,788	–108,830	–75,868	–47,353	–21,682
Non-performance risk (EUR)	66	56	43	28	14
Discounting (EUR)	0	0	0	0	0
Present value of cash flows – reinsurance company (EUR)	–153,722	–108,774	–75,825	–47,325	–21,668

Source: The authors.

The reconciliation table is a summary table for the PV of cash flows from both, the insurance company and the reinsurance company. The item 'discounting' expresses changes in discount rates from both, the insurance and reinsurance company perspectives. In our case, the amount of discounting is zero. It expresses that both, the insurance company and the reinsurance company, use the same interest rate.

Conclusions

In our paper, we have presented the GMM method applied to the measurement of reinsurance contracts using the methods and principles of IFRS 17. Considering the fact that the standard does not specify a precise methodology for the calculation of any component, neither for risk adjustment nor the CSM, insurance companies have the opportunity to choose their own methodology. IFRS 17 herewith provides some freedom and at the same time the possibility of competitive advantages in the area of methodology to insurance companies.

Based on our results achieved during the calculation of the risk adjustment, we have assessed the possibility of using the Solvency II and the Cost of Capital methodology. These two methodologies are applicable not only to the calculation of the risk margin in determining the solvency of the insurance company, but also to the determination of the risk adjustment under IFRS 17. We have also observed this issue in our paper, too. It is up to the insurance company's decision, which sum of percentile it chooses. IFRS 17 requires the insurance company to disclose this amount. This approach is, of course, very simplified. It implicitly assumes that the Standard Formula of Solvency II corresponds to the risk profile of the insurance company. This assumption must be verified in the process of Own Risk and Solvency Assessment. If the insurance company has enough data, it can try to derive the amount of the risk adjustment based on its own data.

In our model portfolio, the insurance company's underlying insurance contracts have been considered onerous, which is why they have been reinsured. The insurance company protects itself against the risk of insolvency by signing the reinsurance contract. The signed contract is onerous for the insurance company that is why the LRC is established, whereas the same contract is profitable for the reinsurance company. In our case, the insurance company and the reinsurance company have used the same actuarial assumptions for the measurement of the reinsurance contract. In the reconciliation table, the PVs of future cash flows of insurance and reinsurance companies are the same, because the same discount rates have been used. In the case of the insurance company, the PV of non-performance risk must be included.

Obtaining IFRS 17 compliance will not be easy. It will require insurance companies to process large volumes of premium, claims, actuarial, and investment data, as well as to perform numerous calculations and recalculations of fulfilment cash flows and the CSM, calculate onerous contracts for every reporting period, and calculate liability for incurred claims. The critical periods will be the reporting periods before the effective date, when insurance companies should develop and deploy the CSM calculation method, reconfigure IT systems, improve, and integrate transaction and reporting systems. In the year 2022, it will be necessary to provide parallel run, fix, and modify the gaps, to provide review and rectification, as well as to provide a restatement of the statement of the financial position opening balances. The right service provider can drive compliance by helping insurance companies design a strategy to assess impact, identify the technology and infrastructure changes required, define an implementation roadmap, and ensure effective execution.

In addition, insurance companies must consider other systematic risks related to the COVID-19 pandemic or climatic changes when applying IFRS 17. According to Kútiková (2021), the increase in mortality due to COVID-19 affects the rates of life insurance products tariffs. The level of this impact depends on the type of model that the insurance company chooses when modelling mortality. However, this situation has not occurred in practice yet, as in the life insurance sphere, long-term insurance contracts are being signed, and a one or two-year significant fluctuation in population mortality will not affect the calculation of premiums. From a long-term perspective, insurance companies protect themselves from the risk of increased mortality using various forms of reinsurance, which decrease the risk of potential loss. Moreover, every insurance company has tried to anticipate a pandemic in the past, and therefore, cannot afford to be unprepared if something happens. The systematic risk related to climatic changes, which can cause several natural disasters, can lead to increased insurance claims. Insurance companies are required to create higher technical provisions for coverage of insurance claims, which afterward leads to decreased profit. Furthermore, it will have an impact on the PV of future cash flows under IFRS 17, or on technical provisions under effective IFRS 4. Both items, future cash flows, as well as technical provision, are presented on the equity and liability side in the statement of financial position and thus increase the sum of liabilities.

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