Evaluation of Insurance Liabilities in Small Economy Environment

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***Abstract* – This research evaluates insurance liabilities and analyses their influence on insurer's capital. The author measures the changes in the amount of insurance liabilities due to the forthcoming Solvency II and IFRS 4 "Insurance contracts" phase II requirements by comparing a situation in life and non-life insurance markets. Presenting the new approach to setting up a risk-free interest rate and its applicability to liability discounting, the author investigates applicability of this approach to small economies using the Solvency II QIS 5 methodology and the Lithuanian insurance market data.**

***Keywords:* insurance liabilities, technical provisions, risk-free rate, Solvency II**

I. INTRODUCTION

The valuation of insurance liabilities is a topic, which keeps currently all insurance industry confused. As insurance liabilities are calculated for each insurance line, where an insurer bears insurance risks and expects to pay insurance claims in the future, the correct value of these liabilities is a very important issue not only for insurer's management, but also for its stakeholders and supervisors. The aim of insurance liabilities is to provide the information about the capital that will be needed to cover all claims, which arise from the insurance contract. Even the small changes in the valuation of insurance liabilities can usually change the insurer's solvency position and, therefore, its financial stability as the sum of insurance defined in the contract is many times higher than the earned insurance premium. There are two factors that could change the valuation of insurance liabilities in the near future: the Solvency II requirements [16] that are supposed to be implemented by 2014 and IFRS 4 "Insurance Contracts" phase II [18] requirements that plan to emphasize the importance of time value of the insurance liabilities.

The subject of this research is the influence of Solvency II [16] and the second phase of IFRS 4 requirements on the insurance liabilities of insurance companies in a small economy, where the insurance market is quite small and has some local restrictions related to market limitation, for example, small population number, valuation difficulties of interest rate term structure due to the lack of data related to yields of bonds denominated in local currency. As an example of such a market, the author uses the Lithuanian insurance market and analyses how the future legislation requirements could change the valuation of insurance liabilities in it.

The first objective of this paper is the analysis of decomposition of interest rate used in the discounting of insurance liabilities. The second objective is the evaluation of changes in insurance liabilities due to the introduction of illiquidity margin and other progressive calculation requirements.

Within the framework of research, the author applies the comparative and systematic analyses.

II. THE DISCOUNT RATE FOR TECHNICAL PROVISION EVALUATION

Nowadays the discount rate for the calculation of insurance technical provisions is usually understood as the market variable, which can significantly influence the result of valuation of insurance liabilities [4]. In the past, however, a discount rate was a more technical term used in insurance business to describe the internal rate of guaranty incorporated in the endowment or whole life insurance policy. This type of guaranty was usually fixed for the duration of insurance policy and was not supposed to be changed until the lump sum was paid according to the insurance policy conditions. This practice is now changing very rapidly and the value of not only life insurance, but also non-life insurance liabilities in the future will be evaluated by recognizing their time value. The projected changes in this type of evaluation will significant influence the financial results of insurance company.

The Solvency II Directive, first of all, seeks to enhance the stability of insurance market. In the first Pillar of Solvency II requirements, it sets a new framework for the calculation of solvency capital and the evaluation of insurance liabilities, which will be mostly consistent with the requirements of IFRS 4. The Solvency II framework is already established to assure the harmonized approach to these topics in the whole EU territory, but it is also acknowledged that this framework has a significant weakness as it does not clarify how to implement some of the most important requirements.

One of the most difficult questions in this regard relates to setting an interest rate used for the discounting of technical provisions. As this interest rate should include the measurement of currency risk, when the insurance liabilities are denominated in a particular currency, and also should be based on free-risk interest rate term structure defined for each of currencies used in the EU insurance market, we should define how to do it in a small economy, where we have not always the data available for such a task.

To assure the consistent evaluation of insurance liabilities according to the Solvency II requirements, it is very important to use the relevant interest rate for the discounting of insurance liabilities [19] and for the assurance of its comparability with the discount rates, which are

internationally used for the evaluation of similar liabilities (defined benefit pensions, financial guaranties, non-insurance provisions etc.) [9].

Each EU member state adopted though at this stage its own approach for the calculation of technical provisions as the insurance regulation leaves some discretion in this regard.

There are member states that require using a single discount rate for all life insurance provisions (e.g. Lithuania), but there are also several member states that require using the term structures of interest rates of government bonds for each major world currency, based on their swap curves [15] or risk-free recalculation (e.g. the UK and Netherlands).

In the EU Solvency I regime, which did not try to create a holistic approach to insurer's stability, the discount rate for technical provisions had to be calculated using the premise that the average spread for government default risk could be around 40% of the yields of government bonds; therefore, the "pure" risk-free interest rate used to discount provisions was set at 60% yield level. This practice encouraged the use of an over-prudent discount rate and the conservative evaluation of insurance technical provisions, i.e., not seeking to match their value with a fair or market value as it is common for other financial instruments.

This practice could change in a totally different direction now, as EIOPA [16] proposed not only using the particular risk-free interest rate curve as the benchmark for discount rates of insurance liabilities in particular currency, but also calculating a discount rate in the Solvency II regime by adding an illiquidity premium to the risk-free interest rate. As this approach corresponds to the requirements in the forthcoming IFRS 4 "Insurance Contracts" II phase [3, 8], it is necessary to analyse how this new approach will influence the evaluation of technical provisions in the near future.

In the financial theory, the rate of return, at which an investment trade is often expressed, is the sum of five different components (see formula 1):

$$r = \eta + \lambda + \theta + \pi + f(n) \quad (1),$$

where:

η – the real interest rate. This is a basic compensation for the postponement of consumption, because the lender has to postpone purchases from the beginning of loan until capital repayment.

λ – the liquidity margin reflecting the perceived difficulty of converting the asset into money and the uncertainty of the effect of liquidity. Liquidity margin covers mark-to-market risk (i.e., risk of a bond price fall in the market) and liquidity risk (such as the risk of not finding a ready buyer at the theoretical market price) [8].

θ – the credit risk spread. This component is a compensation to the lender of capital for the uncertainty whether or not the interest and principal will be repaid at maturity. In some cases this factor only reflects the effect of the probability of default, while in other cases it also incorporates the expected severity of the loss associated with defaults [8, p.49].

π – the expected change in value. This member is a compensation for the expected decrease in purchasing power due to inflation and could be calculated as $E(\Delta k / k)$, where k is the consumer price index. Assuming perfect information, π is the same for all participants in the market, we can denote $\tilde{r} = \eta + \pi$, and this is the nominal interest rate on a short-term risk-free liquid bond (such as U.S. Treasury Bills).

$f(t)$ – the member, reflecting the debt term or length of the investment, t. In general, the long-term debt should be a higher risk premium reflecting the likelihood the borrower will default.

The similar interest rate composition was analysed by the experts of the Bank of Canada, who in the Financial System Review of June, 2008, highlighted the composition of corporate investment grade spreads as one of three most important issues nowadays. According to these experts, in general, three important components drive variations in bond yield spreads. One of them is the expected loss due to possible default; the second component is a credit-risk premium and the third one – an illiquidity premium (see Figure 1).

Fig. 1. Decomposition of corporate bond spread [17]

The expected loss from default generally reflects the fundamentals of the firm, such as the degree of leverage and its ability to generate a stable stream of profits. The credit-risk premium is related to the variability of, or uncertainty about, potential loss from default. Both the credit-risk premium and the expected loss from default are affected by changes in the macroeconomic activity. When combined, these two components comprise the part of the yield spread θ attributed to default-related credit risks (see formula 2):

$$Spread = \lambda + \theta \quad (2)$$

The illiquidity premium λ, as the non-credit-risk factor, relates to a lack of general market liquidity. Moreover, the credit-risk and illiquidity premiums, like other risk premiums, can vary with any change in the risk appetite of investors and are, therefore, likely to be positively correlated over time.

As the Solvency II requirements for insurance companies emphasize the use of risk-free interest rate as the discount rate for technical provisions, the majority of the above-mentioned spread components should not be included in the calculation of risk-free interest rate. Therefore, the market yield should be stripped down using top-down [8; 16] approach to risk-free yield, with only exception related to the illiquidity premium, which is accepted in the discount rate evaluation as the component of illiquidity of particular insurance liabilities.

The research conducted by Linartas and Baravykas [12] shows though that the EU Solvency II requirement to set a discount rate for each local currency is difficult to achieve due to impeding small market restrains. As significant part of

insurance provisions is classified by the insurance companies as long-term liabilities, which are paid out as insurance claims only in 5 or even 30 years, the discount rate should also be chosen taking into account the bonds with similar maturity. This matching requires checking if the discount rate has the corresponding quality, i.e., it is set in a highly liquid market for all bond maturities. For such local government bond markets as in Latvia and Lithuania, which have significant limitation in terms of availability and liquidity for the bonds with long-term maturity, this is nearly impossible to achieve [12, p. 34-37].

This presents significant difficulties for the insurance company willing to establish a coherent interest rate term structure that could be used for the discounting of insurance liabilities, which could be overcome if the interest rate term structure for minor currency would be based on Euro.

The other discount rate component – illiquidity premium – is even more difficult to separate from the nominal yield of government bonds and to measure its influence to insurance provisions.

Fifth Quantitative Impact Study (QIS 5), which was performed by the newly established pan-European supervisory institution EIOPA, provided the first opportunity to test the applicability of an illiquidity [17] premium to the discount rate. As this study had the objective to measure what impact the Solvency II requirements would have on insurers' capital and technical provisions, QIS 5 at this time provided the best estimate of possible changes in this regard. The study covered 2520 or more than 78% (re)insurers based on the EU market, which represented all 30 EEA countries. It is especially important for our research that QIS 5 included more than 95% of technical provisions and for the first time analysed illiquidity margin influence on the measurement of provisions. Three different buckets were distinguished from all insurance contracts, to which illiquidity premium could be more or less applied. Analyzing this study results it could be concluded that only a limited list of insurance products could be allocated to each of these buckets (see Table 1). Only annuities, run-off insurance business, in particular unit-linked and non-life products, could be distinguished here as typical highly illiquid products, from the client's point of view, to which full illiquidity premium could be applied.

TABLE 1
Illiquidity premium application rate to insurance products [17], compilation by the author

50% application (partial illiquidity)	**75% application (significant illiquidity)**	**100% application (principal illiquidity)**
Non-life insurance in general	Life insurance with profit participation in general	Annuities (including annuities from non-life)
Unit- and index-linked insurance	Pure savings products	Retirement business in run-off
Life insurance without profit participation	Unit- and index-linked insurance with guarantees	Unit-linked insurance
SLT (Similar to Life Techniques) health insurance	Various types of annuities.	Rarely non-life insurance and non-SLT health insurance
Non-SLT health and reinsurance (both life and non-life)	Rarely SLT health, non-life, non-SLT health, life reinsurance, annuities from non-life, and life insurance without profit participation.	
Rarely life insurance with profit participation, pure savings products and longevity swaps		

Many countries did not identify any products that would be eligible for in such a manner corrected discount rates, often because such an approach would not be applicable under current legislation and, hence, was disregarded. Some supervisors in countries, where an illiquidity premium was applied, noted that for some undertakings there was uncertainty as to what products the transition discount rate is intended to apply to. In particular, it was not clear whether the transition discount rate should only apply to those products in the 100% bucket.

The illiquidity premium in particular for QIS 5 purposes was limited to 14 bp (see Figure 2), decreasing its amount when the duration of insurance liabilities was more than 16 years.

Fig. 2. Illiquidity premium used in QIS 5 testing [16]

According to the data available, an illiquidity premium added to a discount rate can have an impact on all types of business (unit-linked, with and without-profit business) with a magnitude varying from 1% to 7% of the value of technical provisions, depending on the product and the bucket of the illiquidity premium. The most common product to which it was applied was annuities (immediate and deferred), including bulk annuities.

III. Financial Stability Issues Related to the Evaluation of Insurance Liabilities

The author has analysed the practice in the Lithuanian insurance market related to the valuation of insurance liabilities, seeking to indentify how the forthcoming change in this sphere will influence the amount of technical provisions and financial stability of the whole insurance market.

The research [11] confirmed that the life insurance companies in this country are more ready to new discounting practice then non-life insurance companies. In particular, according to the investigation, more than 37.27% of life assurance provisions are already valued using a prudent discount rate and expected present value notion. The majority of other provisions consists of unit-linked liabilities (59.11%), which are measured on the asset-liability matching, i.e., a fair value, principle.

Because of the above-mentioned discount rate calculation principles set in EU directive 2002/83/EC, the life assurance provisions are discounted since 2005 using an over-prudent discount rate set below 2.6% level. This level is not only below the discount rate used for typical financial instruments [7], but also below the rate set in the Solvency II requirements [3]. Therefore, according to QIS 5 results, due to the projected increase in the discounting rate and change in insurance liabilities calculation methodology, their amount can decrease

from 8% (unit-linked) to 2% (life insurance without participation in profit).

Based on the amount of the illiquidity premium risk sub-module in the Solvency II Solvency Capital Requirement (SCR), which corresponds to a reduction of 65% of the illiquidity premium included in the valuation of technical provisions, the effect of the introduction of the illiquidity premium in the valuation of technical provisions in QIS5 can be estimated as being almost additional 1% of the value of technical provisions (which represents around 15% of SCR).

This projected downturn in insurance liability amount will decrease the safety margin of life insurance provisions and, therefore, can destabilize insurer's long-term financial stability if it will not be hedged by a corresponding increase in SCR requirements. Due to this change in the Lithuanian insurance market, the amount of provisions released from more prudent requirements could exceed 34 mil. LTL [11]. This amount could help insurance companies increase their capital, which was pressed during the period of financial crunch [1; 11].

The measurement of non-life insurance liabilities will suffer even more changes. The draft IFRS 4 phase II project proposes the use of the expected present value model for all long-term insurance liabilities; therefore, non-life provisions will also be valued by a similar principle as life insurance liabilities.

The significant part (43.43%) of non-life provisions in Lithuania [11] and in other developed countries [6; 20] consists of unearned premium provision, which historically was valued on the cost basis. This valuation is not consistent with the expected present value approach proposed in IFRS 4 project or the best estimate + risk margin approach underlined in QIS 5.

The Provision for claims outstanding, which in Lithuania represents the majority of non-life insurance liabilities (see Figure 2), is also formed as the back-looking liability for already incurred claims that do not include future claims projected according to the insurance contract terms. Provision for claims outstanding usually is not discounted in the EU except two cases.

Firstly, discounting is allowed when claims are paid as the annuity payments till the end of beneficiary's life similar to life assurance principles.

Secondly, discounting is allowed when claims outstanding are already known and are about to be paid in the long term.

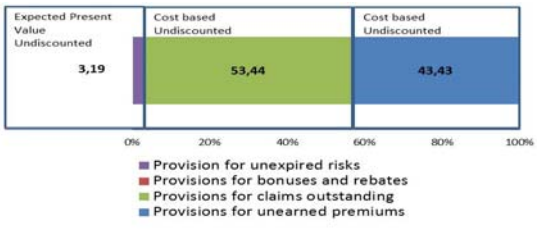

Fig. 3. Structure and evaluation methods of non-life insurance liabilities based on the Lithuanian insurance market data, 31/12/2011 [13] (the author's calculation)

These two exceptions are though typically strongly restricted by the supervisory authorities and there are no generally accepted principles for setting up a discount rate. For this reason, the discount rate used for this purpose is often over-prudent and linked with the investment return on long-term assets. The studies in this sphere [2; 5; 14] also showed that the CAPM and other discount rate setting up methods could be applied only in particular cases and hardly could be used by small insurers.

According to draft insurance accounting principles, the non-life insurance liabilities will be valued using stochastic measurement, including the development scenarios of all possible claims and the cash flows of future insurance premiums. Neither unearned premium provision, nor provision for claims outstanding is valued according to such principles. Only non-life provisions that are typically built using a similar approach are provisions for unexpired risk, but this type of liabilities does not play a significant role (see Figure 3).

Due to such difference between insurance liability calculation requirements today and applied in the Solvency II regime, the non-life insurance provision methodology could change significantly. The primary change will be related to the introduction of discounting of claims outstanding using a risk-free rate. The second important change is related to the introduction of risk margin (RM) as the additional provision amount added to provisions measured on the best estimate basis. Other important changes are related to the stochastic analysis needed to measure claims outstanding, and to the introduction of residual margin, which will be amortized till the end of insurance contract. To investigate how these changes will influence insurance companies, the author has analysed non-life insurance market in Lithuania and found out that the technical provisions in this market will decrease from 9.2% to 37.2%. The major decrease in provision amount is projected in credit insurance and insurance for other financial losses. The projected decrease in most popular car insurance group is also vast and is measured from 15.6% to 23.3% depending on the insurance risk.

It should be mentioned that this research did not encompass the residual margin valuation as this margin is related to possible insurance profit at contract inception and could be valued only by an insurer her/himself. Despite that, due to the change in declared position of the International Accounting Standard Board, according to which residual margin after contract inception will be recalculated with further development of claims profile, this margin could, therefore, play a minor role in the future insurance liability measurement.

The author has come to a conclusion that these changes in the calculation of non-life insurance technical provisions could have one-time 241.2 mil LTL positive impact for insurers' capital. Also, there is expected the positive impact of change in life assurance amount that can increase the equity of insurers by 43.17%, but will still not mitigate the fast capital demand related to the introduction of new SCR requirements, which according to QIS 4 and 5 results [16] will increase solvency capital requirements by 2.5–3 times in small economies.

IV. Conclusion

1. The discounting rate for insurance liabilities will be based on risk-free interest rate term structure and include an

illiquidity premium. Its measurement for such currencies as LTL will be problematic due to the sketchy profile of government bonds and not existent liquid market for its trading.

2. Non-life insurance liabilities are usually valued using retrospective and cost based methodology. Therefore, their amount will decrease from 9.2% to 37.2% with the introduction of new evaluation requirements.

3. The 37.27% of life insurance liabilities are already valued using prospective methodology and discounted to evaluate time value of money, but the discount rate used for this calculation will be based on a risk-free interest rate that means that it will significantly increase in Lithuania and some other EU member states, which have not introduced valuation based on the interest rate term structure. The valuation of expected claims dispersion is not implicitly incorporated in life assurance provision and not valued through a separate risk margin.

4. The introduction of new evaluation principles of technical provisions could significantly increase one-time capital amount for insurers, but could endanger their long-term financial stability situation due to decreased requirements for setting up technical provisions.

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Audrius Linartas. Apdrošināšanas saistību izvērtējums mazas ekonomikas apstākļos

Problēma ir tāda, ka mazai valstij obligāciju tirgos, gan Latvijā, gan Lietuvā, ir būtiski ierobežojumi attiecībā uz obligāciju pieejamību un likviditāti ar garāku termiņu. Apdrošināšanas sabiedrībai ir ļoti grūti, ja tā vēlas izveidot saskaņotu procentu likmes termiņstruktūru. Pētījums aplūko īpašās prakses tādās ES valstīs kā Lietuva, Nīderlande un Apvienotā Karaliste, un nāk pie secinājuma, ka ES, izvērtējot maksātspējas režīmu, tika aprēķināti, pamatojoties uz pieņēmumu, ka vidējā starpība par valdības saistību neizpildes risku ir aptuveni 40% no valsts obligāciju peļņas. Tas nozīmē, ka diskonta likme, ko izmanto, lai nodrošinātu dzīvības apdrošināšanas aplēsēs, tiek noteikta ļoti saprātīgi.

Анудриус Линартас. Оценка страховых обязательств в условиях малой экономики

Проблема в том, что небольшие рынки государственных облигаций, как в Латвии или Литве имеют существенные ограничения с точки зрения доступности и ликвидности на облигации с длительным сроком погашения. Это создает значительные трудности для страховой компании, готовой установить согласованную процентную ставку временной структуры. Автор выделяет конкретной структуре ставки дисконтирования для расчета страховых технических положений и подчеркивает важность процентной ставки неликвидности компонента новой премии. Поскольку каждая страна приняла собственный подход для расчета технических положений страхового регулирования, остается некоторую свободу в этом отношении. Исследование рассматривает конкретную практику в таких странах-членах ЕС, как Литва, Великобритания и Нидерланды, и приходит к выводу, что при оценке режима платежеспособности интересы были рассчитаны на основании предположения, что средний предел для государственных рисков дефолта составляет около 40% от доходности государственных облигаций. Это означает, что ставки дисконтирования, используемые для страхования жизни, устанавливаются в разумных объемах.