UNEXPIRED RISK RESERVE

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ABSTRACT

International Financial Reporting Standard 4 required liability adequacy testing (LAT). In non-life insurance, the most important components of LAT are run off analysis for claims provisions and unexpired risk reserve (URR) calculation. URR is defined as a prospective assessment of the amount that needs to be set aside in orders to provide for the claims and expenses which will emerge from unexpired risks and which is over and above the unearned premium reserve pertaining to the same risk as at the same valuation date. In algebraic form: URR = max {(E[Claims] + E[Expenses] + DAC – UPR); 0}, where E[Claims] and E[Expenses] are claims and expenses expected to be incurred after valuation date on policies with unexpired exposure periods as the valuation date, DAC are deferred acquisition costs and UPR is unearned premium reserve as at valuation date. In some countries, insurance regulator requires increasing modeled URR by some risk margin. In the near future, Solvency II will bring some changes – unearned premium reserve will be calculated on different way, URR will be calculated similar to current approach, except URR would be smaller due to effect of discounting.

Key words: reserves, unexpired risks, URR, LAT

INTRODUCTION

International Financial Reporting Standard, IFRS No. 4 requires the Liability Adequacy Test (LAT). LAT requires that the insurer assesses at each reporting date whether its insurance liabilities adequate, using current estimates of future cash flows arising from insurance contracts. If that assessment shows that the value of its liabilities in respect of insurance is not adequate in light of the

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estimated future cash flows, all deficiencies are recognized in the income statement.

The most important components of testing the adequacy of non life insurance liabilities are checking the adequacy of provisions for claims through an analysis of the sufficiency of the reserved amount (run off analysis) and calculation of Unexpired Risk Reserve (URR)**.**

This paperwork is devoted to defining, modeling and calculation of reserves for unexpired risks which are applied in actuarial practice, as well as their critical review and changes by the Solvency II in the near future.

1. RESERVES IN NON LIFE INSURANCE

At the beginning, it should clarify the terms of reserves in nonlife insurance. We will focus on the purpose, definitions and general principles and investigate the common techniques used in actuarial practice in the evaluation of unexpired risk reserve and outstanding claims. It is important to note that reservations must be not only adequate, but adequate in all circumstances. Claims reservation is a major challenge for actuaries because the process requires the use not only of complex statistical methods, but also significant actuarial valuation. The process of any provision is very important, as established reserves in the company books have a direct impact on the financial result, shareholders' equity and solvency.

The types of reserves in non life insurance

At the time of closing of financial books, reserves are divided into three main categories:

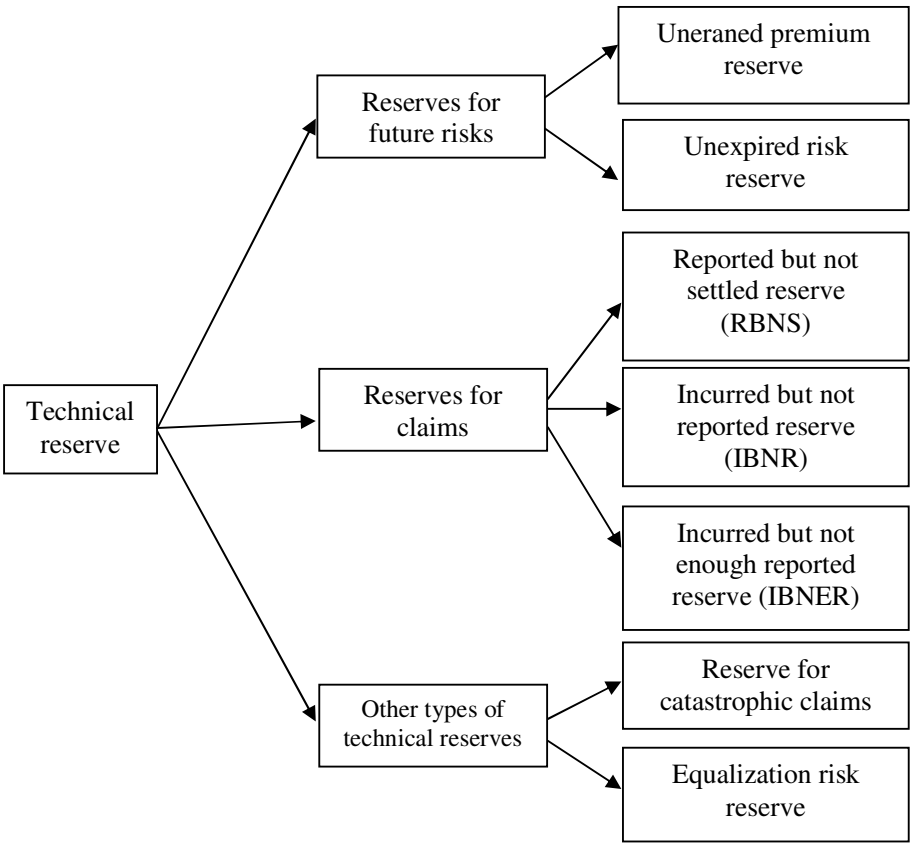
- The future liabilities for risk exposure from valuation date to date of policy expiration - relating to the liabilities associated with insurance for the future period, based on the policies under which the premium revenues are recognized;
- Past liabilities for the period of risk exposure which ended - relating to liabilities incurred as a result of past events, before the closing of company books;
- Liabilities for uncertain events.

The above classification is conceptual; a specific type of technical reserves may vary in different legislation. Figure 1 shows an example of classification of non life insurance technical reserves.

Reserve for risks that existing policyholders will be exposed after the date of valuation includes:

- Reserve for unearned premiums - are explained by the fact that, in the case of non life insurance policies, risk exposure is usually beyond the current financial year. Transferred part of the premium into the next financial year is intended to cover the liability for risk after the end of the current financial year;
- Unexpired risks reserve - calculated on the basis of estimation for future claims and expenses which will arise after the closing of financial books, due to insurance policies concluded before that date, to the extent the estimated value of these policies exceeds level of reserves for unearned premiums

Figure 1. Classification of technical reserves in non-life insurance



Claims reserves are divided into three components:

- Reserve for reported but not settled claims is an estimated value which is reserved with the intention of claims settlement that are known to the insurer at the end of financial period,
- Reserve for incurred but not reported claims is formed to cover the payments for claims, even though that happened, not yet reported to the insurance company and,
- Reserve for incurred but not enough reported is related to claims that are re-evaluated and that must be explicitly emphasized that there is a possibility of additional payments in future.

2. UNEXPIRED RISK RESERVE

Unexpired risk reserves are formed in case of in capacity of insurers to fully cover the expected claims and expenses arising from active portfolio after the date of valuation.

2.1. Definitions

Accounting Class
An accounting class is a defined group of certain lines of insurance business as per relevant regulation.

Unexpired Risk Reserve
The unexpired risk reserve is defined as a prospective assessment of the amount that needs to be set aside in order to provide for the claims and expenses which will emerge from unexpired risks and which is over and above the unearned premium reserve pertaining to the same risks as the same valuation date. In other words, if any, that is additional to the amount of expected claims and expenses from active portfolio of the assessment to cover reserves for unearned premiums for that class on the same date.

Unearned premium
The portion of premium which is not earned by the insurer i.e. the amount of premium that covers the period from the valuation date until the date of expiration of the contact.

Unearned premium reserve
Unearned premiums reserves (UPR) are premiums which are reserved because the corresponding period of insurance cover has not yet passed. This is part of the

premium income is recognized in the books in the accounting period, which is kept at the end of the accounting period for unexpired risks. According to local regulations it is the sum of unearned premiums on policies unexpired on the valuation date by pro rata temporis method. Often in other countries for the UPR takes a value equal to the sum of all unearned premium less deferred acquisition costs.

Acquisition Expenses
Acquisition expenses are all expenses (both direct and indirect) connected to the processing of proposals and the issuing of policies. They include both direct expenses, such as commissions, and indirect expenses, such as advertising costs or the administrative expenses connected with the processing of proposals and the issuing of policies.

Deferred Acquisition Costs
Deferred acquisition costs are part of acquisition costs to be paid during the current financial year, but in the company books can be carried forward into the next financial year in accordance with the duration of the policy. They are regarded as assets in the financial statements. It should be noted that under Solvency II, deferred acquisition costs may not be used to cover the solvency requirement since having no value in the solvency balance sheet.

Maintenance or Administration Expenses
Maintenance costs are all other costs not included in the acquisition expenses or in the expenses of resolving claims.

Unexpired Exposure Period
The time period between the valuation date and the expiry date of the policy contract. For annual policies the unexpired exposure period would be a maximum one year from the valuation date and for multi-year policies the unexpired exposure period can be several years from the valuation date.

Valuation Date
Date of valuation is the date on which the reserve calculation is performed and active portfolio is recorded.

Claims Settlement Expenses
They can be divided into the following two major categories:

- Direct claims expenses - refer to the resolution of specific claims, such as the expenses of a lawyer or a liquidator claims, medical and legal expenses, expenses of special investigations, etc.

- Indirect claims expenses - cannot be allocated directly to specific claims settlement. These are usually the salaries of the claims administration and related expenses, office expenses, data processing expenses, fees for experts who provide consulting and administrative services, etc.

It is necessary to follow these instructions when you consider the calculation of URR:

- All accounting class must be evaluated to determine appropriate URR
- For each class separately to assess whether there is a need to form a URR or not
- The positive excess of the unearned premium over unexpired risks in particular accounting class, should not be used to partially or fully compensate deficits that lead to the formation of reserves for unexpired risks in the second class of accrual
- It is reasonable to group together certain types of insurance, if it can be established that the method of calculating and the prospective claims are similar
- In cases where data for certain types of insurance are insufficient for credible statistical calculation of specific URR it is also recommended to group certain types of insurance. However, it should be done with caution, and the reasons for this should be fully documented
- When the actuary thinks that some segments of different types of insurance business may lead to different results, these segments can be analyzed individually.

2.2. Components of the model calculation of URR

Should be develop an appropriate model for establishing reserves for unexpired risks, which include all factors that directly or indirectly affect the calculation of reserves. Such a model should include several different components including:

- Reserves for unearned premiums
- Claims forecast
- Expense forecast.

It must be noted that all these components must be calculated separately for each type of insurance. In principle, the calculation of each component should be done at level of each homogeneous risk groups.

Unearned premium reserve component

This is the simplest component of URR calculation, since it is only defined in relation to the reserve premium for the specific unexpired risks, which has not expired by the date of valuation. In other words, this component is the provision for unearned premiums for such group or class of insurance risk.

It should be noted that the goal of testing the sufficiency of the model established by UPR and thus UPR which should be used in the model is the one that the company shows in the books. It is important to note because there are several possible approaches for the calculation of UPR.

Component of the expected claims: E [claims]

Forecast is made on the basis of claims that are expected to occur in the future in relation to unexpired exposure of certain types of insurance (or its homogeneous subgroups), including the expected claims expenses for this portfolio. It is important to note that the determination of reserves for unexpired risks taken only claims that could occur in the remaining period of insurance.

Homogeneous risk groups should be used for prediction of claims (e.g. motor third part liability bodily injury) where there are significant differences in the characteristics of the claims (timing, amount, uncertainty, etc.) within each class. If the actuary considers it appropriate, different models can be made for each group or class of risk for either the frequency or intensity or both, of:

- Attritional losses
- Large claims
- Catastrophic claims
- Exposure.

Forecast claims shall include all claims that may occur in the remaining period of insurance, including:

- Claims reported after the remaining period of insurance, which occurred during the remaining period of insurance
- Claims reopened at any date, which occurred during the remaining period of insurance.

Forecast should provide the ultimate amount of all claims, and shall include:

- Any further development of the claims from the date of occurrence to the final settlement,
- Any claims that is expected to be reported after the end of the unexpired exposure period, but occurred within that period,

- Inflation / trends which are appropriate for the type of claims (e.g. court award inflation),
- Inflation which is appropriate for the timing of expected payments,
- Legal / judicial environment until final settlement of all claims,
- Economic conditions until final settlement of all claims,
- The practice of claims settlement until final settlement of all claims,
- Changes / trends in the frequency / severity and
- Claims with low frequency (and large severity), which may not be observed in recent years.

This list is not exhaustive and may be extended depending on the factors that could influence, or affect the claims forecast.

Component of the expected expenses: E[expenses]

Expenses related to the unexpired part of risks are an important component of the overall analysis that leads to the need for establishing reserves for unexpired risks and levels of reserves. Therefore, it is equally important that the actuary fully understand the cost structure of insurers to be able to make reasonable estimates regarding the expected expenses in connection with unexpired part of risk in force. It is important to pay attention to the analysis of expenses to the extent necessary for actuaries to get enough guidance on the cost estimates in relation to establishing the URR.

The development of expenses data and expense analysis of each situation involve great ability to evaluate and subjectivity. In practice, the actuary included in the expenses analysis will have to consider many factors and determine the appropriate approach to the problem which can be addressed based of these factors.

Expenses of the non life insurance company can be divided into the following major categories:

- Acquisition expenses
- Maintenance or administrative expenses
- Claims settlement expenses
- Investment expenses.

Acquisition expenses are expenses that have already been incurred, under the current portfolio of the assessment. Therefore, acquisition expenses could be ignored for purpose of URR except for deferred acquisition expenses.

Investment expenses are usually deducted from the investment income, and are not presented separately in the financial books.

The expenses of claims settlement are used to calculate outstanding claims and for the URR.

Categories of expenses used for the calculation of the URR are maintenance expenses and claims settlement costs regarding new claims for the existing portfolio. In estimating of future expenses, the actuary must take into account the following:

- Inflation increase
- Differences in budgeting as a result of hiring new staff, extraordinary expenses, etc.
- The circumstances under which administrative expenses are modeled that are not evenly distributed over the duration of the policy.

2.3. Determination of unexpired risks reserve

Provision for unexpired risks are calculated based on projections of future claims and expenses that are expected to arise after the date of valuation, and related to contracts in force on the day of valuation. Above-mentioned amount is compared with established reserves for unearned premiums, after all deferred acquisition expenses. Any excess amount is recognized as the URR. The calculation is made net of reinsurance.

In algebraic form, the basic formula for calculating the URR as follows:

$$URR = \max \{(E[claims] + E[expenses] + DAC - UPR), 0\}$$

Where:

E [Claims] - the expected claims that will occur after the date of valuation on active policies in remaining period of insurance, including the costs of claims settlement relating to these claims:

$$E[claims] = \frac{claims * UPR}{earned\_prem}$$

E [Expenses] – expected administration expenses that will occur after the date of valuation on active policies in remaining period of insurance:

$$E[expenses] = \frac{admin\_expenses * UPR}{earned\_prem}$$

UPR – unearned premium reserve as at the valuation date;

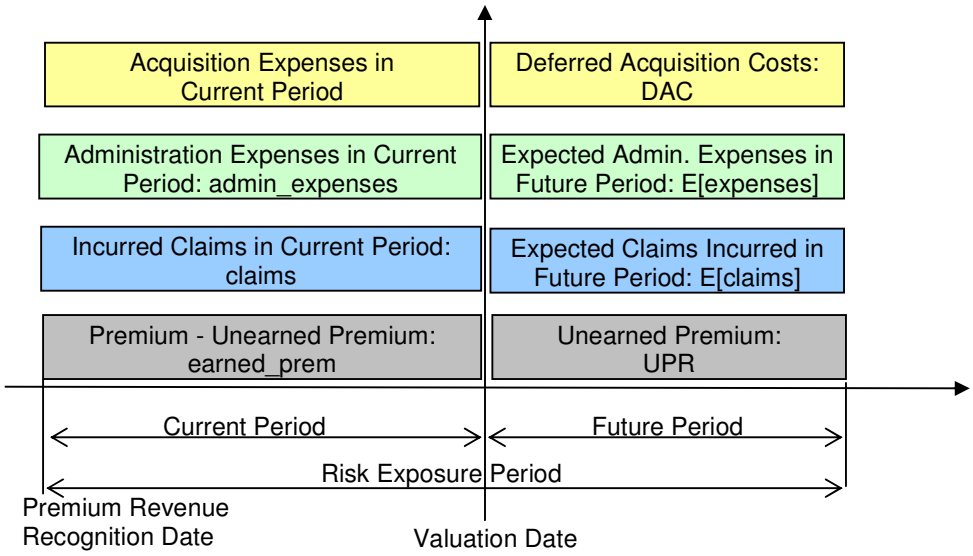
DAC – deferred acquisition costs related to premiums that are being considered for calculation of unearned premium;

earned_prem – earned premium or premiums recognized in company books decreased for a change of unearned premium;

claims –amount of claims settled with the expenses for claims settlement increased by the change of outstanding claims, and decreased by recourse claims.

Figure 2 shows all the components involved in the formula for calculating the URR.

Figure 2 Components of the model calculation of URR



The simplified formula for URR:

$$URR = E[claims] + E[expenses] + DAC - UPR$$

Written on a different way URR is obtained:

$$\text{URR} = UPR * \left(\frac{\text{E[claims]}}{\text{UPR}} + \frac{\text{E[expenses]}}{\text{UPR}} + \frac{\text{DAC}}{\text{UPR}} - 1 \right)$$

Then engage the upper formulas for E [claims] and E [expenses]:

$$\text{URR} = UPR * \left(\frac{\text{claims}}{\text{earned\_prem}} + \frac{\text{admin\_expenses}}{\text{earned\_prem}} + \frac{\text{DAC}}{\text{UPR}} - 1 \right)$$

Finally, it is transformed into the following basic formula for calculating the URR:

URR = UPR * (claims_racio + admin_expenses_racio + DAC/UPR – 1)

Or more precisely:

URR = max {UPR * (claims_racio + admin_expenses_racio + DAC/UPR – 1); 0}

Previous formula is often used in actuarial practice when calculating the URR, as the simplest way to give the percentage for increase unearned premiums reserves if the sum of three ratios above exceeds 100%.

Additional comments

Calculate the amount of reserves for unexpired risks should be adjusted to include all known events that occurred between the date of closing of company books and the date of calculation.
Estimates should be consistent for a number of consecutive years unless the actuary has registered a change in circumstances that would require different basic assessments, such as:

- Known trends in premium rates
- Known factors affecting the level of claims related to unexpired risk
- Budgeted or planned changes in the level of expenses
- Exceptional levels of claims in recent years, which is not expected to repeat.

2.4. Disclosures

The actuary should disclose the following information regarding the determination of URR:

- The methodology used for analysis and separate expenses between four major groups, and his opinion on the extent of adequacy of the methodology
- The methodology used to analyze the separate of expanses between different types of insurance and / or sub-groups within one or more types of insurance and his opinion on the degree of adequacy of the methodology
- URR obtained for each type of insurance
- The methodology used to forecast claims, which are used in the calculation
- The data used to forecast expenses and claims as follows:
    - number of years that were used for analysis
    - paid and / or incurred claims
    - the basis for data collection: accident year, underwriting or calendar year
- Estimated levels of inflation and the expenses basis used in the evaluation
- The methodology used for the calculation of URR reinsurance.

2.5. Margin risk calculation URR

The regulations of individual countries, in calculating the URR applied an increase for the margin risk. Unexpired risk reserves calculation is simpler than was reported in the previous chapter, as greater amount of unearned premiums and products of UPR and the combined ratios. Combined ratio is defined as the sum of claims ratio and expenses ratio. Unearned premiums reserves and unexpired risks reserves are a central component in determining the solvency and the capital adequacy requirement.

Risk margins applied in calculating the URR reflects the uncertainty in estimating these reserves. The level of margin has been prescribed for the purposes of determining the requirement of Solvency and in Australia is 10%.

3. URR AND SOLVENCY II

Assessment of technical reserves for non life insurance in accordance with the Solvency II

Solvency II introduces a new, and for many, fundamentally different approach to establishing the technical reserves for outstanding claims and premiums. The new approach is guided by the need to calculate liabilities consistent with the market.

Therefore, in the absence of appropriate hedge portfolio, the technical provisions of Solvency II are determined as the discounted best estimate increased by risk margin. These three terms can be interpreted as follows:

- Best estimate - the best estimate reserve (undiscounted) is equal to the probability weighted average of future cash flows
- Discounting - the best estimate is discounted for time value of money (expected present value of future cash flows), using appropriate risk-free term structure of interest rates
- Risk margin - calculated as the present value cost of holding capital to meet the Solvency capital requirements (SCR) for the risks which cannot be protected by hedge techniques, throughout the whole run off period of the active portfolio, using the appropriate risk-free interest rates term structure.

The scope of technical reserves relating to premium

Solvency II framework directive considers best estimates premium reserve method as a replacement for the current reserves for unearned premiums and unexpired risk reserves. Calculation of best estimate of the premium reserve relates to all future claims payments arising from future adverse events that are insured under current active policies, appropriate future administrative expenses and all future expected premiums.

According to CEIOPS (Committee of European Insurance and Occupational Pensions Supervisors), "The premium provision is determined on a prospective basis taking into account the expected cash-in and cash-out flows and the time value of money. The expected cash flows should be determined by applying appropriate methodologies and models, and using assumptions that are deemed to be realistic for the LOB or a homogenous group of risks being valued. The cash flows should not include expected future renewals that are not included within the current insurance contracts."

This is a fundamental change in the current accounting practice of calculating unearned premium reserves by pro rata temporis method. This means that the companies because of Solvency II should take into account the ultimate combined ratio (expenses to cover claims and other insurance costs) related to the unearned premium. It follows that when the discounted combined ratio applied to the unearned premium is lower than 100%, immediately recognizes the expected profit which is not the case with the current methodology for calculation of unearned premium. Also, the discounted combined ratio above 100% will lead to the formation of unexpired risks reserves, similar to the current approach, except that the new URR would be lower due to discounting.

4. FURTHER ADJUSTMENTS ACCOUNTING URR

Taking into account the claims ratio as the ratio of incurred claims and earned premiums during the year, it is clear that a part of earned premiums, with a corresponding claim, was transferred from the previous year. If the previous year premiums were adequate to cover the claims (it was not necessary to establish a URR), but the premiums for the current year are insufficient to cover the claims then the claims ratio will be the ratio between low ratio, which refers to the previous year and higher ratio relating to the earned portion premiums for the year. This claims ratio is inadequate multiplier for reserves for unearned premiums in current year because it dilutes the high ratios that should apply. Otherwise, if the premiums from the previous year were insufficient to cover the claims, while the situation is satisfactory in the current year, the formula can produce URR though it is not necessary.

Routine application of the described calculation URR may be a problem, but there is a satisfactory practical solution. Actuaries in the insurance company without a doubt know when their rates were inadequate and can assess their contribution to earned premiums and unearned premium reserves. However, it can be difficult to determine claims arising under that part of the earned premiums. Knowing how much of the reserve for unearned premiums derived from inadequate tariffs, URR can be calculated by applying the percentage of inadequate premiums, but the calculation of that percentage, also requires knowledge of appropriate claims. There remains the problem of how to determine the excess of the appropriate premium to compensate for a lack of the inadequate premiums. This problem is much bigger challenge for the insurance supervision body which has only limited information from the standard of reporting, so problem solution that they can provide is likely to be only a rough estimate.

There is still an open question regarding the calculation of the URR. The amount of outstanding claims, which is used in the formula for the claims, estimates the insurance company's administration, as well as cost of their settlement. Not so strict standards of administration in the provisioning could cause inadequate outstanding claims provision booking and lower claims, which directly leads to the lower URR. This is the opposite of what supervision is required and what the purpose of introducing provisions for expired risks is.

In the case of a underestimated claims reservation, the second part of the LAT, run off analysis, will certainly disclose it, so actuaries can adjust the calculation of URR, to obtain realistic values.

CONCLUSION

The goal of this paperwork is to give more information about one important category of reserves in non life insurance, which is not defined in domestic legislation. IFRS 4 only generally described URR within liability adequacy test. In available literature it is difficult to find more detailed review of URR.

The paper has already described that the URR is very important and can be quite large, especially in a situation where the combined ratio of specific types of non life insurance is much greater than 100%. URR deserve the attention even in a situation where their recognition is not required in the local company books. If the calculation shows that URR is necessary to be established, it is clear sign to actuaries and management that in the following year the company will not have enough premiums to cover claims and expenses for active policies at the end of current year. Where regulations do not allow recognition of URR in the company books, actuaries and management certainly can react in time and take other measures to ensure fulfillment of obligations to policyholders by unexpired policies.

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