

Full length research paper

Development of model for insurance risk management and its application to insurance companies operating in the Serbian market

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The literature on the topic of risk management in insurance generally separately treat insurance risk and insurance company risk, however such a separate treatment of risk excludes a third type of risk which is defined here, that is the risk of incorrectly calculating insurance risk, which causes uncertainties and disruptions in the operations of an insurance company and its concept of risk management arising from its activities. This paper presents a Model developed for insurance risk management and its attempt to assess the calculation of insurance risk. Also, the Model has been applied to the 2005 to 2010 results of five insurance companies in the Serbian market.

Keywords: Risk; Insurance; Management

INTRODUCTION

Insurance is an “uncertain business,” characterized by competition for premiums that pushes insurers into the unknown. The insurance industry is as much in the business of uncertainty as it is in risk, with notions of quantification and actuarial principle increasingly evaporating in an ever more competitive, vibrant and amorphous insurance market (Ericson and Doyle, 2004).

Insurance companies face numerous risks arising from the insurance industry itself on a daily basis, as well as risks arising from insurance company operations, such as placing available funds, fulfilling obligations under insurance premiums, and harmonizing resources and the placement of free funds.

Insurance literature mostly addresses several types of risk that insurance companies are facing. IAA (2004) distinguishes five main categories that can be further classified into parts. The main categories are: Underwriting risk, Credit risk, Market risk which also includes ALM or mismatch risk, Operational risk and

Liquidity risk. Doff (2006) added another risk category: Business risk, which is the risk of losses due to unexpected changes in the competitive environment of the firm or in the extent that it can flexibly adapt to these changes.

For the purpose of this paper, we have classified insurers risk into two main categories: the insurance risk and the insurance companies risk. Insurance risk is the main risk and represents the risk of the insurers. It may be defined as the inability of insurance companies to absorb risks taken on the basis of concluded insurance contracts. Depending on the type of work covered by the insurance company, insurance risk is shared in the risk of life insurance, the risk of non-life insurance, and as a separate type can be extracted catastrophic risk.

Apart from insurance risks, insurance companies also face the risks originating as a direct result of insurance company operations. Just like other financial entities operating in the financial market, insurance companies face market risk, risk of maturity and structural mismatch of assets and liabilities, risk of depositing and investing the company's assets, and other risks arising from operations, such as operational, legal, and reputational risk.

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The aim of this paper is to present the relationship between these two types of risk in insurance and to develop a model that will quantify the connection. In other words, this paper quantifies a third type of insurance risk called here "the risk of wrong assessment of insurance risk" that will measure a loss that insurers face because of wrong assessment of insurance risk. Insurance risks very often are not reliably calculable except in hindsight, at which point the risk has already been transformed into an all-too-measurable loss (Alborn, 2009).

The risk of wrong assessment of insurance risk is causing disturbances in the business of an insurance company and its concept of risk management arising from its activities. Therefore, this risk shows that there is a direct relationship between insurance risk and insurance company risk and that deviation from the set of risks in insurance lead to deviation from the set of risks arising from operating an insurance company, which could endanger the stability of the company.

Given that the insurer plans their investment activities by the amount of available funds to which the size the Insurer came by the amount of the insurance risk assessment, the logical conclusion is that the wrong assessment of insurance risk affects the investment funds that carry a risk of an insurance company. If there is a wrong assessment of insurance risk, the insurance company has to allocate more funds to cover the underestimated risk or if the risk is overstated, there will be a surplus of funds that will not be properly used.

If the insurance company has to withdraw funds from the market to cover losses arising from realizing the major claims than planned, then it disturbs the planned investment of available funds, and with them the risks planned. Conversely, if the insurance company has overestimated the risks, it means that there are available surplus funds that could be invested. If the insurer has invested these funds, then he could make some profit from the investment that would increase his operating result and thus increase the value of the company. On the other hand, overvaluation of risk can lead to increased premiums and thus reduce the competitiveness of the company. If the premium rate is too high, an insurance company will not have enough clients for successful operation. If the premium rate is too low, the company also may not have sufficient funds to pay all the claims (Melnikov, 2004).

To meet the challenges that are put before them and to successfully fulfill their primary role, protection of the insured, insurance companies must be able to manage in an integrated manner the overall risk portfolio. Therefore, the realization of optimization of insurance companies' business, which includes the most effective use of all available resources and maximizing the economic value at a given proficiency level of risk, primarily depends on efficient risk management that includes integrated treatment of all risks in order to minimize their potential

destructive effects.

The model for implementation of insurance risk management that is directly related to the insurance company risk (hereinafter referred to as the Model) which shows the impact of realized insurance risk, manifested as insurance claims based on the payment of insurance premiums, on insurance company risks, which affect the amount of free funds available to an insurer after settlement of claims.

METHODOLOGY

When determining the risk impact described above, the following terms are suggested as a complex function of parameters:

- Settled insurance claims,
- Technical insurance premium,
- Total insurance premium,
- Generated profit expressed in percentages in relation to the total premium collected, mutually related in a specific manner expressed by the formula:

$$RIRM = \frac{\text{settled claims}}{\text{total premium}} \quad (1)$$

$$SCTP = \frac{\text{settled claims}}{\text{technical premium}} \quad (2)$$

$$PROFIT = \frac{\text{profit before tax}}{\text{gross premium}} \quad (3)$$

$$\frac{PROFIT}{RIRM} \quad (4)$$

Where RIRM is the Result of Insurance Risk and SCTP represents the share of Settled Claims in the Technical Premium. The results obtained by equation (4) show how much the insurance market managed to affect the increase of the realized market profit by proper insurance risk management.

Implementation of these ratios in the Serbian market can produce numerous results, which can give a clear picture of the status of the Serbian insurance market, and demonstrate the impact of insurance risk on operations and the operational risk management of a company.

Results

Implementation of the Model in the Serbian insurance market can be realized measuring various segments of

Division of the Serbian insurance market since 2008.

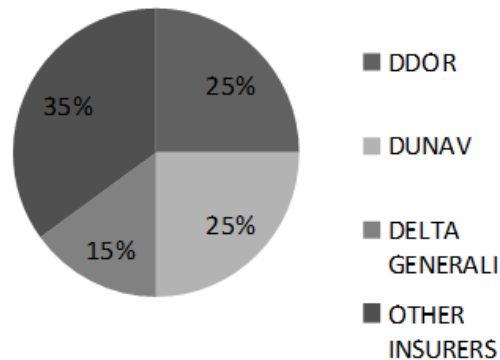


Figure 1 Division of the Serbian insurance market since 2008. Source: author's calculations, National Bank of Serbia

the market. In this paper implementation has been carried out in two phases in the period 2005 – 2010 on business data from five insurance companies that are selected based on next analysis of the Serbian insurance market: DDOR and Dunav insurance companies as two leading insurers in the last decade, Delta Generali insurance company that joined the leading insurers, and Takovo and Wiener insurers as the representatives of the rest twenty insurers that shares the rest of 35% of the market (Figure 1.).

All data used for obtaining the results in this paper were taken from regular annual reports on insurance companies' operations, published by the National Bank of Serbia. In phase one, the implementation of the Model was separately done for RIRM (Equation 1) and SCTP (Equation 2) ratios of non-life insurance operations, life insurance operations and the overall results of operations of the selected insurance companies. Table 1 shows the results of RIRM ratio, obtained by the comparison of settled claims and total/technical premium of the non-life insurance business in selected insurance companies.

From a comparative review of RIRM indicators for companies it can be seen that from year to year, the share of settled claims had an upward trend in all non-life operations of the insurance companies. Table 2 shows the results of RIRM ratio, obtained by the comparison of settled claims and total/technical premium of the life insurance businesses in the selected insurance companies.

From the comparative review of RIRM ratio in life insurance operation it can be seen that only DDOR and Dunav insurance companies had indicators that can be analyzed, while the RIRM ratio in other companies is extremely low, indicating that the business of life

insurance is not sufficiently or even at all developed (as in the case in Takovo insurance company) to pay attention in this analysis. DDOR company had the largest value of RIRM indicator in 2007, while the value of RIRM in 2009 has declined to the level of 2006. RIRM indicator of Dunav insurance company had a declining trend from 2005 to 2009, when it recorded the lowest value of 42%, indicating that the operations of life insurance over the years in the insurance company did not develop as well as non-life insurance operations.

If we compare the results of the non-life and life insurance types, one can come to the conclusion that life insurance operations still are not sufficiently developed to influence the overall result of the business and the result of insurance risk management can only be attributed to the result of risk management in non-life insurance, which is, in two leading companies operating in the market, amounting up to 90% of all insurance operations. Table 3 shows the overall results of RIRM and SCTP ratios, which includes both the life and non-life insurance business in the selected insurance companies.

By comparing the results of SCTP ratios of the two largest insurance companies DDOR and Dunav, it shows that there is a trend of adapting the level of technical premium to good management of insurance risk, which reduces the overall annual result of settled. However, these two companies still have room to reduce the amount of technical premium for approximately 10%, thus reducing the amount of total premiums.

Results of RIRM analysis shows that over the years DDOR and Dunav insurance companies have nearly the same share of settled claims in the total insurance premiums, growing from 40% to 51%, while in other companies this participates less. The given results show

Table 1. Results of RIRM ratio of non-life insurance business in selected insurance companies

| Insurance company | 2005 RIRM (%) | 2006 RIRM (%) | 2007 RIRM (%) | 2008 RIRM (%) | 2009 RIRM (%) |
|-------------------|---------------|---------------|---------------|---------------|---------------|
| DDOR | 42 | 47 | 50 | 51 | 57 |
| DELTA | 15 | 24 | 25 | 30 | 37 |
| DUNAV | 39 | 48 | 47 | 51 | 46 |
| TAKOVO | 19 | 22 | 31 | 22 | 34 |
| WIENER | 33 | 46 | 54 | 56 | 55 |

Source: author's calculations, National Bank of Serbia

Table 2. Results of RIRM ratio of life insurance business in selected insurance companies

| Insurance company | 2005 RIRM (%) | 2006 RIRM (%) | 2007 RIRM (%) | 2008 RIRM (%) | 2009 RIRM (%) |
|-------------------|---------------|---------------|---------------|---------------|---------------|
| DDOR | 24 | 40 | 59 | 37 | 42 |
| DELTA | 3 | 4 | 3 | 4 | 8 |
| DUNAV | 63 | 56 | 55 | 57 | 42 |
| TAKOVO | 0 | 0 | 0 | 0 | 0 |
| WIENER | 3 | 5 | 8 | 5 | 20 |

Source: author's calculations, National Bank of Serbia

Table 3. Results of RIRIM and SCTP ratios of overall business in the selected insurance companies

| Insurance company | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | SCTP (%) | RIRM (%) | SCTP (%) | RIRM (%) | SCTP (%) | RIRM (%) | SCTP (%) | RIRM (%) | SCTP (%) | RIRM (%) |
| DDOR | 59 | 42 | 67 | 47 | 70 | 50 | 72 | 51 | 85 | 56 |
| DELTA | 19 | 13 | 29 | 21 | 30 | 21 | 36 | 25 | 46 | 30 |
| DUNAV | 54 | 39 | 67 | 48 | 66 | 47 | 71 | 51 | 73 | 46 |
| TAKOVO | 26 | 19 | 29 | 22 | 40 | 31 | 30 | 22 | 48 | 34 |
| WIENER | 27 | 22 | 36 | 30 | 37 | 30 | 44 | 36 | 69 | 40 |

Source: author's calculations, National Bank of Serbia

that there is a trend of the adjustment of the level of total premium to the reduced number of settled claims which are result of good risk management and that there is still room for reducing the amount of premium for 10% without the risk that the company's operations will be affected. By reducing the level of premiums, insurance companies are brought into a position to attract new policyholders and thus improve their overall position in the market.

The second phase involves implementation of the equations (3) and (4) in the selected insurance

companies. The obtained results demonstrate how much the insurance companies in Serbia affected the increase of generated profit by successful insurance risk management. Therefore the impact of insurance risk management on the financial management of insurance companies is analyzed, given as the final result of business performance expressed through generated company profit. Profit is expressed in percentage compared to the realized premium (Equation 3 and Figure 2.) and then related to a corresponding RIRM indicator (Equation 4 and Figure 3).

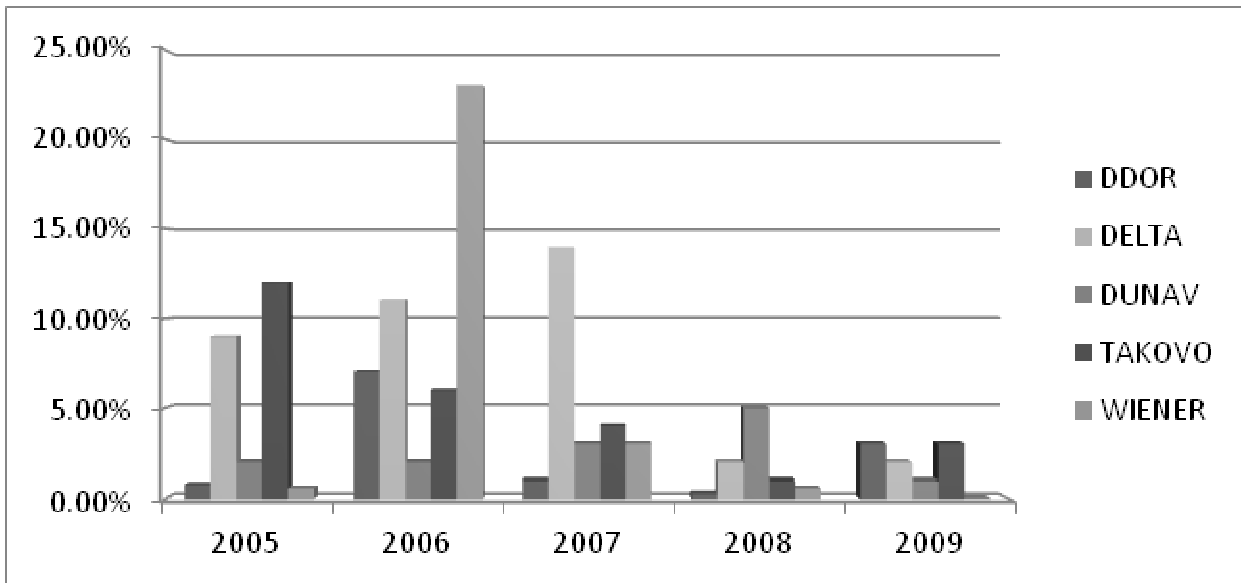


Figure 2. Realized profit versus collected premium. Source: author's calculations, National Bank of Serbia

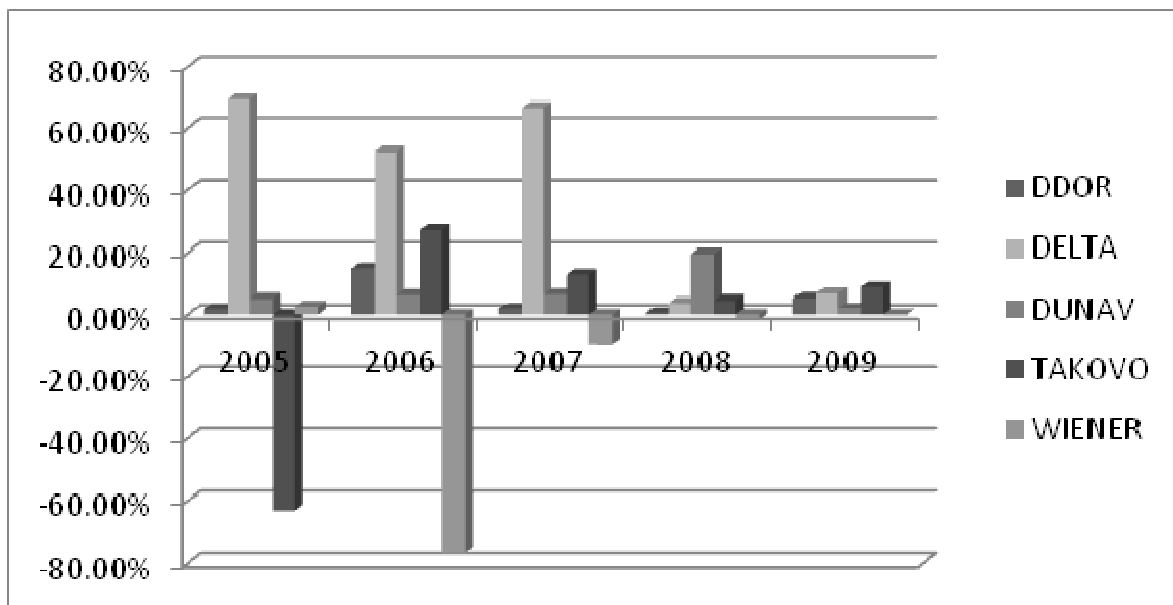


Figure 3. Effect of RIRM on profit realized in the Serbian insurance companies . Source: author's calculations, National Bank of Serbia

DDOR insurance company in relation to the total premium in 2005 generated profit in relation to the total premium collected amounting to 0.8%, in 2006 generated profit of 7% which is 11 times higher than in 2005, in 2007, the generated profit to the total premium was 1% and in the 2008, this relationship is given a score of 0.3%, which is the lowest score observed during the five years. The level of profit thus calculated has affected the

impact of RIRM on generated profit, because RIRM, over the years, had greater variations as opposed to profit. The year 2006 was the highest impact of RIRM on generated profit, amounting to 14.8%, while the least impact was in 2008 and it amounted to 0.5%.

The results of impact analysis of RIRM on the profit for the companies are very different, as over the years analyzed in one company, as between companies, which

can be seen in figure 3 above. Figure 3 shows that the impact of risk management in the insurance business is only comparable till 2007, if viewed in DDOR and Dunav insurance companies, as the two insurance companies that cover more than 50% of the insurance market. The results of analysis conducted on data from Takovo and Wiener insurers are not comparable because they have operated with loss. From the years 2008 and 2009 it is clear that the Delta insurance company increased its market share to 16% and thus joined the previous market leaders. The biggest contribution to generated profit and its increase is achieved by Dunav insurance company, which in the year 2008 amounted to 19.6%.

These results lead to the conclusion that the DDOR, especially in year 2008, had a chance to increase its profit, given that they had the ability to place 10% of premium on financial market as a surplus of funds and thus increase its profit.

The reasons for such low profit can vary. The state of the financial market has changed over the years. Thus, the years 2005, 2006 and 2007 were years of prosperity. Foreign direct investments were increasing, investment funds were developing, businesses in the stock exchange was growing from year to year, in all there was domination of public confidence in the stability of financial markets. However, the year 2008 was a year that marked the beginning of the global economic crisis. The weakening economy, looser market conditions and deterioration in the credit markets are limiting factors for growth of insurance companies. In addition, volatility in the securities market contributes to the decline of investment profit of the overall insurance sector. The combination of these factors had a negative impact on growth and profitability of insurance companies and in some ways led their operations to higher danger. The current environment sets the conditions for the reduced volume of business in respect of prior periods, which is consistent with the value of insurance companies in the stock market.

All this has led to reduced activity in the financial market and increasing the risk of doing business. This is probably the reason why most insurance companies operating in the Serbian market in 2008 recorded the lowest profit in relation to the total premium charged.

Conclusion

Insurance companies are facing the challenges of balancing risk exposure with protection of the insured from the consequences of adverse events. In order for insurance companies to meet the challenges they are exposed to and to successfully fulfill their primary role of protecting the insured, they have to be able to comprehensively manage the overall risk portfolio.

With proper management of insurance premiums,

insurance companies can consolidate and improve their competitive position in the insurance market, and thus fortify the position and level of the share of the insurance sector in the overall financial market.

Reducing the cost of the premium is very important, especially in times of crisis when the solvency of the insured is substantially reduced. By reducing the cost of premiums insurance companies can not only prevent the churn rate of the current insured but even increase their number, while keeping profits at the same level. Thus fewer insured paying a higher premium can make the same profit for insurance companies as when there are more insured paying a lower premium.

Reducing premiums and increasing the number of the insured would raise citizens' standard of living, since their purchasing power would grow. With an increased workload, insurance companies would require an increased number of employees. This would mean additional jobs for citizens, while for insurance companies it would mean additional justified loading.

With proper cost-benefit analysis and implementation of the Model for management of the risks of insurance and insurance companies, insurance companies could reduce insurance premiums, enhance profits by increasing the number of insured, as well as increase the number of employees without jeopardizing profits, thus participating in the growth of society's living standard and general public prosperity in the country.

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