RISK MANAGEMENT IN LIFE INSURANCE COMPANIES IN BOSNIA AND HERZEGOVINA

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Abstract
Despite the global economic crisis, life insurances in BiH are being in positive trend and their number rises. The paper is aimed to analyze the degree of development of risk management systems in life insurance companies in BiH. In particular, the authors have tried to establish the existence of policies and procedures in the framework of risk management in life insurance companies. Also, the most common risks identified by insurance companies are the following: liquidity risk, risk of change in price of financial real and other assets, and foreign exchange risk. The authors will analyze the most common methods that insurance companies use to protect themselves. The authors also seek to identify limitations in development of risk insurance system.

Keywords: *life insurance, risk, development of risk management system*

1. INTRODUCTION

Unlike in countries where the global economic crises has left its mark on entire economies, in particular the financial sector, in Bosnia and Herzegovina financial sector reports are promising. When the insurance sector is involved, the insurance field of Bosnia and Herzegovina is marked by a constant growth of total premium in life and non-life insurances. Without ignoring the aforementioned positive moves, the insurance market in BiH is still underdeveloped. The underdevelopment is largely due to the unfavorable economic circumstances in BiH, insufficient trust in insurance companies and citizens being unused to buy extra insurance policies in addition to mandatory ones.[1]

Insurance companies should become participants in the financial market as active investors on the financial market and set the imperative of their own development. Life insurance companies and the entire insurance sector both need radical reforms, beginning with segmentation of the market by entities, then advancing the role of the regulator, i.e. better developed supervision, etc.

Disregard of the premium system, which largely reduces premium to insurers, as well as unfair competition, are strains on the BiH insurance sector and eventually lead to problems in operation and functioning of insurers.[2]

The development level of life insurances is an indicator of the development level of the insurance sector and an important element of stability in every country. Numerous discussions resulted in a number of analyses and conclusions on importance of life insurances, yet with few clear positions and lacking in concrete solutions. Risks and damages keep rising, which leads to a constant need to expand insurances. Progress is evident both in organization of insurance markets and in growth of the realized premium. In 2011, the total earned premium was KM 488,111,838.00, of which 83.60% applies to non-life insurances and 16.40% is the share of life insurance premium. The share of life insurance premium in total earned premium is still small when compared with the same share in developed countries; in the EU27 countries, the share of life insurance in total premium is approximately 59%. [3]

Underdevelopment at the level of insurance sector is also corroborated by the premium per capita indicator, which was 84 USD in 2011, less than in countries of the region and less then in almost all

[1] Central Bank of BiH, Financial Stability Report for 2008, Sarajevo, 2009, p. 63.
[2] Insurance Agency of BiH, Statistics of the insurance market in Bosnia and Herzegovina for 2009, Sarajevo, 2010, p. 8.
[3] Insurance Agency of BiH, Statistics of the insurance market in Bosnia and Herzegovina for 2011, Sarajevo, 2012, p. 34.

countries of Europe. Underdevelopment and instability of financial market, especially capital market, affect the insurance sector by making the volume of investments insignificant both in countries of the region and in BiH. This had a favorable effect on growth of premium because insurance market was not exposed to significant losses.

A premium structure analysis shows a trend of growing share of life insurance premium, which is evident in data from 2005, when the share of life insurance premium was 9.57%, to 2011, in which the share of life insurance premium reached 16.40% of total premium. Insurance market manifest certain changes that lead to integration of markets within Bosnia and Herzegovina, which already has a positive effect on the state and development of the system. All the aforementioned is indicative of a growth and development of life insurance in BiH, yet it does not also mean that the sector itself is developed enough, which can be characterized as a disadvantage but also as an advantage since BiH insurance companies have remained immune to many of the external effects in the times of crisis.

Development of every country, including BiH, is based on saving, which is largely concentrated in the very insurance system in developed financial systems. Insurance companies are regularly among the most significant investors. Therefore it is very important for every country to take a particular care of the insurance system. It is especially important who manages thus collected assets, and how. As this is the case of trading risks, so the regulations are very precise in every country. It is important to establish the behavior of insurers when investing the collected assets in order to control investment risks.

We should bear in mind that all types of insurance in a certain area have their own specifics that can be defined as overall relations in the process of reproduction. This means that there is a certain distribution of probabilities of individual events in the respective area. Namely, the probability of survival is different from state to state. That is distribution of the same product, life insurance, associated with growing risks.

In order for an event to be able to represent a risk for an insurance company, it must be recognizable, measurable and manageable over a certain period of time. Adhering to principles of safety and stability in its operations in order to preserve values of cash flows and capital, insurance company must develop a system of identifying, measuring and managing the risks to which it is exposed. It is exactly the exposure of insurance to risks that calls for knowledge and adoption of modern concepts in asset and liability management at any given time. Asset and liability management is not only required by regulators but also necessitated by efforts of insurance companies to survive in their increasingly dynamic and complex environment and to increase their earnings and profitability.

2. RISKS AND RISK MANAGEMENT CONCEPT

For insurers, especially those dealing with life insurances, risk is inherent in the business and can occur in many different forms. The greater the probability of deviation from expected results, the more significant the exposure to risk. However, risk can be managed rationally due to its being measurable by various statistical and mathematical methods.[4] Each for itself, insurers will determine significance and coordination of risks between assets and liabilities, and then the complexity of the techniques used will depend on insurers' products and investments. Not only that, insurer examines all risks that require coordination of its assets and liabilities. Risks significant in terms of their potential influence on the economic value are sought to be managed. The risks that can be included in insurers' risk management concept are:

[4] Ćurak, M., Jakovčević, D.: Osiguranje i rizici (Insurance and risks), RRIF plus – d.o.o., Zagreb, 2007, p. 62.

1. Market risk
    - risk of change in interest rates[5]
    - equity, real estate and other asset risk
    - currency risk
    - related credit risk
2. Underwriting risk
3. Liquidity risk[6]

Market risk is the sensitivity of a financial instrument or portfolio to changes in market parameters. Interest rate change risk (including variations in spread of market credits) represents the probability of loss resulting from fluctuations in interest rates and their impact on future cash flows. If future cash flows of assets and liabilities are not balanced, fluctuations in interest rates may have an adverse effect on interests. Interest rate risk management is particularly important with life insurances where insurer must invest 30-year premium with stable returns. Equity, real estate and other asset risk is the risk of loss resulting from fluctuations in market values of shares and other assets. Insurer may be exposed to unfavorable economic effects to the extent that market values of shares, real property and other assets do not move in accordance with liabilities. Currency risk is the risk of loss resulting from fluctuations in exchange rates that affect positions of assets and liabilities denominated in a foreign currency which may have an adverse effect on the insurer. Related credit risk is noticeable when determining the exposure to market risk which results in that the insurer could increase the exposure to credit risk of other party. And not only that, market risk includes general market risk (with all investments) and specific market risk (with specific investments). It includes the exposure of derivatives to fluctuations in prices of fixed assets and risk factors. Market risk also includes the exposure to unanticipated movements in financial variables or to movements in actual or implied volatility of asset prices. Market risk can be linear, nonlinear or geared. Exposure to nonlinear or geared market risk arises through the use of derivatives. In times of significant economic turmoils, the benefit of reducing risk by diversification may temporarily vanish and serious financial consequences may result. Therefore, insurer should be able to measure its exposure to market risk through risk factors (for example, through interest rates, shares and currencies) and through the entire portfolio. To measure exposure to market risk factors, insurer will set the appropriate portfolio metrics to changes in market parameters.

Market credit spread may be the main cause of market risk. For example, insurers may significantly invest in corporate bonds to have the advantage of higher revenues through marketable securities, let's say if they have obligations that are volatile or discretionary. Interest rates may be affected by changes in general conditions of credit markets, leading to widespread credit degradation and differences between production and selling prices, which considerably vary in accordance with positions of bonds, especially in extreme situations. Under some jurisdictions, it is allowable to achieve greater flexibility in managing these risks by keeping a copy of portfolio of government securities together with credit derivatives.

Shaping of interest rates should include yield curve shifting, twisting and bending[7] scenarios, individually and in various acceptable combinations. Insurers with complex portfolios are expected to show more sophistication in shaping interest rates (for example, stochastic shaping of interest rates) than insurers with simpler portfolios. Sometimes insurers will try to find a solution by replacing sophistication and accuracy with simplicity and conservatism. Decisions made in this manner should

[5] The most common ALM risks are two types of interest rate risk. The first is the reinvestment risk when assets need to be invested and interest rates are low and [the second is] the disinvestment risk when assets must be sold, and interest rates are high.

[6] International Association of Insurance Supervisors, Standards on Assets – Liability Management, October 2006., Standard No.13, p. 8

[7] Shifting means a parallel shift of the yield curve (i.e. return of investments of all maturities decreases or increases in the same measure). Twisting means a turn of the yield curve (i.e. following the same change in gradients of yield curve). Bending means that the return of investment of shorter or longer maturities moves in the opposite direction from returns of investments of average maturity (i.e. curvature of the yield curve changes).

be transparent, i.e. clearly comprehensible and documented.[8]

Underwriting risk is a special risk of insurance that arises from the underwriting of insurance contracts. To control underwriting risk it is therefore possible to treat underwriting risk by parts within the ALM concept. For example, the uncertainty of time schedule and volume of future payments of claims, especially for non-life businesses, may require coordination with assets. General inflation rates that may affect both claims and expenses are also an important aspect of underwriting risk such as excessive inflation of particular claims. Coordination between assets and liabilities is also important in allowing for any option that may affect payments made under policies. In particular, insurance contracts may have financial options offering choices to policy holders – they include settlement options, policy loan options, over-deposit options and favorable terms of surrender or renewal. When policy holders carry out these options, insurers may have additional costs during lifetimes of policies or have a liquidity loss.

As the risk of an embedded option generally may not be altered, it is important for insurers to manage their assets and liabilities in a manner that would alleviate their potential influence. For example, management could take measures such as arranging reinsurance, issuing other types of policies or stopping product sales.

Liquidity risk is exposure to loss in the case when liquid assets, among the assets supporting liabilities, would be insufficient to fulfill the conditions of cash flow in time [9]. This could force insurers to sell assets at unfavorable prices. Liquidity profile of an insurer is the action of both assets and liabilities, and varies in view of market conditions. Direct cash requirements, if foreseeable to a certain extent, should not pose an excessive liquidity risk to an insurer. Any direct request for cash payment may pose a risk if there is not a sufficient quantity of cash. A well-organized insurer will structure its assets so as to ensure sufficient cash and market securities to meet its obligations when necessary. Therefore, the insurer may itself reduce payments to policy holders who terminated contracts in order to demonstrate adverse market conditions, and thus ensure that assets continue to be in keeping with expected duration of obligations. Sometimes there is also a possibility of timing payments to policy holders (at least in the case of individual life insurance policies) in order that amounts are not paid out before the corresponding assets are sold. Here are some of the possible causes of liquidity problems for insurers:

- intentional mismatch strategy
- joint investment risk, or the risk of unmarketability of assets invested in a member of conglomerate or a group, or a situation when joint companies may create outflow of sources of financing or operational sources of the insurer
- financing risk, i.e. the risk when the insurer is unable to provide sufficient external financing because its assets are not liquid at the moment when it needs such financing (for example to deal with large and unexpected claims).
- liquidation value risk or a risk arising if unexpected timing or amount of needed cash require liquidation of assets at the time when market conditions result in loss of realized value.
- negative publicity
- large unexpected loss that is payable immediately
- delay of payment from reinsurer
- policy holder's actions
- worsening of economy with abnormally volatile and shaken market
- political and legal risk, in case of unforeseeable changes in legislature and court compensations
- unmarketable investments due to association with other companies

[8] International Association of Insurance Supervisors, Standards on Assets – Liability Management, October 2006., Standard No.13, p. 7-9.
[9] International Association of Insurance Supervisors, Standards on Assets – Liability Management, October 2006., Standard No.13, p. 6

- multiple insurers face large unexpected liquidity demands at the same time with the need to liquidate some of their asset portfolios, which results in a situation that market is unable to absorb any value other than at unfavorable prices.

3. PRODUCTION LINES AND RISK MANAGEMENT

Risk management concept varies with business line, depending on the nature of product and appropriate investment strategy. Risk manageability may be improved by segmenting complementary parts of assets and liabilities. The use of separate segments allows the insurer to define its investment strategy and risk management strategy in relation to different needs of different production lines. However, a simple combination of risk management strategy appropriate for each business block does not necessarily need to achieve an optimum overall strategy for the insurer. This can have advantages because, for example, risks are managed together instead of managing a block of businesses. Risk management concept will depend on the available capital and the flexibility it provides.[10]

It is necessary to develop specific risk management strategies for business lines that have some specific characteristics, for example:

- payments of liabilities are guaranteed to be made on predetermined dates
- cash flows of assets will be reinvested
- profit is realized primarily on spread, i.e. difference in interest rates received for assets and issued for liabilities
- size of the interest spread profit margin is small relative to assets and liabilities
- duration of obligations is such that returns that have appropriate duration are hard to find
- forms of executing prominent investment that require appropriate assets to honor the guarantees
- one or more financial options for which risk management concept could use dynamic hedging techniques
- the business is intensely reinsured, the insurer must pay claims prior to receiving payments from the reinsurer. [11]

Some examples are used for illustration, since products vary depending on jurisdictions.[12]

Accumulation annuity, deferred annuity

Asset and liability management is important for financial mediation products. Profits on accumulation or deferred annuity depend on interest rates that can be earned by cash inflow. Interest rate spread margin is relatively small; therefore asset and liability management is crucial to maintaining stable profits. These products may be businesses with regular or unique premiums, usually with chosen maturity and may be relatively short-term, for example 5 to 10 years. That is why the risks could be very easily manageable. Asset and liability management becomes more complicated if the product has options of early termination of contract without adjustment to market value, guaranteed interest rate for future premium deposits or guaranteed cash or annuity at retirement.

Deposit funds

An insurer could choose to keep unmatched assets and liabilities for some lines of products. For example, daily interest fund may be cashed at any time at the option of the policy holder. While it would be conservative to keep supporting assets entirely in the form of cash, longer lifetime of assets is justified by the fact from experience that not all policies are immediately cashed out. For these products, defining prices and guaranteed interest rates must quickly be matched with market interest

[10] International Association of Insurance Supervision, (2006) Issues Paper on Asset Liability Management, p. 6.
[11] Ibid, pp. 10-11.
[12] Ibid., pp. 7-9.

rates because inactive interest rates will lead to losses if the rates are too high, or to low selling if the rates are too low.

Payout annuities, lifetime annuities, immediate annuities

As with accumulation annuities and deferred annuities, so the payout annuities are priced as spread business and their returns depend on interest rates that are achieved by cash inflow. Since the spread of interest rates is relatively low, asset and liability management is crucial to maintain the earning process. These products are usually a unique premium business and do not have fixed maturity. They may have a very long duration and may not be entirely matched with the duration of assets. Therefore balance management must take into account future investment risk as well as mortality risk. In the case when insurers use investment in shares or real estates as part of long-term balance management, it must take into account the risks associated with these investments and monitor them carefully bearing in mind the risk tolerance that the subject can bear.

4. DEVELOPMENT OF RISK MANAGEMENT CONCEPT IN LIFE INSURANCE COMPANIES OF BOSNIA AND HERZEGOVINA

The insurance sector of Bosnia and Herzegovina consists of 26 registered companies and 11 of them deal with life insurances. A survey was conducted to investigate application of the risk management concept. All the 11 insurance companies that deal with life insurances were surveyed. Questions in the survey questionnaire were aimed to obtain data and form the pattern of adoption and application of the risk management concept. Survey results will be presented on the basis of answers on questions asked in the questionnaire. The survey was designed to test not only stability of the risk management function, but also the level of organization of the risk management system, scope of activity of the function, jurisdiction over the system, applicability of the Standard on Asset-Liability Management and risk management in insurance companies. Table 1 shows the breakdown of answers on the question whether policies and procedures of risk management in insurance have been defined in the insurance company.

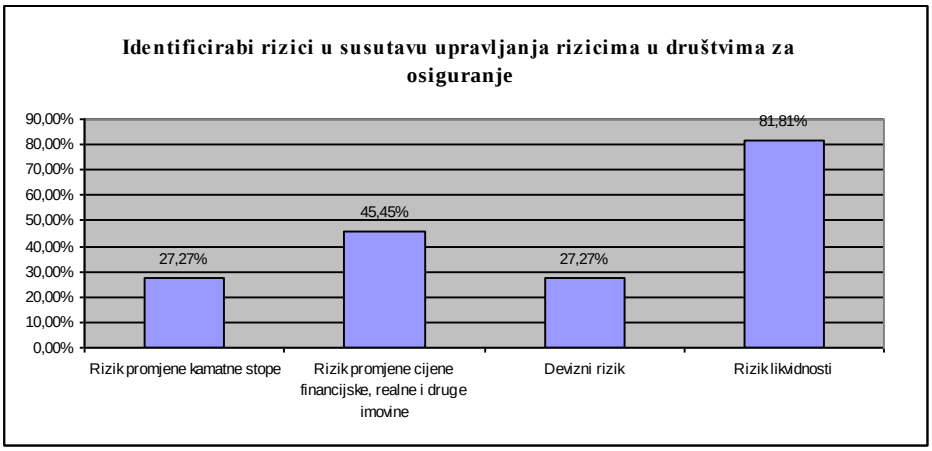
Table 1. Risk management policies and procedures being defined in life insurance companies.

Possible answers	Insurance companies	in %
YES	10	90.90
NO	1	9.10

Source: authors' analysis

Graph 1 shows the risks identified by the risk management system in insurance companies.

Graph 1. Risks identified in risk management systems in insurance companies in BiH



Source: authors

The questionnaire asked a question about techniques of measuring exposures to specific risks, prescribed by risk management system in the insurance company. The answers are shown in Table 2.

Table 2. Techniques of measuring exposure to specific risks

Possible answers	Insurance companies	in %
Duration	6	54.54
Duration gap	1	9.09
Net interest yield	5	45.45
Gap	4	36.36
Test of sensitivity of changes in technical reserves to interest rates	1	9.09
Test of sensitivity of assets to changes in interest rates	3	27.27
Average weighted maturity	1	9.09
Coordination of future liabilities with yields and investments	3	27.27

Source: authors

Interesting is also the question how the insurance company protects itself from risk, whose answers with corresponding percentages are listed in Table 3.

Table 3. Methods of protection from risk in life insurance companies

Possible answers	Insurance companies	in %
By maturity matching of assets and liabilities	9	81.81
By financial derivatives	1	9.09
By diversifying investments in various instruments and financial	1	9.09

institutions		
Foreign currency clause	1	9.09

Source: authors

On the question of company's level of organization on use of a particular way of insurance from risk, the answers are for administration, i.e. the company administration makes decisions on use of a concept and method of insurance from risk. Table 4 shows what limitations to development of asset and liability management are emphasized by insurance companies.

Table 4. Limitations in development of asset and liability management system

Possible answers	Insurance companies	in %
Underdeveloped insurance market	9	81.81
Macroeconomic environment	5	45.45
Legislation	6	54.54
Inability to apply protection techniques	1	9.09
Internal reasons	1	9.09
Competition and damping in insurance, above all inferior work of the agency	1	9.09
Undeveloped capital market	1	9.09

Source: authors

All insurance companies in BiH, including those dealing with life insurance, face certain internal limitations when it comes to asset and liability management, or risk management.

Table 5. Internal limitations in life insurance companies

Possible answers	Insurance companies	in %
Absence of procedures and policies	3	27.27
Lacking knowledge and skills for asset and liability management system	7	63.63
Lacking knowledge of risk measurement techniques	4	36.36
Lacking understanding of protection instruments in asset and liability management system	4	36.36
Inappropriate information system	0	0

Source: authors

The obtained answers on questions from the questionnaire show the sensitivity of insurance companies to the need for establishing risk management function. Insurance companies in BiH recognize the need of quantifying business risk exposure levels, specifically in 72.73% of the surveyed insurance

companies. Identifying the risk in business is the second variable followed by insurers, 54,54% of them in BiH. In addition to these two variables, what insurance companies control and monitor is the variable of risk management reporting control, which is found in 45,45%.

There are several types of risk identified by the risk management system in insurance companies in BiH. Most of insurers recognize and control liquidity risk, then risk of changes in prices of financial, real and other assets, foreign currency risk and in the forth position by occurrence is risk of changes in interest rates. These answers confirm that BiH insurance companies are aware of the necessity to control risk.

Those insurance companies that are aware of the necessity to control and measure risks, are also aware of the necessity to protect themselves from risks, and have been doing so by maturity matching of assets and liabilities. Only several insurers specify financial derivatives, foreign currency clause and diversification of investments in different instruments and financial institutions as instruments of protection from risks. In nearly all surveyed insurance companies in BiH, decisions on what particular method of protection from risk will be used are made by administration. What is interesting, let us not forget the environment in which they operate, insurers also feel some limitations in development of risk management systems. Most insurers point out the underdeveloped insurance market, followed by legal regulations that are not consistent with development of asset and liability management system. However, these are not the only problems; another problem is internal limitations that are very much responsible for underdevelopment of asset and liability management system. Most insurers emphasize the lacking knowledge and skills as the internal limitation to development of the system. That is not the only internal limitation; others are lack of knowledge of risk measurement techniques, absence of procedures and policies, lacking understanding of protection instruments in asset and liability management system.

6. CONCLUSION

In the period of last several years, life insurance premium has dynamically grown, yet life insurance premium has not reached the average of transition states. Life insurance is a vital segment of insurance systems and need to be improved. By the share of life insurance premium in total premium, BiH has not yet reached the average of the EU27 countries. A single-digit number representing life insurance premium per capita in euros is indicative for Bosnia and Herzegovina, as compared to the same ratio for the EU27 countries being a four-digit number expressed in euros. Improving this insurance segment requires stable macroeconomic preconditions (economic stability, higher living standard, developed culture of using insurance services, high level of trust in insurance and in the overall financial sector as well as developed market of securities). Insurance companies in BiH also recognize needs of quantifying exposure levels and identifying business risks.

Analysts emphasize the key fields that need to be addressed by insurers, specifically: corporative management that involves improving and developing the risk management system, improving investment evaluation techniques, promoting transparency, fair treatment of customers, etc. It is especially necessary to point out the issue of implementation of the Solvency II provisions and directives, which are required for insurance companies if aiming to grow, develop and approach to standards prevailing in insurance systems of developed countries, especially the countries of the EU.

Risk management function is a function with ascending and very dynamic development trend, yet the task that it imposes on the concept of asset and liability management and on risk management is very challenging. This field requires a high level of competence in business, collection of large quantities of various information, and optimization of the profit maximizing function. Particular attention in development of this function should be given to: support of senior management, technological framework, organizational assumptions, development of cooperation with other organizational units, wide acceptance of risk management function, etc.

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