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Methods used in risk financing

Ana Maria POPESCU
Bucharest University of Economic Studies, Romania
notariat.dejure@gmail.com
Ștefan Virgil IACOB
"Artifex" University of Bucharest, Romania
stefaniacob79@yahoo.com
Alina Eliza DABIJA
University of Craiova, Romania
dabija_eliza@yahoo.com

Abstract. *Given that in most risk management programs, risk control, which involves avoiding, preventing and reducing risks, is not fully effective and over time several methods of financing the losses that have occurred have been developed, such as would be detention or transfer.*
The withholding assumes that the injured party is also the one that bears the financial consequences, and the transfer involves the occurrence of a different entity from the injured party that bears the direct financial consequences. This method transfers the risk to another entity and involves an additional cost paid by the transferor to the one he accepts, namely the insurance premium or fees. By transferring risk through insurance, the bank is offered related risk management services, better defining its risk profile or can contribute to improving performance indicators and flows, thus preventing the crisis situation.

Keywords: risk management, financing methods, efficiency, indicators.

JEL Classification: G20, G40.

Introduction

From an economic point of view, it is not feasible for an institution to create a reserve against losses characterized by low probability of occurrence and high impact, namely catastrophic losses, losses that are very difficult to predict. Thus, an insurance company that has access to the reinsurance market may be able to absorb losses that may threaten the solvency of a single institution.

By insuring against operational risks, the bank has the possibility to reduce or eliminate large fluctuations in the cash flow caused by operating losses, to improve the income and performance indicators of the financial institution, even leading to an increase in its market value, to avoid situations catastrophic and benefit from qualified monitoring services, which can provide a better definition of the operational risk profile.

In order to reduce operational risk, the term operational risk must be included in the concept of risk, operational risk management must be developed and implemented, business line competencies and responsibilities must be defined, operational risk reporting must be performed and the bottom-up management approach of risks.

The article is accompanied by tables and graphs that have the role of better highlighting these aspects related to the efficiency of banking.

Literature review

In the literature it is considered that an operational risk in order to be insured must meet three characteristics, namely: to comply with the law of large numbers, the occurrence of the anticipated event to cause unforeseen damage, and the occurrence of the event and the size of the loss to can be determined objectively. Notable works in this field, we mention those of Awdeh et al. (2011) considered a number of issues regarding the impact of capital requirements on banking risk. Anghelache et al. (2017) and Anghelache et al. (2016) analyze banking risks, their management methods and have studied the fundamental elements related to operational risk. Cipovova and Dlaskova (2016) are concerned with credit risk management methods. Doerig (2000) and Hakens and Schnabel (2010) address the impact of operational risks on financial services. Geiger (2000) is concerned with the regulation and supervision of operational risk in the banking system. Hall and Howell (2001) addressed some issues related to operational risk insurance under the Basel Capital Agreement. Issues related to operational risk are addressed in their work by Kuritzkes (2002) and Peters et al. (2009). Miller (2014), Thomas and Ware Preston (2008) and Wendy (2001) are concerned with insuring operational risks in the banking system.

Methodology, data, results and discussions

The constraining factors regarding the risk mitigation methods are the following:

- the cost of risk mitigation;
- the time required to implement the actions;
- the need for resources;

- difficulties in changing conceptions, stubbornness, because the new procedures inevitably involve people, difficulties in implementing technical solutions;
- ignorance that can affect the identification of risk.

The financing method corresponding to each institution is determined on the basis of several criteria, namely:

- the legal provisions, depending on the type of risk, the transfer by insurance is mandatory;
- the additional costs or those of the transaction determined as the difference between the price paid by the transferor and the expected value of the payments from the institution accepting the transfer.

Also, the organization's ability to bear and retain risks must be sufficient to bear the maximum probable cost of risk, estimated, depending on the industry, on the basis of financial indicators (e.g. 2% of net assets, 10% of gross profit, 5% of net cash flow).

If there are no transfer methods, withholding is the only way to finance the risk (e.g. events that will occur with certainty). Also the much higher the degree of control over the risks the more attractive their retention.

The activities that create risks will be monitored by insurers; for example, control activities may be reduced if the remuneration is based on the profit recorded and the results of the control activities. These are reflected in the profit only after a certain period of time, and the balancing of the situation will be achieved through a monitoring of the risk control activity.

By accepting the risk, the organization receives a compensation that it invests and from which it obtains income, and the costs of a possible bankruptcy or the costs of attracting funds in crisis situations are much higher than the transfer costs. The risk financing costs for insurers are lower than for other organizations because the reserves set up for the payment of claims by organizations that are not insurance/reinsurance companies are considered non-deductible expenses. In the same vein, the additional costs are a compensation for services that, in the absence of the transfer, the transferring organization must do alone.

The Basel Committee recognizes the important role of insurance in reducing the financial impact of an institution's operating losses, which may lead to the allocation of the minimum capital required for these lower risks.

Insurance is an effective risk management tool used to reduce the economic impact of losses used by the banking sector over several decades.

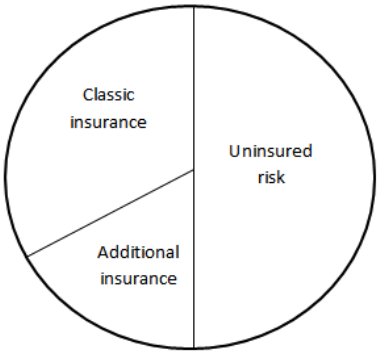
In the operational risk sizing model, an insurance contract can be incorporated by separately evaluating the insurance and then deducting it from the aggregate loss. The effects of the insurance contract are applied to each loss and then the net losses are added together. This is much more realistic because it takes into account the overlaps or shortcomings of individual insurance contracts, as well as the lack of risk exposure and compensation. It will also allow large losses not to be covered if they occur very late after it has been used or allow the incorporation of explicit stochastic extension such as loss due to the

counterparty (if the insurer cannot pay the obligations), payment insecurity (if the insurer does not pay the compensation established in the contract, due to the misunderstanding between the insured and the insurer regarding the causes of the loss, due to the nature of the unobservable loss from outside) and the liquidity risk (due to the delay in paying the insurance). The most natural incorporation of the insurance contract is made immediately after the calculation of the capital, the insurance being applied on the risk profile of the bank.

The role of insurance is to transfer the negative impact of risk from one entity to another, so we can consider it practically a financing in case of an inconvenience that can cause an acute decrease in liquidity of the financial institution leading to the loss of allocated capital, and in case the occurrence of a very large event the negative impact in the banking sector can spread in the insurance sector as well.

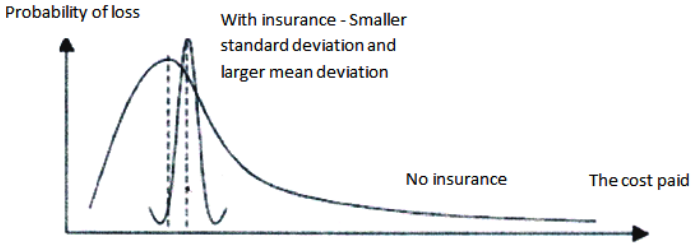
The Basel Accord stipulates that only a part of the operational risk can be insured, the rest not being recognized due to the way the credit institution's operations and processes are carried out.

Figure 1. *Possibility of insuring operational risk*



To understand the value of an insurance, it must be realized that the transfer of risk does not involve the transfer of current risk but of economic impact and impact calculation (for example, the purchase of fire insurance for a building does not involve immediate economic impact, but insurance premiums are paid).

Figure 2. *Effect of insurance on loss distribution*



The insurance has the effect of diminishing the standard deviation (unexpected loss) on the individual indemnities, as a cost for the institution in the formation of the predetermined insurance premiums. Thus, the price of insurance must be equal to the expected value of

the loss for the policy period plus the additional costs and profits of the insurance institution.

Thus, for the insurance company the risk is less expensive considering the effect of diversification and development of risk management, resulting in the decrease of both the standard deviation and the average related to the loss distribution curve. It is much more advantageous for an institution to manage and estimate its own operational risk on a daily basis, given that insurers manage losses with low probabilities of occurrence that require high-accuracy industry data. Insurance reduces the uncertainty of the loss and thus the institution will obtain constant cash flows, which will bring benefits, such as:

- reinvestment of added value, which would otherwise have been lost;
- reduces the financial impact of the loss;
- insurers provide loss control and risk management services:
  - insurance companies perform external monitoring and risk investigation, the cost and availability of insurance are incentives to reduce losses, and known causes of risk determine decisions to assume or transfer risk;
  - after facing losses due to operational risk, the institution will encounter difficulties in increasing the new capital and thus the insurance payment will be considered a valid fund.

Insurance companies can obtain information on the risks that a single institution could not take and can monitor the risk management of institutions and can guide them in the development of risk management programs. They also develop a comparative advantage in the receivables process due to economies of scale and specialization gains and are concerned about moral hazard, which leads to indifference on the part of institutions regarding risk management once they have purchased insurance and transferred the risk.

In recent years, the insurance industry has been concerned with creating new products and services that provide better coverage of operational risk, so there are insurance solutions (multilateral, specific or limited risk approach), capital market solutions (securitization), hybrid solutions and possible future solutions.

The multilateral approach (a single policy includes deductibility and a single limit that will cover a multitude of losses established by the contract) involves the analysis of the controls and risk procedures used by the institution. Thus, a multitude of possible losses are identified and insured simultaneously with the commitment that the management of the institution to maintain the analysis of controls and risk procedures.

The specific approach (several policies will be concluded each with deductibles and own limits that will cover the multitude of losses established by the contract) involves the analysis of controls and risk procedures used by the institution, and may even include a full assessment of operational risk.

The limited risk approach (a single policy will cover a specific loss) involves the payment of a premium over a period, the net present value of which is equal to the amount of the loss. The benefit of the insured consists in the fact that the loss is borne during the period in which the premium is paid.

Securing certain elements of operational risk (such as bonds for earthquakes affecting Tokyo Disneyland, the guarantor and for earthquakes affecting Japan) involves the purchase of bonds whose coupon may be attractive to local individual investors and thus the risk will spread locally and not outside the affected area.

Hybrid solutions involve combinations between the multilateral or specific approach and the limited approach.

Possible future solutions involve combinations between the multilateral or specific approach and the limited approach (covering losses that would not otherwise have been included) demonstrating increased insurance solutions and sufficient loss coverage, which can be considered a reduction in the institution's risk. The multilateral approach is preferred by large institutions as long as it has high deductibility's and limits, but the specific approach is preferred by any entity, although the required initial value may be quite high for small institutions. However, the deductibility and limits can also be adjusted according to the level of the applicant as well as according to different causal factors. Standardization of insurance products requires only a single assessment by supervisors and can then be used, but the main disadvantage is that it does not exactly fit the individual needs of the entities that use them.

The FOA considers insurance as a viable measure to reduce operational risk, but there should be concerns from supervisors about its use.

The insurance deduction is made within the limit of 20% of the operational risk capital determined prior to the recognition of risk mitigation techniques. The following types of insurance policies were used for operational risks:

- the complex bank insurance policy that covers risks such as fraud, counterfeiting, loss of damage to property, dishonesty or failure to perform duties by employees;
- professional liability, which protects against losses suffered by third parties as a result of the negligence or professional errors of the insured's employees;
- computer fraud, which covers losses caused by the malfunction of the computer network, viruses, data transfer problems, fraudulent transactions;
- the employer's liability in case of violation of labour legislation;
- non-financial property that covers the usual risks that may affect the property of the insured (fire, earthquake, etc.);
- unauthorized transactions that may represent computer fraud or fictitious records and general liability.

The operational risk insurance procedures are presented in more detail below. Thus, the complex bank insurance (Bankers Blanket Bond or BBB), covers direct financial losses resulting from dishonest or fraudulent acts of employees, theft of money, shares or during transport, forgery, destruction of invoices, shares or signatures.

Computer fraud (CC) policies cover direct financial losses resulting from the alteration, destruction or falsification of electronic data, damage to programs, viruses or false instructions transmitted through various types of communications.

Unauthorized Trade (UT) policies cover direct financial losses resulting from an unauthorized activity performed by an employee.

Property insurance policies (P) cover physical damage to the insured property (tangible) caused by fires, explosions, collisions and other disasters.

Policies to cover professional indemnities, errors and omissions of bankers (PI) cover debts or compensation for damages and/or financial losses resulting from the activities of employees.

General (multilateral) commercial liability policies (CGL) cover legal liability resulting from personal injury, damage to the owners of a third party in an accident in the course of business.

Employee practice liability policies (EPL) cover legal liabilities resulting from the commission by which the institution of an improper practice towards employees including discrimination harassment and/or coverage of financial losses.

Directors 'and Officers' Liability (D&O) policies cover legal liability resulting from defective actions of directors 'and officers' actions, including misrepresentation, mismanagement or material errors or omissions in disclosures of financial information.

Business interruption policies (BI) cover loss of profit and increase in costs due to the suspension or interruption of business resulting from damage to property insured due to fires, explosions, collisions, floods and other natural disasters.

Electronic insurance policies (El) cover legal liabilities resulting from electronic activities related to the insured's internal (website, e-mail) including slander, defamation and unauthorized copying, invasion of property, breach of security.

The most common elements insured are: loss of software, hardware, cost of programming failure and emergency intervention services, data reset, consistent loss of financial or activity.

Given the novelty of this risk, there are currently few institutions that perform proper management of this type of risk, and the assertion of the existence of an optimal solution is false, and can, at best, follow its main components. Operational risk instruments vary from one financial institution to another and include: calculating the capital requirement to cover this type of risk, creating scenarios against exposure, adjusting statistical distributions, making cause-effect connections, dividing by risk classes. In order to achieve the above, the institution must have a database containing information related to transactions, events, checkpoints and reference, exceptions, variants, process maps.

The Basel II agreement provides for certain criteria for insurance eligibility. Insurance is used to outsource the risk caused by losses of high severity and low frequency, such as fraud, physical loss of assets, etc., by reducing the economic impact of operating losses, which will be reflected in the capital requirement for this type of risk, thus encouraging sound and prudent management.

The taxonomy provides the framework under which the capital requirement related to operational risk is determined and provides the initial guide that helps to reduce the risk through insurance and calculate a close compensation for recognizing the resulting risk profile.

The connection between insurance and operational risk through a visual representation of the convergence provided by standard insurance policies adjusted to the taxonomy universe of loss risk events related to operational risk.

Three ways of adjustment are needed to change the taxonomy, namely it is proposed to align with the description of loss events in several models depending on primary causative factors (personnel, processes, systems and external events); it is recommended to include additional activities to make the taxonomy more robust and it should be indicated whether each activity is classified according to the definition of business risk.

The insurance application must help the easy understanding of its products because standard insurance products have been developed in response to customer and market needs, being maintained by competitive pressures, and the application of insurance products is flexible to adjust the grouping for any category.

Given that insurance is not a perfect cover for operational risk, it must be considered a residual risk, which requires the Basel Agreement to specify the minimum criteria for a contract to reduce operational risk and the methodology for processing capital to explain the residual risks associated with contracts.

Operational risk taxonomy involves:
- introduction of the initial level (processes, systems, personnel, external);
- intensifying the examples of the activity;
- considering whether each example of activity follows business risk;
- grouping of categories;
- the categories of internal and external fraud are renamed internal and external acts;
- computer fraud occurs in both the categories of internal and external documents;
- employee practices and workplace safety is incorporated into the category of employee events;
- customers, products and business practices are incorporated in the employee risk category;
- execution, delivery and process management are included in the process category;
- the destruction of physical assets has been replaced by the destruction or loss of assets.

Although credit institutions will use insurance products against this type of risk, they will be tempted to reduce the likelihood of this risk, because the occurrence of such an event can have a negative effect on reputation, and thus loss of customer confidence in the bank's ability to removal of unwanted effects and thus may suffer much greater damage than those due to operational risk.

Reinsurance is a very important aspect for the risk management associated with insurers, and its strategy is a major factor in the external evaluation of the financial power and ability to pay claims.

In the case of the first two approaches to determining the capital related to the operational risk that is calculated by applying a certain percentage on the gross income obtained from the activity carried out, it is not possible to distinguish between institutions that use management and risk mitigation programs and those that do not. developed such systems. Due to the fact that simple approaches are not risk sensitive, they do not allow capital reduction by concluding insurance contracts or other risk mitigation techniques.

The methodology for reducing capital with the help of insurance is a correct, consistent and right way. Thus, the following are some calculation methods, depending on the approach used to determine the capital requirement.

Table 1. *Capital reduction approach*

Capital approach	Approaching capital reduction	
	Approaching Premiums	**Approaching Limits**
Basic Indicator Approach	Capital decrease = Amount premium insurance policies multiplied by a fixed percentage and a loss reduction rate gradual transfer of risk	Capital decrease = the sum of the limits of the insurance policies less the insurance premiums, multiplied by a factor related to the coverage of each policy
Standardized Approach	They are similar to those presented above except that the decrease in capital is determined after the addition of capital for each line of business.	
Internal Measurement Approach	The first is an indicator for risk transfer and is multiplied by the gradual reduction of the severity of the loss and by a secondary factor related to the induction data.	The reduction in capital associated with a policy is a proportion of the limits that cover unexpected losses adjusted by reducing the expected loss through insurance. If the policy does not cover the risk segment, it is necessary to introduce an additional coverage factor to adjust the residual risk.
Loss Distribution Approach	Based on historical data, the distributions of frequencies and severities of total loss are established. It simulates the reduction of the high quantum of the loss distributions due to the insurance, obtaining the net capital, being able to incorporate the complex or alternative insurance structure.	

In the works performed by insurance companies, it is recommended to explicitly include insurance for each approach to reflect the risk profile of each institution and to encourage prudent and healthy risk management. Thus, the following are highlighted:

- the desire to create a level of the field, the basic and standardized approaches are less sensitive in terms of risk, and the explicit inclusion of insurance will allow them a single way to control the risk and recognition of efforts as well as those using advanced methods;
- the processing of the insurance is inconsistent along the different business lines considering the explicit and implicit observance of the decrease, but also the potentially different criteria of the transmission of the insurance of the decrease of the capital;
- the main concern is whether insurance to reduce capital has been incorporated.

The following are the different approaches to reducing capital, highlighting the benefits of insurance in reducing risk. Thus the basic formula:

$$K_n = K_g - K_{RT} \quad (1)$$

Banks that use the basic approach are banks that do not operate internationally. The approach of premiums and limits determines the capital requirement at the company level and provides a partial reduction of the capital requirement for all standard insurance policies. The Premium approach is based on the reduction of capital for insurance contracts by paying premiums for policies, which are directly correlated with the amount of risk transferred.

So:

$$K_{RT} = P \times \lambda \quad (2)$$

The solution of this approach is the calibration of the factor λ.

Among the advantages of this method we can list: very simple calculation formula; the insurance premium is a measure of the risk posed by market forces; avoid covering potential arbitrage high limits/low probabilities of approaching limits. However, this method has a number of shortcomings, such as:

- the differences in the value of the insurance limits are not explicitly taken into account;
- the efficiencies of the premiums paid are not taken into account (premiums paid according to the favourable risk tail are more efficient in reducing the risk than what the supervisors want 99.9%);
- determining the value of λ;
- the former fluctuate depending on market cycles.

The approach of the limits is based on the decrease of the capital for the insurance contracts by the difference between the level of expected losses and the limits of the individual insurance policies purchased by the institution.

The limits represent a measure of the maximum amount of risk that can be transferred to the insurer; the premiums paid representing the proportion of the risk applied to the expected loss. Policy limits lower than the insurance premium must be that the value of the policy limits is related to the unexpected losses that are transferred through the policies. Thus, the value of the risk transfer reduction is determined according to the formula:

$$K_{RT} = \sum_{p \in politei}(L_P - P_P) \times CB_P + CR_P \quad (3)$$

This method has a number of strengths, such as: it provides higher limits for risk reduction that reduce the amount of economic capital required; Recognizes that the reduction in economic capital is more appropriate to come from higher coverage limits; applies both to specific standard risk policies, but also to multilateral ones. At the same time, it has a number of weaknesses, such as: it requires a differentiation between aggregate and single loss limits; can cover arbitrage opportunities for high limits, extremely low hedging probabilities if the limits are bought at values higher than unexpected losses.

The calculation methods for the Standardized approach are identical, except that the decrease in capital by transfer of risk is determined after the sum of the capital for each line of business, it is not necessary to allocate insurance at the level of the line of business.

In the case of approaching the internal evaluation, two methods will be distinguished for diminishing the capital through insurance, namely: approaching the premiums and approaching the limits.

The premium approach in which the insurance premium is considered an indicator of the risk transfer exposure that multiplies with the expected loss reduction determined by the bank's data, multiplied by a second factor, a sector factor that describes the relationship between expected loss reduction and insurance. The insurance premium is used as an

indicator of the exposure to the transferred risk, multiplied by the reduction of the expected loss. Thus the capital after insurance is determined according to the formula:

$$K_g = EI \times PE \times LGE \times \gamma = EL \times \gamma = UL \quad (4)$$

The capital reduction is given by the relationship:

$$K_{RT} = ELR \times \gamma^{RT} \quad (5)$$

The net capital, which includes insurance, is calculated with the relationship:

$$K_n = K_g - K_{RT} \quad (6)$$

The approach has a weak point such as the factor γ_k^{RT} which must be determined at the industry level, but also a number of advantages: the loss coverage at individual or aggregate level can be calculated using a single formula, the policy coverage is automatically taken into account implicitly by the insurance price, the methodology is consistent with determination of gross capital.

Approaching the limits within which the capital decrease is based on the limits of the insurance policy. If the policy does not fully cover the risk segment (k), then an additional coverage factor (CB) must be introduced to adjust the residual risk.

Both approaches are based on the approximation of the risk transferred to the insurer by the premium paid, respectively the difference between the policy limit and the premium paid. In both cases the value of the insurance is determined separately and then deducted from the aggregate loss.

The benefit of implementing the loss distribution approach is the real replication of the bank's risk profile, including the reduction of the risk affected by insurance, being necessary a development of sophisticated models and the collection of substantial data. Incorporating insurance into the aggregate loss distribution changes the net distribution of the loss by reducing the severity of the loss from the risk transfer through insurance, but the frequency is not affected. The basis of the LDA model is when the frequency and severity curves are combined by simulation, each individual point of loss can be compared with the specific insurance policy purchased by the institution, the policy limit and the deductibility.

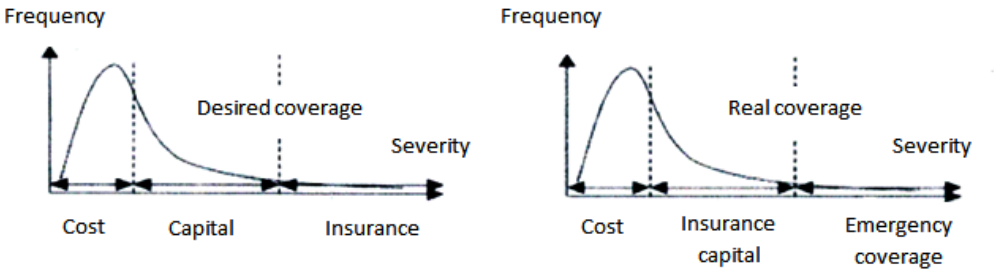
The transfer of risk through insurance products changes the distribution of the aggregate loss by reducing the severity of the loss exceeding the deductible value of the policy, but does not affect the frequency of the loss. By combining the frequency and severity distribution by simulation, each individual loss can be compared with the purchased insurance policies and the corresponding limits and deductibility policy.

To incorporate the insurance in the LDA model, the risk transfer policies must be applied to the risk classes and business lines, and for each individual policy the value of the policy limit, deductibility or retention and their type must be applied.

Insurance, as a method of financing operational risks, has a number of shortcomings. Unlike the banking sector, the insurance market has insufficient capitalization to meet the

growing demand, which can lead to the situation where the insurer cannot provide compensation in case of a large event. In reality, large losses are not covered by insurance, so there is a discrepancy between the desired theoretical coverage and the coverage valid in the market, illustrated in the following graph:

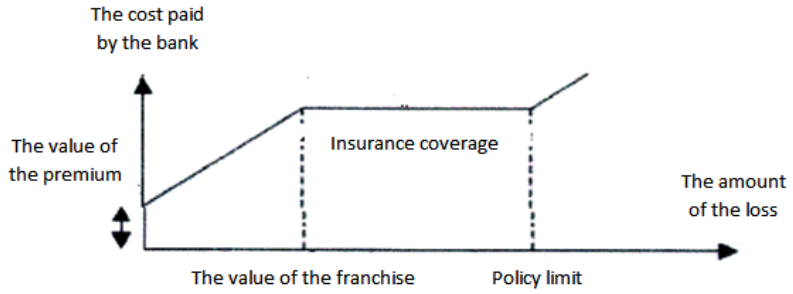
Figure 3. *Theoretical coverage versus actual coverage*



Each insurance contract has conditions, limits and exclusion clauses, and thus there may be differences between the amount of the loss and the amount of compensation. The specific risk of the insurance creates gaps between the coverage compared to the value of the capital. The definition of coverage may be inconsistent with the internal operational risk measure or the credit institution's risk management program.

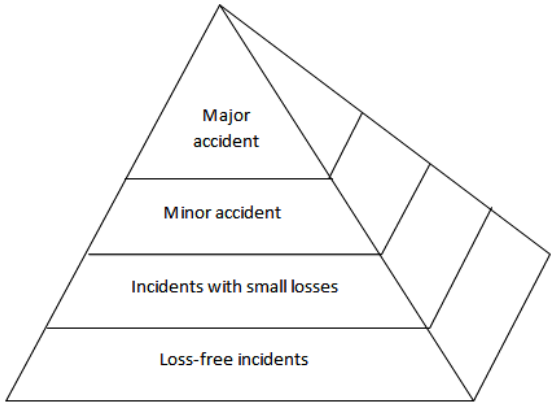
The insured amount is difficult to determine due to the insufficiency of historical data on operating risk losses and risk classification. By choosing risk financing through insurance, institutions may be tempted not to improve their operational risk management, or on the contrary it can be considerably improved, as insurers will select their clients according to the application of appropriate operational risk management standards. One way to reduce moral hazard is to set a high level of franchise. Due to the information asymmetry, insurance companies do not know exactly whether or not credit institutions are safe, so they are tempted to increase premiums, which will lead to lower demand for insurance, and reduce product categories.

Figure 4. *Insurance coverage*



It is necessary to correctly frame the bank's exposure because in its absence, the banking institution, in case of setting the risk premium only according to frequent losses and low severity, will only aim to reduce them, and in case of significant loss could cause significant damage.

Figure 5. *Exposure to operational risk*



If the insurer cannot rigorously assess the risks related to each client, he charges the same premium for all policyholders intervening the issue of adverse selection. If the insurer incurs very large losses, it may withdraw from the market and no longer offer insurance to the banking sector against operational risks. For the rigorous risk assessment and for determining the insurance premium, the insurer can use the techniques of the rating agencies, which consist in:

- business risk assessment (aspects such as management quality, strategy, market position are taken into account);
- financial risk assessment (the financial situation of the organization over a longer period and the medium-term projections are analysed, and these indicators are compared with the sector average);
- or the overall assessment of the organization (includes the potential impact of external factors).

Insurers can use reinsurance to transfer some of the risks they have taken out, which is a dissatisfaction to the insured institutions because:

- the collection of compensation requires a long time (because the insurer or reinsurer can or is able to honour the payment only after obtaining the necessary funds from the next reinsurer, in some cases the reinsurer pays only after the insurer has paid the indemnity, sometimes creating liquidity problems for the insurer);
- there may be counterparty risk against a reinsurer that the institution does not know (if the reinsurer goes bankrupt, the bank has the legal right to appeal against the original insurer, but if the initial insurer is the bankrupt, the bank cannot go against the reinsurer);
- concentration of risk on an unknown counterparty (which, if it knew, the bank would not accept as a business partner).

Delays in payment of claims may occur if the exact value, time, place and cause of the loss cannot be determined, or when the risk produced is covered by several insurance contracts and may even lead to the loss of the entire activity of the insured. Delays in payment of compensation are almost inevitable, and so this seems to be the main disadvantage of insurance, compared to capital, which is valid almost instantly. Thus, as a solution to this

inconvenience is that the insurance policies include an advance payment without delay (FIORI mechanism of acquisition of shares), which can be used only by very large institutions and thus will limit the incentives to use insurance.

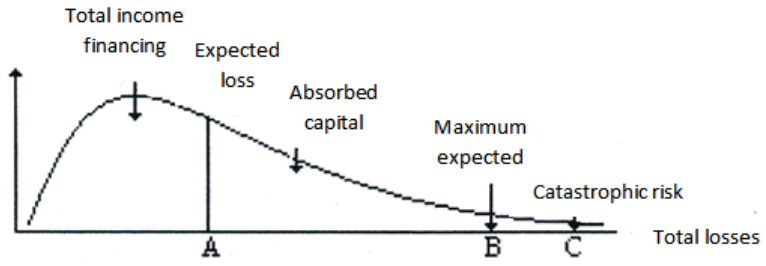
As insurance becomes a normal practice, in the case of paying a very high indemnity, the insurer's bankruptcy may occur and thus the rest of the insured institutions would remain exposed, which will lead to the manifestation of systemic risk. In case of catastrophic losses the desired coverage will be different from the possible one. Against operational risks, as self-insurance alternatives, mutual funds for self-insurance, securitization or risk plans with limited duration can be used.

Mutual self-aspiration funds are agreements concluded by several institutions to set up funds that are used to cover possible losses, which insurance companies do not accept or for which they request exaggerated insurance premiums. The disadvantages of these funds are the occurrence of cases of adverse selection, moral hazard, or cases where an institution does not want to save a rival. According to the British Bankers' Association, for the fund's solution to be effective, it must have at least 30 members.

The transformation of assets into securities traded on the market transfers operational risks to investors in the capital market, offering a lower counterparty risk and an upper hedging limit, due to the dispersion of risk and the large volume of resources available for investments (e.g. issuing of obligations).

Limited-risk risk plans are self-financing programs through which the institution sets up an account managed by an external agent through which it will periodically pay the premiums that will be capitalized. If the available money in the account is exhausted, the external agent can offer the bank a financing line.

Figure 6. *Impact of operational risk on capital before and after using insurance for operational risk*



It is estimated the expected loss, the average loss distribution, represented on the Ox axis of point A, and all losses after this point will be absorbed by income. Point B on the Ox axis represents the maximum possible loss, so provisions will be made so that it can absorb the losses between points A and B. Point C is the point where the company becomes insolvent.

The message from the Basel Committee shows that insurance protection is useful, but does not relieve banks of the responsibility of creating internal risk control systems, recommending that they also adopt counterparty risk limitation policies.

Conclusions

From the analysis made by the authors in the article *Methods used in risk financing*, a series of theoretical and practical conclusions can be drawn. Thus, risk management and control programs are not fully effective, so methods of financing losses through retention or transfer have been developed.

Risk minimization methods depend on the resources available, the cost of risk mitigation, the concepts and the time allocated to the implementation of the processes.

Another conclusion that emerges from the study undertaken by the authors is that the Basel Committee on Banking Supervision recognizes the benefits of insurance, as an effective risk management tool, to reduce losses incurred by banks due to operational risk, which materializes in a much better definition of risk-taking.

Another conclusion is that adequate risk management leads to improved performance indicators and cash flows and thus to an allocation of the minimum capital needed to cover losses.

A final conclusion is that there are a number of disadvantages of insurance such as poor capitalization of this market, difficult determination of the insured amount, partial or late payment of compensation, withdrawal of insurers from the market which led to the emergence of alternative systems such as securitization, self-financing programs or self-insurance mutual funds.

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