RISK PERCEPTION IN FINANCIAL AND NON-FINANCIAL ENTITIES

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RISK PERCEPTION IN FINANCIAL AND NON-FINANCIAL ENTITIES

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INTRODUCTION

Every financial or non-financial entity faces risk in its activities on a daily basis. Thus, it should aspire to understand the risk and to recognise its impact on the outcomes of performed activities. Commonly, to address these issues different aspects of studies related to the problem of risk perception are undertaken. However, risk perception still remains a meaningful concept, which might be developed in many different and tempting aspects.

The subjects of the papers gathered in this collective work highlight the complexity of the problem of risk perception. Readers will find here the papers that treat the problem of risk perception more generally and tend to explain its idea, as well as the papers that focus on one specified aspect of risk perception, often directed to one specified type of entity. Within the second area, there are papers that discuss various aspects of widely understood problem of risk perception in corporations, financial institutions and even with regard to public-finance related issues.

We hope that this collective work provides a valuable input in the studies related to the problem of risk as it offers original studies based on conceptual analysis of as well as the outcomes of the related researches.

We would like to thank all the authors for their contribution and the reviewers for valuable and inspiring comments.

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SOME REMARKS ON THE PROPER UNDERSTANDING OF RISK PERCEPTION

Introduction

Perception is being defined as the act or faculty of apprehending by means of the senses or of the mind. Accordingly, it is associated with understanding or cognition (http://dictionary.reference.com/browse/perception, accessed: 20.05.2011). With regard to this definition, the perception of risk is two-dimensional. The first dimension addresses the understanding of risk, while the second one – the cognition of risk embodied in the entity's ability to analyse risk.

It is a common knowledge that risk is accompanying any type of the business decisions and probably thus it is often in focus as a subject of theoretical and empirical studies. The business entities are advised to take actions against risk with the purpose to enhance the value creation process. These actions are embodied in the risk management process which begins with risk analysis stage. This paper aims at supporting the thesis, that on the business entities' level the risk is perceived predominantly through the risk analysis as an element of risk management process. In particular, it aims at discussing some aspects that allow a better understanding of risk perception, with regard to both theoretical insight, and applicative approach.

The first section of the paper provides a two-tier understanding of risk perception and characterises the domain factors determining the risk perception. The second section of the paper revises risk perception in the context of risk analysis as a process conducted in the two stages: the risk identification and risk assessment. The third section of the paper provides some empirical evidence on risk perception as it discusses the results of the survey conducted in 2011 with regard to the global risk perception.

1. The domain factors determining risk perception

1.1. The understanding of risk

The understanding of risk is not a straightforward problem as numerous definitions of risk exist. Probably the most widely known definitions of risk are based on the A.H. Willet and F.H.Knight discussions. According to Willet, risk is "the objective correlative of the subjective uncertainty" and "it is uncertainty considered as embodied in the course of events in the external world" (Willet, 2002, p. 29). The degree of risk may be ascertained by the relative perfection of the knowledge of preceding conditions. According to Knight, risk is a measurable uncertainty whereas the term uncertainty should be limited to the cases of non-quantitative types (Knight, 1964, p. 20). In other words, an entity faces the risk if the outcomes are unknown, but the probability distributions are known ex-ante. Deriving from Willet and Knight concepts, the definition of risk is based on the probability of events. As a consequence, many define risk as the volatility (variation) surrounding the outcome of a future event (future outcomes around the expected) (Young and Tippins, 2001, p. 73; Banks, 2002, p. 1; Williams and Heins, 1989, p. 8; Culp, 2001, p. 7).

Such definition of risk, however, stresses that the outcomes of risk, might be both negative or positive, providing a rise for the distinction of the negative and positive concept of risk (*Zarządzanie ryzykiem,* 2009, p. 13; Culp, 2001, p. 7). The perception of risk with the negative concept is more common. Accordingly, risk is associated with a threat, and thus requires proper risk-response actions that are helpful in mitigating or at least minimising the impact of risk. The risk that results only in the negative outcomes is often referred to as the pure risk. As a consequence, risk is being defined as the uncertainty concerning the occurrence of loss (Rejda, 2001, p. 42).

The positive concept of risk assumes that risk can result in the positive outcome as well as in the negative outcome. This is specifics of the speculative risk (Rejda, 2001, p. 6). Accordingly, risk might be utilised to gain benefits and is perceived as an opportunity for the entity. Such approach to risk is typical if we deal with some kind of investments (e.g. the project or financial investments) (Hubbard, 2009, p. 88-90; *Zarządzanie ryzykiem*, 2009, p. 13). However, risk as an opportunity has also a strategic dimension – the negative outcomes of risk need to be controlled to enable a business to maximise its opportunities. Such a concept is based on the assumption, that each strategic decision inevitably bears risk, but offers some opportunities as a reward (compare Chapman, 2006, p. 5).

The perception of risk as an opportunity in the speculative sense is believed to contradict the most established understanding of risk both in practice and in the decision theory (Hubbard, 2009, p. 90). For that reason, in this study the

further development of the problem of risk perception will be under-pined on the negative concept of risk and thus concerning its negative outcomes (losses), whereas the positive outcomes are associated with opportunities in the strategic meaning.

1.2. The subjective cognition of risk

Assuming that the risk is defined as the variation of outcomes, the core problem is the assessment of the outcomes' probability. This matches directly the discussion over the ability to assess the risk by the decision-makers. A fundamental issue is whether the objective or subjective risk is revised, which moves the problem to the personal dimension.

The objective risk is the variation that exists in nature and is the same for all persons facing the same situation. The objective risk is based on the objective probability of the outcomes which is the proportion of times that the outcome would occur, assuming an infinite number of observations and constant underlying conditions. The assessment of the objective probability is the same for all persons in a given situation. The subjective risk, however, is the personal estimate of the objective risk. Accordingly, the subjective probability addresses what the decision maker believes to be true. Thus, it is estimation and a state of the mind. (Williams and Heins, 1989, p. 9-10). The problem of risk perception requires a closer consideration of the subjective nature of risk with regard to the cognitive limitations of a human being as a decision-maker.

The subjective nature of risk emphasises that each person participating in risk analysis is directed by own opinions, memories and attitudes that determine the overall world view. Most people are prejudice while making judgements about risk, rather than analysing the facts rationally and logically. Moreover, people's conclusions often differ from conclusions of others who are looking at the same information. Sutton (2010, p. 33) convinces, that even highly trained experts, who regard themselves as being governed only by facts, will reach different conclusions while presented the same set of data.

These observations allow distinction of some factors that affect a decision-maker perception of risk, as presented in Table 1[*]. These factors are mostly tied to the feelings and acceptability of risk determined by the human nature within the perception of the information about the reality.

[*] The factors presented in Table 1 feature all people (individuals) facing the risk and willing to assess somehow the impact of risk. For the purposes of this study, these factors were attributed to decision-makers.

Table 1

Factors that affect risk perception of a decision-maker

Factor	Feelings and willingness to accept the risk
Degree of control	if a decision-maker feels that has control over hazardous situation, feels less risk
Familiarity with hazards	mysterious or unfamiliar hazards are particularly unacceptable
Direct benefits	the more clear and visible benefits (reward) for risk-taking, the higher the acceptance of risk
Personal impact	the higher impact a decision-maker has (according to his or her belief), the different is the perception of the outcomes of risk
Natural vs man-made risk	natural risks are more acceptable than the man-made
Recency of events	decision-makers tend to attribute higher level of risk to events that have actually occurred in the recent past
Effects of the consequence term	decision-makers feel that high-consequence events that occur rarely are less acceptable than more frequent, low consequence events
Comprehension time	if a decision-makers are informed that a significant new risk has entered it can take some time for them to digest that information

Source: Own study based on the description provided by Sutton (2010, p. 34-36).

The subjective approach to risk is also explained by cognitive sciences. D. Kahneman and A. Tversky developed the prospect theory that addresses the human cognitive bias and handling of risk (Kahneman and Tversky, 1979, p. 263-292)[*]. The results of Kahneman and Tversky research is a set of quirks and flaws in human judgement on numbers, and in particular how decision-makers will routinely assess one risk as very high and another as very low, without making any mathematical computations. This is the reason why decision-makers commit errors when assessing the risk. The two domain reasons lie in the fact that people have limited ability to recall the relevant experiences they would use to assess the risk, and that people tend to make logical mistakes (errors) in the assessment of the height of probability. Tversky and Kahneman provide examples supporting these general findings (Tversky and Kahneman, 1974, p. 1125-1130; Hubbard, 2009, p. 100-114).

It is important to be aware that people as decision-makers commit errors and omissions in their subjective perception of risk. The estimation of risk – either objective or subjective – is a building block of properly conducted risk analysis that determines the correctness of further steps in risk management pro-

[*] In 2002 D. Kahneman won the Nobel Prize in Economics for the prospect theory. A. Tversky passed away in 1996 (but D.Kahneman admitted that it is a joint prize) (http://eu.wikipedia.org/wiki/Amos_Tversky).

cedure. The risk management procedure is here associated with the constant risk analysis followed by risk control through taking appropriate risk response actions, and the monitoring of the outcomes of the procedure in order to make all necessary improvements. (Chapman, 2006, p. 10; Vaughan and Vaughan, 2003, p. 12; *Glossary...*, 2004, p. 199; Ong, 2006, p. 3). Usually, the risk analysis is the prime element in the procedure that covers both the risk identification and the risk analysis. In these areas risk is a subject of exploration by the decision-makers and in this sense extends the understanding of risk perception.

2. The components of risk analysis

As mentioned previously, risk analysis composes a building block of a proper risk management. In general, this stage of risk management process is dedicated to learn about the risk that is accompanying the business. With the results of risk analysis, a decision-maker is able to decide about the proper method of risk control or about the risk avoidance (by taking no too risky business activities).

In general, risk analysis might be conducted with the application of either deductive or inductive techniques. The deductive techniques follow the top-down approach. The consequences of risk are being described and then the analysts work backward to deduce what combinations of events could have occurred to produce such consequences. The inductive techniques follow the bottom-up approach which works in the other direction. A single peril is postulated, then the inductive approach determines what impact it may have in the certain hazardous conditions.

Both the deductive or inductive analysis may be conducted by means of numerous techniques. In general, these techniques may be divided into three domain categories (Sutton, 2010, p. 83):

a) creative/imaginative – such techniques require "out of the box" thinking and thus the analysts are encouraged to "think the unthinkable" (imagine the low probability accident scenarios that have never occurred before but which are still plausible),
b) experience-based – based on the experience of the panel of experts or on engineering standards,
c) logical/rational – these methods are based on the principles of Boolean algebra and attempt to provide an understanding of risk in a strictly logical and rational manner.

Each approach to risk analysis is appropriate and might be solely applied. However, in practice those techniques are often combined. The above provided cathegorisation of risk analysis techniques indicates the importance of human features that support and at the same time influence the quality of risk analysis

stage. Accordingly, it highlights the aspects shaping the risk perception of particular entities.

In practice, risk analysis composes of two basic stages: risk identification and risk assessment (also referred to as risk quantification)*. The identification of risk should be a systematically and continuously driven process by which the risk of the business activity is recognised. However, properly conducted risk identification requires considering risk as a set of components, as presented in Figure 1.

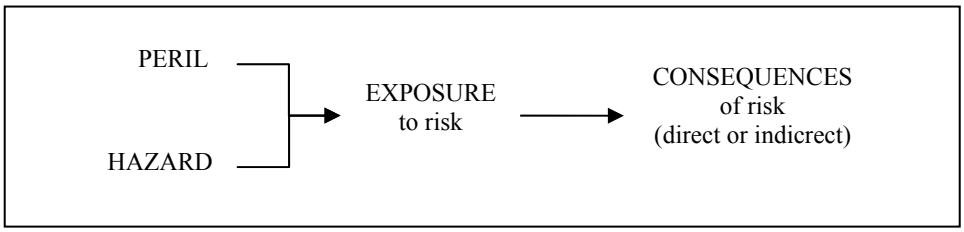

Fig. 1. The components of risk in risk identification

Source: Own study.

The first component of risk is a hazard which is a condition or a practice that has the potential to cause harmful effects. In other words, hazards elevate the likelihood and severity of a loss. Hazards emerge from the external conditions of a business activity. Recognition of hazards only partially explains the nature of risk as it does not clarify how hazardous conditions produce losses. Hazards may produce perils, which are actual causes of loss. For example, the storm is the hazardous condition which may result in the peril of fire (Young and Tippins, 2001, p. 8-9,79-80). Hazards and perils need to be addressed to the exposures of risk, that are typically associated with the business's assets (physical, financial or human) and its liability (legal and moral) (Sutton, 2010, p. 27). Finally, risk is perceived through its consequences that might be direct or indirect (consequential), where the indirect are observed after a certain period of time and are often difficult to accurate estimations. The consequences should be revised with regard to the safety of the business (e.g. the employees being hurt, the damages to the property), then the business environment and finally the economic performance following along.

* The use and understanding of the term 'risk analysis' and 'risk assessment' differs, in particular in the applicative studies of consultants. For some, risk assessment composes of risk analysis and risk evaluation, and the risk analysis of risk identification, description and estimation (e.g. AIRMIC/ALARM/IRM, 2002, p. 4). Often, risk identification and risk analysis are considered as separate stages, where risk analysis is associated with risk quantification and measurement (e.g. *Casualty and Actuarial Society*, 2003, p. 11; Banks, 2002, p. 61,77). However, in most of the classical approaches the risk analysis is a process whereby risk is first identified and then assessed with regard to quantification (compare Williams and Heins, 1989, p. 53).

The risk identification should be followed by the assessment of risk. Traditionally, risk assessment is a process of estimating the probability (frequency) and the severity (impact) of risk. Risk probability measurement aims at indicating the number of times that the risk occurs over a period of time. The assessment of probability, however, might be conducted by means of quantitative or qualitative. The quantitative methods are based on the examination of the relevant historical data to identify events or situations which have occurred in the past. Hence, the extrapolation of their occurrence in the future is possible. The quantitative techniques are also directed to the probability forecasts that are based on predictive techniques that are useful when the historical data are unavailable or inadequate.

The qualitative methods are based on the expert opinions and knowledge and should be drawn upon all relevant available information, including historical, business-specific data. The qualitative techniques are strongly based on the subjective risk perception (discussed above) and thus the results are endangered by errors springing from the cognitive bias. One of the fundamental methods of qualitative risk frequency assessment was developed by R. Prouty, who provided four classes of probability estimation based on the opinion of risk manager as a decision-maker. Prouty's proposal used labels such as 'almost nil', 'slight', 'moderate' and 'definite' (Williams and Heins, 1989, p. 64). The R. Prouty categorisation is widely accepted and under-pines many qualitative risk frequency assessments.

The assessment of risk severity addresses the estimation of the height of loss that may be caused by the risk occurrence. In other words, the risk severity revises the consequences of risk measured in volume. According to Williams and Heins (1989, p. 64-65), the two most common measures of risk severity (consequences) that are used in risk management are the:

a) the maximum possible loss, which defines the worst loss that could possibly happen (to one unit, per occurrence),
b) the maximum probable loss, which defines the worst loss that is likely to happen (to one unit, per occurrence).

Thus, the maximum possible loss is more that he maximum probable loss. Such an approach to measuring risk severity is widely spread in practice and numerous similar categories were developed for the purposes of analysing the severity of a particular type of risk*.

* For example, A. Friedlander developed categories that address the severity of the peril of fire with regard to the reliability of protection systems. He recommended the assessment of normal loss expectancy (a loss expected when all protection systems are operative), the probable maximum loss (known as PML, a loss expected when a critical part of protection systems is out of order), the maximum foreseeable loss (known as MFL, the loss expected when none of the private protection systems are functioning) and the maximum possible loss (known as MPL, the expected loss when all private and public protection systems are inoperative or ineffective) (compare: Williams and Heins, 1989, p. 65; *Glossary*..., 2004, p. 144, 178)

The risk analysis is ended up by the construction of risk matrix (sometimes referred to as a map of risk), where the expected risk frequency and risk severity of particular types of identified risks is being visualised. In Figure. 2 an exemplary risk matrix is presented, based on the subjective categories of risk estimation.

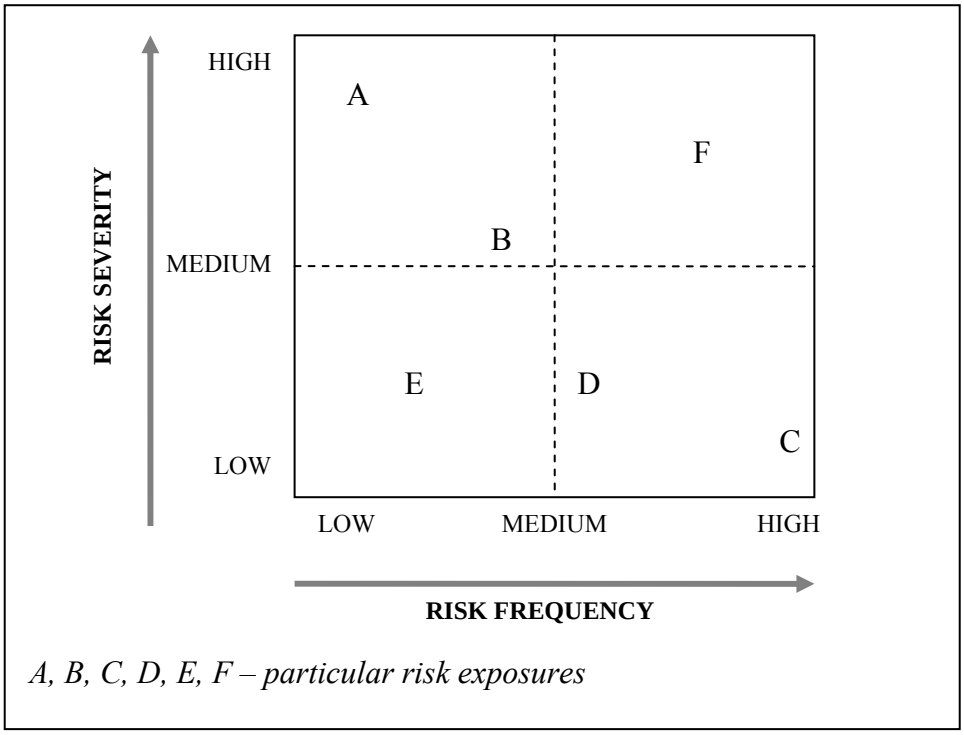

Fig. 2. Risk Matrix

Source: Own study based on: Ratliff and Hanks, 1992, p. 27).

Often the graphic visualisation of risk matrix operates with colours – red for very high risk, orange for high, yellow for moderate, and green for low. Also, particular types of risk are given a number, marked with letter (as in Figure 2) or with another graphic sign. The purpose of the construction of risk matrix is to provide clear information which risk requires taking a response action.

3. Risk perception in the global context

The problem of risk perception is a valid one also from the analytical point of view. This is probably why numerous risk service providers conduct the actions aiming at constructing the list of ten top risks that affect the business entities (*Global Risk Management Survey*, 2009, p. 9-10; *Risk Survey*, 2010, p. 9-1; *Risk Survey*, 2011, p. 9-11). One of the latest surveys was conducted in 2010 by

the World Economic Forum and the results were presented in the report titled „Global Risk 2011" (*World Economic Forum*, 2011). It was the 6th edition of the survey and the final conclusions were presented in the form of the Global Risk Landscape 2011 and Risk Interconnection Map 2011, supported by the discussion of differences in risk perception among respondents. The Forum's survey measured the perception of risk likelihood and impact, providing the respondents with the list of 37 global risks. The findings are based on 580 expert respondents.

The Global Risk Landscape 2011 revealed that the respondents in general perceive event-driven risks as having higher impact than risk that are more chronic in nature and more distributed over time. The global risks perceived as having the highest combined likelihood and impact among those addressed are presented in Figure 3.

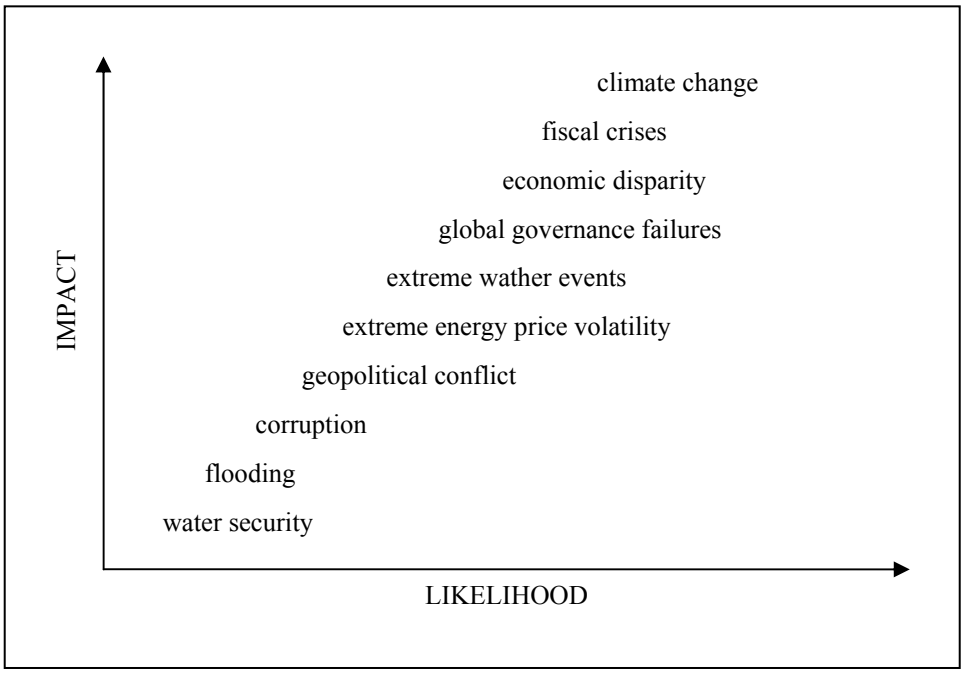

Fig. 3. The top 10 global risks by likelihood and impact combined

Source: Own study based on: *World Economic Forum*, 2011, p. 44).

In the research, the problem of risk interconnections was also examined. The top ten risks in terms of average strength of interconnections are presented in Figure 4. The research indicated that most interconnected risks are economic disparity and global governance failures. The deeper analysis of the problem indicated that the global governance failures directly impact a large number of other risks, whereas economic disparity has stronger interconnections but with smaller set of risks.

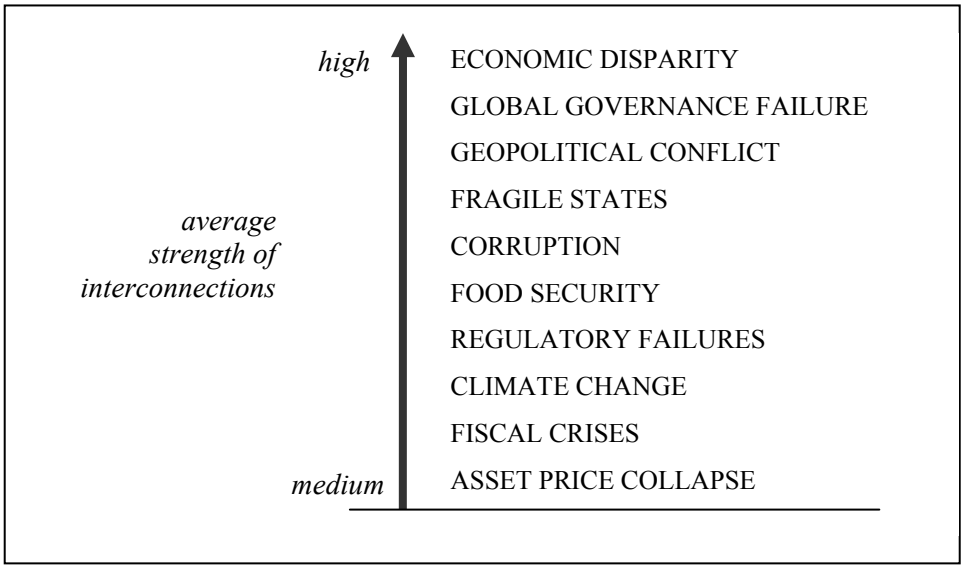

Fig. 4. The top 10 risks in terms of their average strength interconnections

Source: Own study based on: *World Economic Forum*, 2011, p. 45).

Moreover, in the report, the three distinct groups of interconnections were identified:

1) the macroeconomic imbalances nexus,
2) the illegal economy nexus, and
3) the water-food-energy nexus.

The non-exhaustive map of risk interconnections in these three nexuses is presented in Figure 5.

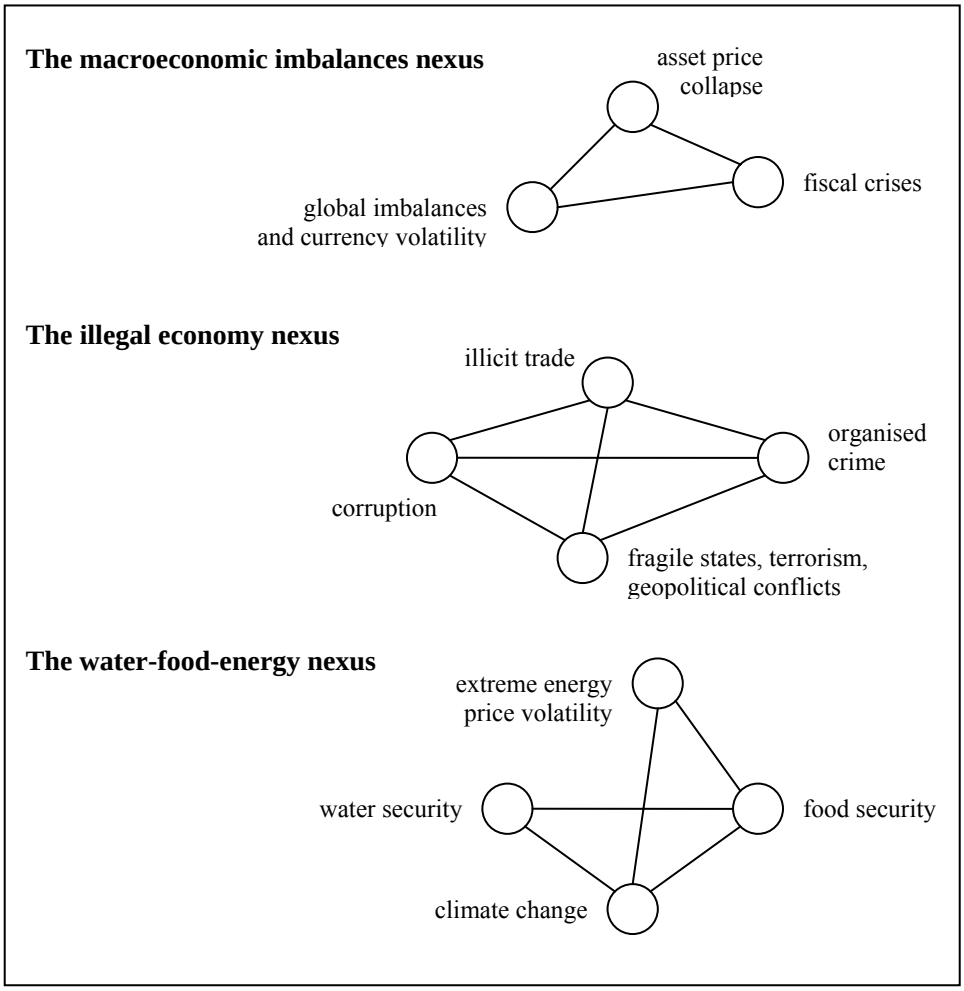

Fig. 5. The three core nexuses of risk interconnections

Source: Own study based on: *World Economic Forum*, 2011, p. 14,22,28-29).

The macroeconomic imbalances nexus is characterised by the imbalances in both the internal (within countries) and external (between countries) dimension. Internal imbalances are caused mainly by the government policies and private sector behaviour and are influenced by the stage of economic development. The external imbalances spring predominantly from the mismatch between saving and investment (*World Economic Forum*, 2011, p. 14). The illegal economy nexus includes risks that are perceived as highly likely to occur and of medium impact. There is a clear feedback loop between the illegal economy nexus and the economic disparity. It is because economic disparity creates an environment that enables illicit trade, corruption and organised crime to grow (*World Economic Forum*, 2011, p. 22). The water-food-energy nexus represent risks that are

chronic obstacles to economic growth and social stability. Economic growth and social stability are at the same time drivers for all these three risks as the improvement of living conditions in emerging economies leads to consumption patterns that are ore resource intensive (*World Economic Forum*, 2011, p. 28).

The research provides a few interesting observations within the differences in risk perception among respondents with regard to their professional perspective. The respondents of the survey were classified into four groups: governments, business, academia and international organisations. Table 2 contains the prime concerns of each group together with the perception of risk relative to other groups.

Table 2

The perception of top risks with regard to the professional perspective

Respondents	**Governments**	**Business**	**Academia**	**International Organisations**
Prime concerns:	societal risks	economic risks	environmental risks	societal risks
Perception higher relative to other groups	- climate change - fragile states - geopolitical conflict - illicit trade	- fiscal crises - slowing Chinese economy - consumer price volatility - terrorism - food security	- climate change - fragile states - biodiversity loss	- climate change - fragile states - illicit trade - food security

Source: Own study based on: *World Economic Forum* (2011, p. 46).

In general, the societal risks are the prime concern of governments and international organisations, whereas environmental risks are the prime concern of academia and economic risks – for business. Such results are understandable and typical with regard to the functions of each group of respondents. With regard to the perception of risks relative to others, Table 2 presents these risks that were indicated as of higher likelihood and/or impact as compared to any other group of respondents.

Conclusions

The perception of risk in the business entity reveals the complexity of the problem. Although the perception of risk is reflected in the results of risk analysis, including risk identification and risk assessment, it is still dependant on the personal abilities of a decision-makers acting on behalf of the business entities. In particular, there are many quirks and flaws of human being nature that influence the perception of risk and thus influence the cognition of risk. It seems that the awareness of these factors is crucial for business entities while organising the

risk management process (and perhaps the risk management division), as it strengthens the awareness of possible areas of mistakes.

In practice, risk analysis ends up with the declaration of core risks for a particular business entity, often called 'the top ten risks', that are further under a deeper consideration and constant monitoring. Thus, the risk perception from the global perspective might be assessed with regard to the top risks indicated by the larger group of respondents. The results of one of such surveys (that were discussed in this paper) revealed, that decision-makers tend to perceive risks in nexus, identifying the interconnections of particular risks. Also, the perception of risks is heavily dependant on the professional context, which influences the types of risks identified as most severe and most likely to occur.

It seems that in the future the problem of cognition of risks will be even further developed. After the escalation of the global financial crisis the quantitative risk analysis techniques are less appreciated, with a higher appreciation of subjective risk analysis, including risk assessment. Thus, the problem of risk perception will surely be extended.

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KILKA UWAG NA TEMAT WŁAŚCIWEGO POJMOWANIA PERCEPCJI RYZYKA

Streszczenie

Celem niniejszego artykułu jest uzasadnienie tezy, że w działalności biznesowej percepcja ryzyka dokonuje się głównie poprzez analizę ryzyka, która to z kolei jest podstawowym elementem procesu zarządzania ryzykiem. Uwzględniając ogólne ujęcie definicyjne pojęcia percepcji, percepcję ryzyka odniesiono do rozumienia pojęcia ryzyka (z uwzględnieniem jego dualnej natury) i poznania ryzyka (z uwzględnieniem dorobku psychologii behawioralnej w zakresie zdolności człowieka). Analiza ryzyka została przedstawiona w ujęciu procesowym, w podziale na etap identyfikacji ryzyka oraz oceny (pomiary) ryzyka. W obu etapach podkreślono znaczenie ludzkiego poznania (w kontekście metodycznym). Rozważania teoretyczne uzupełniono prezentacją najnowszych wyników badań dotyczących percepcji ryzyka w skali globalnej. Uwzględniono percepcję rodzajów ryzyka w ujęciu prawdopodobieństwa i skutków oraz współdziałania różnych rodzajów ryzyka, a także różnice w postrzeganiu ryzyka przez środowisko biznesowe, akademickie, rządowe i organizacji międzynarodowych.

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A SUBJECTIVE APPROACH IN RISK MODELING USING SIMULATION TECHNIQUES

Introduction

Quantitative risk assessment basing on simulation techniques mainly concentrate on historical risk information. Financial companies have been used so far, to perform comprehensive historical data collection concerning key risks. Financial companies' information technology provides not only complex historical information, but gets the information with accurate frequency as well. Financial risk information is assessed by financial markets themselves (by proper financial institutions), thereafter shared with market participants, whereas operational and credit risk information has to be collected by financial companies on their own. Equipped with proper risk information, financial companies are able to model their behavior in volatile environment finding their actual risk exposure. Non-financial companies are even more uncertain about their future, though putting risk modeling aside. The main reason of inclining the modeling, may be historical data availability. Of course, a data collection, similar to financial companies' systems, is possible to be introduced in non-financial companies. Though bringing such the data collection into a company can be an expensive process, especially for small and medium enterprises (SME). Not knowing exact future benefits, non-financial companies, can likely incline such systems. Historical data problems should not prejudge risk modeling resignation. SMEs can introduce risk modeling approach basing on subjective assumptions involving both risks' distributions and interdependencies. Having built a valid model concerning given financial situation, one can model risk basing on special – subjectively chosen – distributions. Triangular and beta distributions work especially great when an expert opinion is the only data source (Vose, 2008). In this study, risk adjusted performance analysis, using simulation techniques with subjective assumptions, is presented. An investment projection model is used, to present both opportunities arising from making subjective assumptions and threatens arising from not taking interdependencies into account. Frequency function is presented as an easy to interpret alternative to probability density functions

and cumulative probability distribution functions in parallel. Frequency based approach is considered, when subjective assumptions arise from an expert opinion, who's statistical knowledge remains rather poor.

1. Subjective assessment better than scenarios?

Simulation techniques like Monte Carlo Simulation (MCS) or Latin Hypercube Simulation (LHS) can be considered as an evolution of classic scenario analysis. In fact, there are hundreds of thousands scenarios being randomly generated during both MCS or LHS as well. Every scenario is a set of random values of risk factors obtained compliantly to assumed probability distributions. Scenarios are processed iteratively in relevant financial model in order to gain risk variables' probability distributions. The main idea of simulation techniques is to analyze as much scenarios as possible, finding every logical situation likely to happen (Vose, 2008). In traditional scenario analysis, in turn, only a few scenarios, with subjectively attributed probability, were generated mostly showing an enterprise: fully exposed to downside risk, not exposed to risk, fully exposed to upside risk. Simulation techniques give an opportunity to consider lots of combinations when some risks gets their upside values whereas others – their downside values. Both mentioned methods obtain, in fact, a risk variable's probability distribution, but the comprehensiveness votes for simulation (Fig. 1).

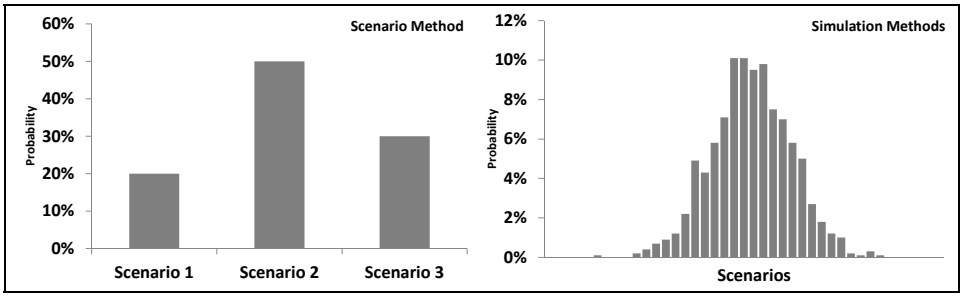

Fig. 1. The nature of the outcome – classic scenario analysis versus simulation techniques

Historical data availability poses a major issue while assuming risk factor's probability distributions. Historical values are considered as objective source of information. Vose (2008), Chapman (2006) agree on number of various situations, when objective way might have been considered as a serious hurdle:

- the data has simply never been collected before,
- the data is too expensive to obtain,
- past data is no longer relevant,
- the data is sparse requiring expert opinion "to fill in the holes",
- the area being modeled is new.

Recapitulating above, risk factors' distributions may be attributed in: objective way, quasi-objective way or subjective way, depending on both historical data availability and adequacy as well. The non-historical descent of risk factor's probability distribution doesn't cross simulation techniques out. Expert opinion can be the source of right distribution, even if the possessed information consists only of the risk factor's extreme values. There exist a number of theoretical distributions being suitable to summarize, more or less detailed information gained from experts knowing best the nature and the behavior of a particular risk factor.

2. Subjective assessment using triangular distributions

Using triangular distributions for simulation reasons doesn't seem to be particularly challenging. Simulation techniques require convenient inverse cumulative distribution functions (G(α)), enabling the right sampling process*. Any professional risk software** provides proper triangular distribution functions, whereas popular spreadsheets don't. The best known, Microsoft Excel, provides object oriented programming using Visual Basic for Applications (VBA). Preparing suitable VBA functions could have been quite usable solution involving low budget, making subjective assessment with triangular distributions possible.

The common approach is using simple triangular distributions described only by their extreme values, with an assessment considering which of them has the highest probability of occurrence (Kaczmarzyk, Zieliński, 2010).

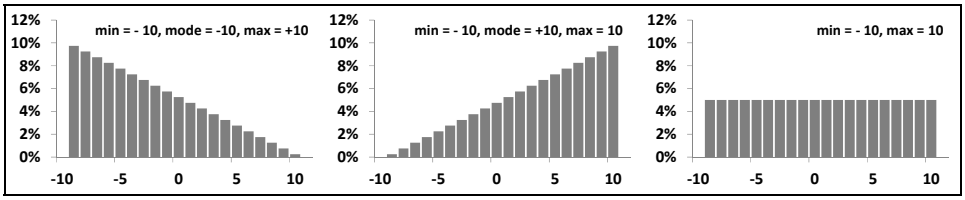

Fig. 2. Simple triangular distributions and uniform distribution

Simple triangular distributions seem to be particularly suitable solution, when the only thing the analyst can do is describe the range of possible risk factor's values. Depending on the highest expected probability, analyst should choose left or right skewness of the simple triangular distribution. Finding the highest expected probability hard to describe, an analyst may use uniform distribution, while assuming the same probability for the expected range of values (Fig. 2).

* Sampling process – generating random numbers due to assessed probability distributions, consist of two stages. Stage 1 – generating uniform random numbers from range (0,1) (generating probability in fact). Stage 2 – transforming uniformly distributed numbers into desired probability distributions using inverse cumulative distribution functions.

** Fe. ModelRisk, Palisade Risk, Crystal Ball.

The more complex approach involves universal triangular distributions (Vose, 2008), enabling analysts to assume the value with the highest probability somewhere between expected extreme values (with the lowest probability).

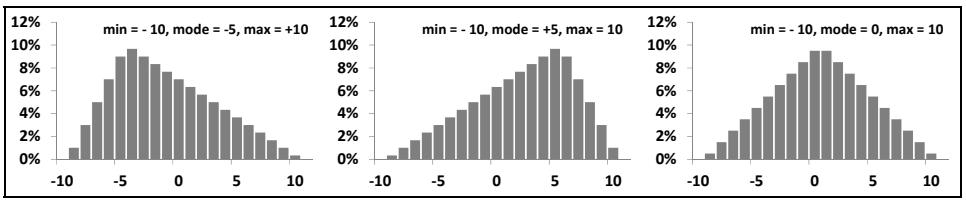

Fig. 3. Universal triangular distribution with same extreme values and different expected values

One has to magnify the nature of universal triangular distribution, which boils down to the fact, that the values nearly the extreme values have equal probability, only when the most expected value lays exactly in the middle of the expected range (Fig. 3).

In terms of financial categories, one is able to provide lots of examples when triangular distributions are a right solution. Let's assume a company considering an investment project and its investment expenditures. Typically, the company lacks of historical information being forced to simulate risk using a subjective assumption. Choosing the triangular distributions, is expected to provide the minimum, maximum and most expected value of the investment expenditures. Defining key distribution values, may necessitate some consultations with experts. In other words, one has to consult if there is a chance to decrease costs and if there is a risk of their increase. Involving brainstorming and other creative thinking techniques may provide desired information in much more effective way.

Triangular distributions are very easy to interpret, even for persons lacking of statistical experience. In other words, risk identification, even on the lowest level of an organization, can be effective, basing on information possessed from serial workers. Let's assume a company holding production lines, which doesn't have information on their actual reliability. Employees responsible for particular production line are likely to have such an information acquired automatically straight from the production process. Obviously, an immediate information won't be much more detailed than required by triangular distributions themselves. Looking for lots of details, company has to introduce special data acquisition process, involving employees from adequate level of organizational structure. Such solution could provide the most accurate probability distribution fit.

Finally, the main constraint of using triangular distributions is linear relation between risk factor's values inside expected range and their probability of occurrence. The other significant constraint of triangular distributions is inability

to differ the expected values' probabilities for different risk factor's having the same range of volatility (with both different and same expected values). Being conscious the real risk factor's nature, one may use beta probability distributions instead, able to reflect the non-linear relation and to differ the probability of the expected value.

3. Subjective assessment using beta distributions

Every theoretical distribution could be used in making the subjective assumptions. Lots of them have complicated parameters which cross statistically inexperienced experts out when it comes to simply draw the risk. Even normal distribution might cause some difficulties while realizing its true volatility range doesn't cover straight with the standard deviation. Some of the theoretical distributions are easy to parameterize instead like triangular ones. One of the most useful distributions is beta which taps the same parameters as the universal triangular distributions mentioned above. Unlike triangular distributions, beta ones are able not only to position the expected value but to set the expectancy strength as well.

Beta general distributions work with a specific set of parameters: α, β (both responsible for shape), minimum and maximum. Beta general gets symmetrical shape while shape parameters are equal (α = β), in the other cases the distribution will remain asymmetrical. Beta general is capable of forming lots of shapes, making the distribution highly universal, especially when the expert opinion is urgent to take shape (Fig. 4).

Setting the beta general distribution's parameters seems to be quite comfortable when having in mind symmetrical shape. The higher α and β, assuming α = β, the wider the distribution's volatility range. Statistical experience is highly recommended when asymmetrical shape is the key, when describing particular risk factors. Quite useful may be David Vose's (2008) approach for asymmetrical beta distributions, leading towards parameters simplification including extreme values (min and max), mode and shape. Vose's algorithm needs an addition for symmetrical cases as follows (1) and can be a perfect basis for urgent changes in existing Excel's Beta. (e.g. by creating new function on the basis of the built-in-excel one).

$$\alpha = \frac{(\mu - a)(2mode - min - max)}{(mode - \mu)(max - min)}$$

$$\beta = \frac{\alpha(max - \mu)}{(\mu - a)} \qquad \text{if } max - mode \neq mode - min \text{ (asymmetrical distributions)} \qquad (1)$$

where $\mu = \frac{min + shape \cdot mode + max}{shape + 2}$

$$\alpha = \beta = \frac{shape}{2} + 1 \qquad \text{if } max - mode = mode - min \text{ (symmetrical distributions)}$$

The shape's parameter determines its kurtosis (the distribution's flattening). The higher the shape's value the lower the kurtosis and the distribution's volatility as well. The recommended solution, when it comes to eliciting the risk distribution from an expert opinion, is to share a suitable legend, presenting beta distributions with different parameters (Fig. 4).

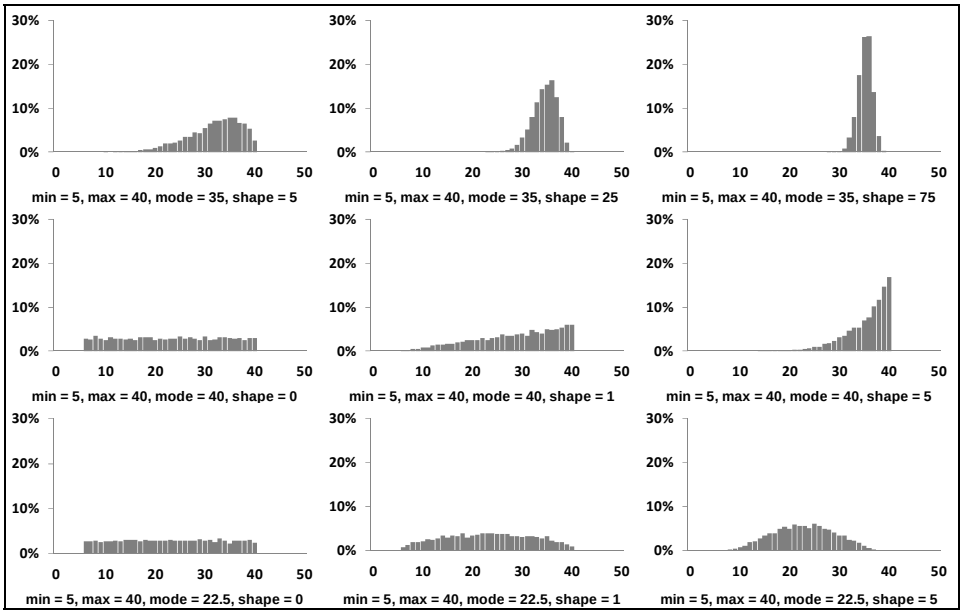

Fig. 4. Beta distributions with the simplified set of parameters

4. Interdependencies' dilemma

There is a huge problem with reflecting interdependencies between risks in risk analysis. Likewise assuming the risk distributions subjectively, the interdependencies may be elicited from an expert opinion, while historical data is inac-

cessible or unavailable. Having in mind the interdependencies seems to be essential. The previously recalled investment project, can be a suitable example once again. Presumably there are two different goods' production lines to be launched. Expected revenues from the production lines won't be independent from each other. As a consequence of diversification level, the revenues changes may exhibit positive or negative correlation as well. Furthermore the omission of interdependencies is going to be, in fact, an assumption reflecting particular level of diversification.

The relevant method of reflecting the interdependencies should work with most common correlation measure such as the Pearson's coefficient (or its conversion as the coefficient of determination[*]). One of the simplest and the most universal methods, is the Cholesky's decomposition providing so called normal copula[**]. Either bivariate (Jäckel, 2002) or multivariate interdependencies' (Cherubini, Luciano, Vecchiato, 2004) problem is easy to be solved using the decomposition. Turning towards the mechanism, the Cholesky's decomposition converts standardized bivariate or multivariate normal distribution with independent vectors into a relevant distribution with dependent ones.

Choosing the right copula is the another significant challenge in the subjective risk modeling. The normal copula achieved with the Cholesky's method doesn't reflect interdependencies nature properly in some circumstances, especially when it comes to the financial companies activity and tail dependence between distributions (Melchiori, 2003; Kole, Koedijk, Verbeek, 2007). Knowing best the right type of the copula, forces the copula fitting process which absolutely requires the historical data.

5. Subjective assumptions and correct charts

Experienced statisticians or financials have embedded-by-experience ability to understand probability density function (PDF) and cumulative distribution function (CDF). The experts whose statistics remains rather poor, may find useful a frequency distribution function (FDF), especially when denominated in percentage points. One supposes the FDF to be clear for nearly anyone, while using "percent from population within range" in fact. The experts are going to fully understand and properly choose, when presented the possible FDF's examples instead of the PDF's or CDF's.

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[*] Using the coefficient of determination maybe actually quite comfortable solution while making the subjective assumptions. Stating the value of the determination's coefficient is much clearer The only thing one has to state is the part of the risk factor's changes which contribute to changes of the another.

[**] A copula is a particular kind of interdependency between probabilities of the risk factors. The normal copulas form characteristic elliptical shapes. Looking for the best fitted copula is looking for the right shape in fact.

6. Subjective assumptions in practice

A simple profitability model is presented for illustrating the subjective assumptions idea (Fig. 5). The model calculates return on equity (ROE) within one year horizon for two production lines financed partially with debt. A risk analysis is conducted with taking into account market risk appearing in the products' prices. The MCS sampling is used with the Cholesky's decomposition for reflecting possible interdependencies between the prices.

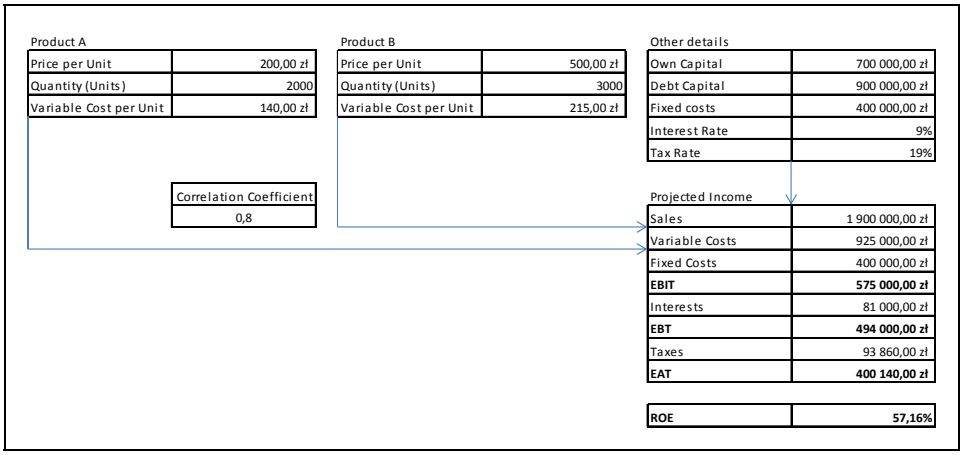

Fig. 5. Simple profitability model, considering return on equity

Let's assume the company is expecting the price for the product A can change within a range of 150,00 zł to 290,00 zł with the most expected price's level at 200,00 zł. Relevantly, product B can change within a range of 300,00 zł to 550,00 zł with the most expected price's level at 500,00 zł. The MCS brings the ROE's distribution, which differs seriously when changing correlation strength between the prices. Checking the ROE at risk with 10% level of significance, one gets following results for different level of the correlation coefficient (ρ):

1. For ρ = +0,8 (the prices behave rather similarly), the ROE is going to be higher than 7,6% with 90% probability (Fig. 6).
2. For ρ = 0,0 (the prices behave independently), the ROE is going to be higher than 14,2% with 90% probability (Fig. 7).
3. For ρ = -0,8 (the prices behave rather contrariwise), the ROE is going to be higher than 22,1% with 90% probability (Fig. 8).

Making traditional scenarios wouldn't have brought the ROE's related information with probability level in such detailed way. Calculating the ROE with simulation techniques brings more comprehensive image of risk when managing finance in a company. Even the triangular distributions enable an analyst to simply consider as much scenarios as possible.

The interdependencies are also crucial. Supposing an analyst is not going to take interdependencies into account while there is a strong positive (or negative) correlation between risks. Missing the interdependencies is going to provide underestimated (or overestimated) risk (e.g. Fig. 6, Fig. 7, Fig. 8).

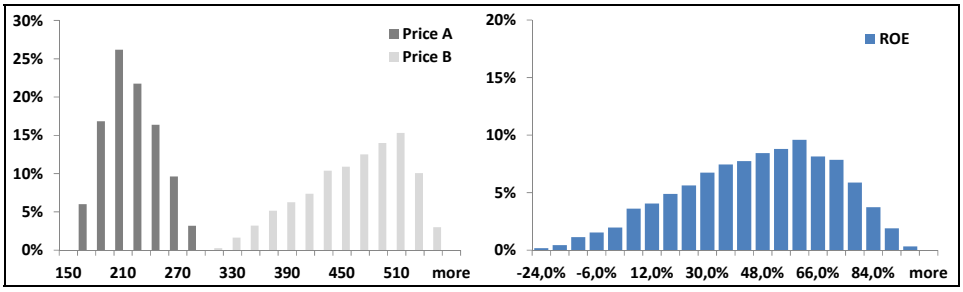

Fig. 6. Example 1, Price A: Triangular min = 150, mode = 200, max = 290; Price B: Triangular min = 300, mode = 500, max = 550; ρ = + 0,8

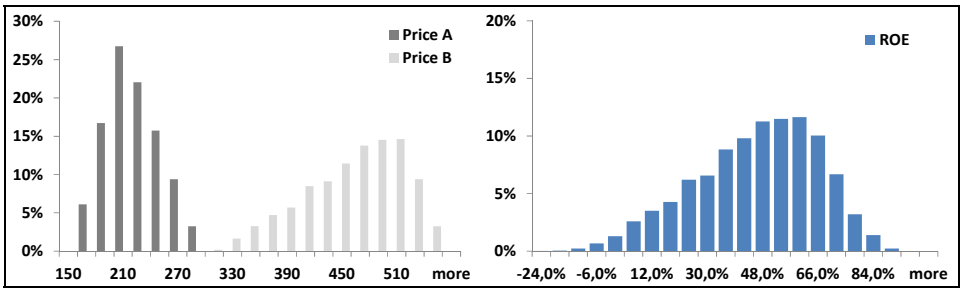

Fig. 7. Example 2, Price A: Triangular min = 150, mode = 200, max = 290; Price B: Triangular min = 300, mode = 500, max = 550; ρ = 0,0

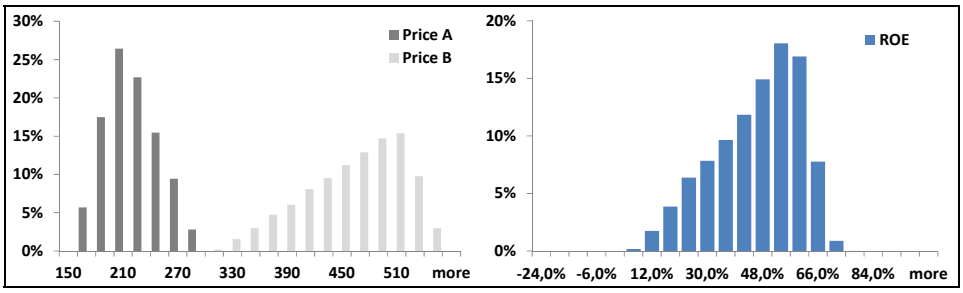

Fig. 8. Example 3, Price A: Triangular min = 150, mode = 200, max = 290; Price B: Triangular min = 300, mode = 500, max = 550; ρ = – 0,8

Alternatively, as has been stated so far, one is able to make subjective assumptions using beta distributions. In order to compare the beta distributions with the triangular ones, the same extreme values and modes were set. The main advantage benefited from the beta distribution is the ability to easily change the

shape. In following examples the shape's parameters were replaced, maintaining the others (Fig. 9, Fig. 10, Fig. 11).

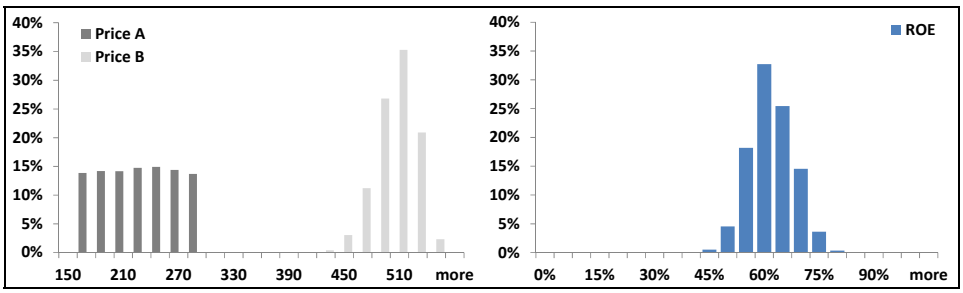

Fig. 9. Example 4, Price A: Beta min = 150, mode = 200, max = 290, shape = 0; Price B: Beta min = 300, mode = 500, max = 550, shape = 20; ρ = -0,8

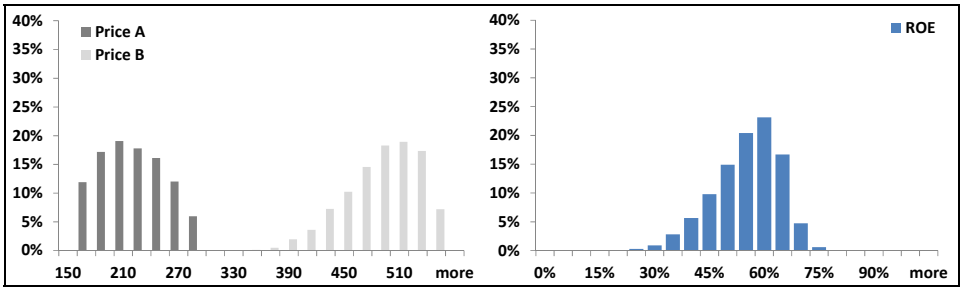

Fig. 10. Example 4, Price A: Beta min = 150, mode = 200, max = 290, shape = 1; Price B: Beta min = 300, mode = 500, max = 550, shape = 5; ρ = -0,8

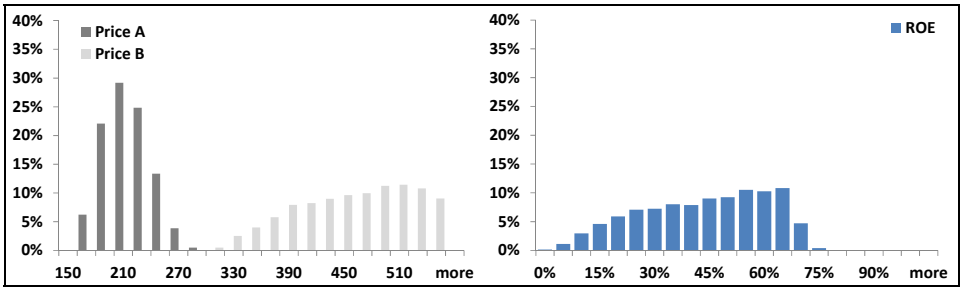

Fig. 11. Example 4, Price A: Beta min = 150, mode = 200, max = 290, shape = 5; Price B: Beta min = 300, mode = 500, max = 550, shape = 1; ρ = -0,8

Furthermore, the FDFs endorse their ability to present the probability as simple as possible. The CDFs with cumulative information could heavily blur probability images. The presented model assumes Product B to bring much higher profit margin than Product A. One is able to possess the same information, while looking at the prices' and the ROE's FDFs – the ROE significantly tends to maintain the shape of much more profitable Product B.

Summary

Whenever risk analysis is important, one has to consider using simulation techniques. Having historical data in hand may be both useful and dangerous as well. Even historical information has to be transformed in some way to truly reflect future nature of an economical process. It is suggested that companies shouldn't cross simulation, when the subjective way, is the only way on the horizon. Even subjectively chosen distribution can bring much more detailed picture of the company's risk. Triangular and beta distributions seem to be really helpful when it comes to picture risk factors without historical data. Empowering the analysis with subjectively chosen distributions with interdependencies' assumptions eliminates some illogical scenarios from simulation process and can't be put aside. The only hurdle is the convenient software. Using spreadsheets is suggested but involves two approaches. First, one can possess license for using some professional add-ons (like @Risk, Crystal Ball etc.). Second, one may develop a model oneself. First approach is rather expensive, whereas second necessitates proper IT experience.

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PODEJŚCIE SUBIEKTYWNE W MODELOWANIU RYZYKA Z WYKORZYSTANIEM TECHNIK SYMULACYJNYCH

Streszczenie

Zastosowanie technik symulacyjnych powinno być brane pod uwagę zawsze w sytuacji, gdy konieczne jest przeprowadzenie analizy ryzyka. Dostępność danych historycznych nie powinna być ostatecznym kryterium wyboru technik symulacyjnych. Subiektywny dobór rozkładów czynników ryzyka oraz współzależności pomiędzy nimi

może stanowić wyjątkowo atrakcyjne i skuteczne rozwiązanie. Zaletą wykorzystania technik symulacyjnych jest możliwość rozważenia ogromnej liczby wariantów, szczególnie w zestawieniu z tradycyjną metodą scenariuszy. Uwzględnienie współzależności eliminuje ponadto nierealne scenariusze. Część teoretycznych rozkładów prawdopodobieństwa w szczególny sposób ułatwia subiektywne założenia w analizie ryzyka, w sytuacji gdy opinia eksperta jest jedynym źródłem informacji o ryzyku. Prezentowany jest pogląd, iż przedsiębiorstwa powinny rozważyć wykorzystanie technik symulacyjnych w procesie zarządzania ryzykiem, podobnie jak czynią to instytucje finansowe.

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THE PROBLEM OF RISK PERCEPTION IN THE INNOVATIVE CORPORATE FINANCIAL STRATEGY

Introduction

Modern companies operating in the changing environment are exposed to new challenges. In order to face these challenges, to develop themselves and to increase their value, modern companies are forced to create and implement new ideas, solutions and instruments in every field of their activity. These new developments can be also applied in the financial strategy changing its character from the traditional approach into the innovative one. Financial innovations that can be applied by the companies can have different forms and fulfill various functions. Their effects for the company's situation can be also ambiguous. Thus, this conceptual paper, based on the literature studies, aims at presenting the way in which the financial innovations can be applied in the corporate financial strategy, regarding its three basic elements: financing, investment and risk management strategy. The analysis of the financial innovations consequences both positive and negative is also provided, focusing on the potential changes in the level of the corporate risk.

The paper is structured as follows. Section 1 presents the definition of the corporate financial strategy and discusses its main types and elements. Also, it introduces the term "innovative corporate financial strategy". Section 2 analysis various definitions of the "financial innovations" and presents the classification of the financial innovations types and functions. Section 3 presents the potential application of the financial innovations in the particular elements of the corporate financial strategy. It also focuses on the consequences of the financial innovations for the company's situation regarding the potential changes in the level of risk.

1. Corporate financial strategy – types and elements

Modern theory of corporate finance assumes that the main objective of the company is to maximize its shareholders' wealth by increasing the market value of the company (Damodaran, 2001, p. 11-15; Ehrhardt, Brigham, 2009, p. 9). To

realize this main goal, the company is required to have consistent long-term global strategy of development. It is difficult to find one, universal definition of the corporate strategy. However, taking different approaches into account, it can be defined as a model concept of company's functioning and development aiming at achieving its main objective with a set of tools and methods that help to realize this goal. This global, long-term strategy should be adjusted to the internal conditions of the company (i.e. its resources, organizational structure, stage of development or ownership structure) and its external conditions defined by its changing macro- and micro-environment. Thus, the global strategy of development is limited only by three elements: (1) the company's goals, (2) its particular characteristics and (3) external conditions.

The global financial strategy is constructed for the whole company and it defines the company's type of activity and the direction of development. It also coordinates all functional strategies that are devoted to the particular fields of company's activity, e.g.: production, R&D, human resources, marketing, finance, communication, sales. Financial strategy is one of the most important, as it is not only one of the functional strategies, but it also determines the effectiveness of the other strategies (by providing them required sources of funds) and the company's general ability to achieve its main goal (Karpuś, 2004, p. 111, Griffin, 2002, p. 140-141). In addition, the inappropriate financial strategy can have significant consequences, as it may lead even to the company's financial distress and bankruptcy.

Financial strategy can be defined as the set of methods, tools and criteria applied in the decision making process in the field of raising corporate funds (financing strategy) and allocating these funds (investment strategy) (Wypych, 2000, p. 33; Zadora, 2004, p. 26-27). It is important to stress, that the decisions taken in these fields should consider the opportunities and threats for the company and its connections with the business environment in order to enhance the realization of the main company's objective. Thus, the traditional approach to the financial strategy distinguished two substrategies: financing strategy and investment strategy. However, taking into account the challenges that the modern company is forced to face, it would be advisable to distinguish one more important aspect of the financial strategy concerning the risk management (see Figure 1).

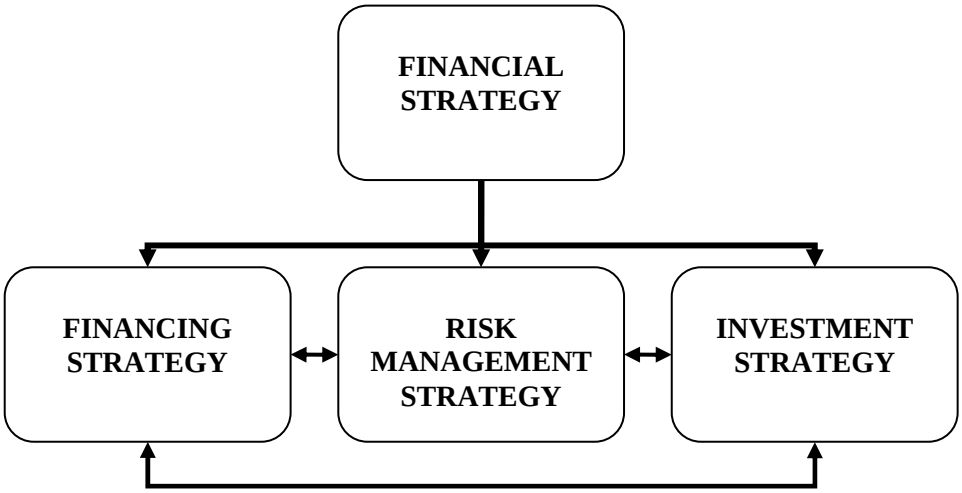

Fig. 1. Elements of the corporate financial strategy

Source: Own study.

All elements of the financial strategy are connected with each other and influence the company's financial decisions. Investment projects require proper sources of funds, as by matching liabilities to assets, the company can maintain its financial balance and long-term solvency. The results of the investment projects determines the level of the generated profit, that has influence on the company's needs for external funding and its ability to attract investors. The investment decisions are based on the investment principle stating that company should invest in assets only when they are expected to earn a return greater than a minimum acceptable rate named hurdle rate. While the financing decisions are based on the financing principle positing that the company should choose the mix of debt and equity in order to maximize the value of investment and to minimize the cost of capital (Damodaran, 2001, p. 4). Both investment and financing decisions can be sources of the company's risk (investment, financing, operating or liquidity risk). The main aim of the risk management in this aspect is to reduce the volatility of the generated cash flows.

Corporate financial strategy based on the company's attitude towards risk can be classified as: (1) aggressive or (2) conservative (Łukasik, 2004, p. 117-121). Aggressive financial strategy is focused on the dynamic development of the company that can be realized either by internal growth or by mergers & acquisitions. It is constructed to use the company's strength and the opportunities generated by its environment. It requires taking up different types of risk, including investment and financial risk, in order to increase the company's value. Aggressive strategy applies variety of tools and instruments to increase the potential growth of the company. While conservative strategy focuses on the main-

tenance of the current situation of the company with the acceptable slow rate of development. All undertaken actions aim at company's protection against the potential threats arising from its environment. Thus, the main objective of the conservative strategy is to reduce the company's risk by using well known and safe tools and instruments.

The types of the instruments applied in the particular financial strategy decide about its character. Thus, traditional financial strategy is based on the classical financial instruments such as: ordinary shares, straight debt instruments, traditional investment opportunities. However, as the financial system and financial markets are developing themselves, the new solutions appeared that can be applied in the corporate financial strategy, enhancing its effectiveness and increasing its value. Therefore, the new type of the financial strategy can be distinguished--innovative financial strategy based on the financial innovations (see Figure 2).

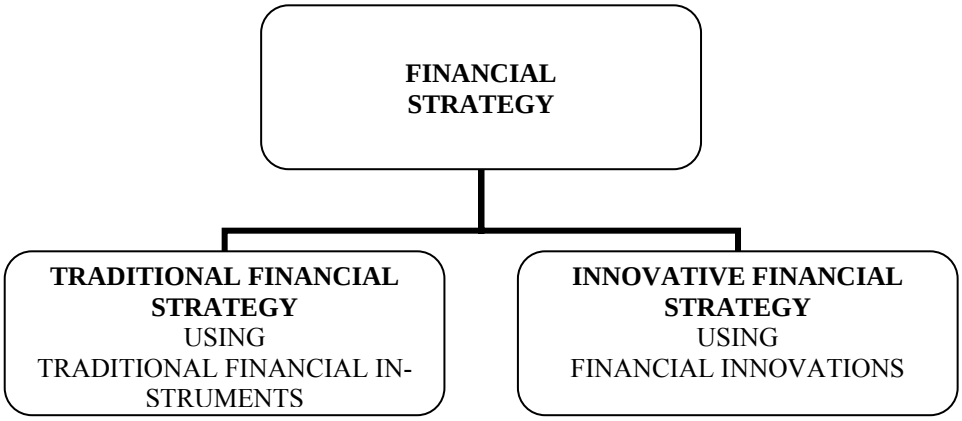

Fig. 2. Types of corporate financial strategy

Source: Own study.

2. Financial innovations – types and functions

The sustainable development and new challenges that face the modern company, require inventing and implementing innovations. The general definition describes innovations as new ideas, solutions and instruments implemented to the business entity in order to improve its situation, to increase its competitiveness and to create value for its owners (compare: Dabic, Cvijanovic and Gonzalez-Loureiro, 2011, p. 196).

Originally, the term "innovation" was used to describe the changes in the technological solutions, creating new combinations of productive means, generating enormous rates of return and thus, enhancing the dynamic development of the overall economy (Targalski, 2006, p. 7). The traditional classification of the

innovations, developed by J. Schumpeter includes four different groups of new solutions: (1) new product, (2) new methods of production, (3) new markets, (4) new sources of raw materials, (5) new organization forms and business structures and (6) new methods of management (Dabic, Cvijanovic and Gonzalez-Loureiro, 2011, p. 196). Based on this approach, the OECD methodology was developed focusing on four groups of innovations: (1) product, (2) process, (3) marketing and (4) business organization (OECD, 2005, p. 48). However, as the growing importance of the financial system in the economy has been observed, the classification of innovations required modification aiming at introducing the new category – financial innovations.

There is no single, universal definition of the financial innovations. Most of the works apply the narrow meaning of the financial innovations defining them as any new developments in financial instruments and they are regarded as financial innovations sensu stricto. These new developments may include: entirely new instruments, combination of traditional instruments, modification of traditional instruments, new application of existing instruments, etc.

However, the broad definition of the financial innovations can be also applied. In this broad meaning (financial innovations sensu largo), financial innovations are explained as any new developments in any elements of the financial system: (1) financial markets, (2) financial institutions, (3) financial instruments and (4) regulations determining their functioning. The distinguished groups of innovations are connected with each other and their relationship is multidimensional, so they are often described as the spiral of innovations (Gubler, 2010, p. 1-49). This means that the new financial institutions create the new financial instruments (products & services) that are traded in the new financial markets and these new solutions require shortly the new regulations. On the other hand, changes in the market conditions together with the changes in the legal environment lead to the formation of new instruments and then foundation of the new markets and institutions specializing in these new developments (see Figure 3).

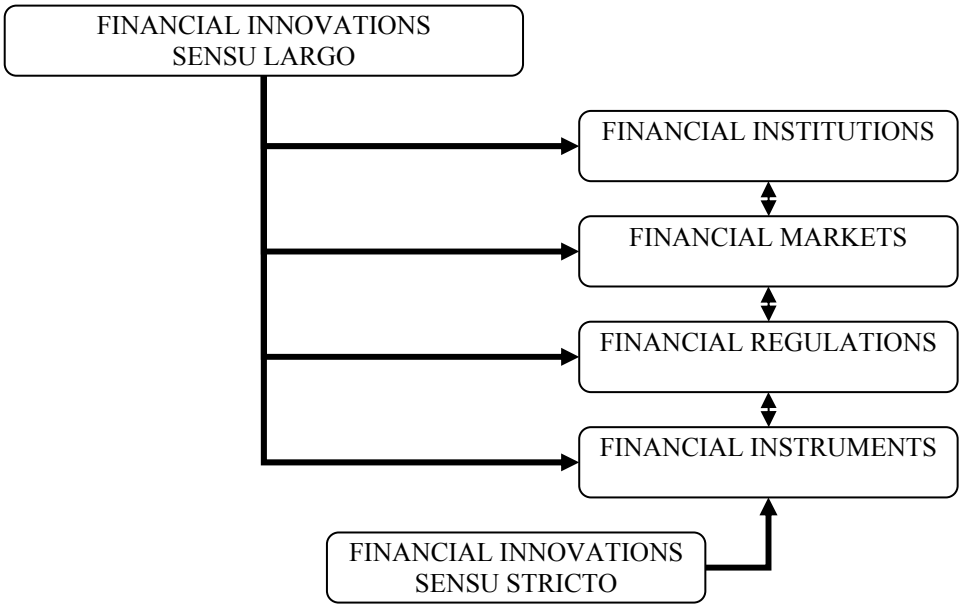

Fig. 3. Broad and narrow definition of the financial innovations

Source: Own study.

It is important to stress, that these new developments, either technological or financial, can be regarded as innovative ones, only if they are perceived as new for the entity implementing them, which means that these solutions can be already known and applied in other entities or organizations (Anderloni and Bongini, 2009, p. 41). Another important fact worth remembering is the connection between the financial and technical innovations, as they are bound together and they evolve together over a time (Michalopoulos, Leaven and Levine, 2009, p. 2-5). Firstly, financial innovations provide mechanism to finance innovative technological projects, when traditional sources of funds are unavailable due to the high level of investment risk. On the other hand, the technological and economic progress resulting in the higher complexity of business processes and new types of risk, forces the financial system and financial markets to adopt to the changes, to be modernized according to the new requirements of the business entities and to the challenges of the modern world. Thus, the technological and economic development would constrained without financial innovations. And at the same time, the application of the financial innovations would be limited without the increasing demand arising from the technical progress.

Financial innovations can classified according to different criteria. Some of them could be useful to analyze their application in the corporate financial strategy. One of the most popular classification of the financial innovations is based on their sources including demand-driven and supply-driven innovations. The

demand-driven innovations are created as the response to the needs of the business entities to meet their individual goals. As the modern financial market is characterized by many imperfections (mainly: asymmetric information, agency costs and transaction cost), many business entities search for new solutions to reduce their negative consequences. Also, unfavorable tax regulations and increasing volatility of the market parameters can create demand for new solutions enabling business entities to avoid paying high income tax or to reduce the level of market risk. While, the supply-driven innovations are created by the financial institutions to enhance their competitive advantage. New developments are offered to the business entities in various fields of their activity, including: investment, savings, financing and payment instruments, tools and techniques. These financial innovations are also created and implemented to improve the results of the financial institutions or to protect their market situation.

Another classification of the financial innovations regarding their functions has been elaborated by the Bank for International Settlements. According to it, financial innovations are divided into five groups: (1) price-risk transferring, (2) credit-risk transferring, (3) liquidity-generating, (4) credit-generating and (5) equity-generating instruments (Fabozzi and Modigliani, 2003, p. 27). The first group of financial innovations provide business entities with more efficient means for dealing with price or exchange rate risk. Credit-risk instruments are used to reallocate the risk of default. Liquidity generating instruments can have three different consequences: they increase the liquidity of the market, they enable deficit units to look for additional sources of funds and they allow market participants to avoid unfavorable law regulations. Credit-generating instruments increase the amount of debt funds available to the deficit units. And equity-generating instruments provide the access to the additional sources of equity capital.

The presented classification of the financial innovations functions can be modified to be better adjusted to the corporate financial strategy perspective. Thus, taking into account the assumptions that the financial innovations should enhance the efficiency of the business entities in fulfilling their objectives, the functions of the financial innovations can be described as follows: (1) payment function (increasing the liquidity of the financial system and business entities), (2) investment function (increasing the variety of investment opportunities better adjusted to the risk-return profile of the investor), (3) financing function (increasing the availability to the sources of funds – either equity or debt capital, both for longer and shorter periods), (4) pricing function (improving the process of assets valuation and risk pricing by the elaborated statistical methods) and (5) risk management function (increasing the possibilities of transferring risk between system participants).

Despite any differences in the approaches towards financial innovations functions, the most important are consequences for the company implementing them, including changes in its financial situation and the level of risk.

3. Financial innovations and their consequences for the corporate risk perception

The implementation of the financial innovations in the corporate financial strategy can be determined either by the internal or external factors. In case of the internal factors, the decision to use financial innovations is based on the company's needs and goals, its particular situation, attitude towards risk and new developments connected with the management style. Regarding external factors, the application of the financial innovations in the corporate financial strategy can be determined by the situation on the financial market, changes in its business environment or unfavorable law regulations. It is often that a combination of different factors influences the decision to implement financial innovations.

There are two situation in which the financial innovations application in the corporate financial strategy is justified. Firstly, when the traditional financial solutions are no longer available. And secondly – when the costs connected with the introduction of the financial developments are lower than the costs connected with the usage of the old, traditional solutions (Pantalone and Welch, 1987, p. 33-35).

Thus, the effect of the financial innovations implementation is the major problem of the innovative financial strategy. As financial innovations can have both positive and negative consequences for the company and its performance. The sustainable innovations help company to fulfill its functions and realize its goals at lower costs and higher efficiency and thus improve its situation. In case of the harmful innovations, unexpected and undesirable side-effects lead to instability of the company and to increased level of the financial risk.

The problem of the financial innovations impact on the company's situation should be particularly assessed in terms of the corporate risk and its perception. As some financial innovations can be used to reduce the level of company's risk. While, at the same time others can be regarded as the sources of the additional corporate risk. Thus, the consequences of the financial innovations applications in the corporate financial strategy should be carefully analyzed and controlled (see Table 1). To make this analysis more efficient, it would be advisable to look for these potential consequences in each of the distinguished elements of the financial strategy, i.e.: financing decisions, investment decisions and risk management decisions.

In case of the financing strategy, financial innovations are applied to increase the access to the external sources of capital (both debt and equity), to decre-

ase the cost of capital or to improve the flexibility of the capital structure (financing function of the financial innovations). They can be also applied to improve the capital structure by replacing part of the company's debt by the equity capital or off-balance sheet liabilities, increasing its financial stability. Also, financial innovations enable the company to adjust the cash flows generated by the issued instruments to the cash flows generated by its operating activity and in this way reduce the financial risk (including financing risk and liquidity risk). On the other hand, financial innovations issued by the company to acquire additional capital are usually complex solutions that can be difficult to understand for the potential investors. Thus, the company's offer should be prepared, first of all to attract new investors providing funds, also to win the competition between other issuers (companies and financial institutions) that are searching for capital. The complexity of financing innovations, together with insufficient knowledge about their mechanisms, may lead to the increased risk of unsuccessful issue. Recently developed financing innovations include: mezzanine finance, private equity finance, hybrid finance, structured finance or swap contracts.

Financial innovations can be applied in the investment strategy to increase or stabilize the expected rate of return on the realized investment projects. In addition, they can enable the company to avoid or postpone the income tax payments. Financial innovations can be also applied to improve the assets structure increasing the liquidity and flexibility of the company, decreasing the level of operating risk. Some financial innovations are implemented to reduce the transaction costs and to limit the investment risk as the result of the portfolio diversification. Complex financial instruments can be also applied to get access to the markets and instruments that are not available in the direct investments (investment function of the financial innovations). They can be also implemented to get the opportunity to earn return on the falling market. Tailor-made investment instruments can be better adjusted to the risk-return profile of the company. However, investment innovations can also increase the company's exposure to risk. This increased risk can have several sources: (1) low liquidity of instruments (in case of "buy-and-hold" investments), (2) low transparency of the market for some instruments (when they are traded on less regulated markets) or (3) high complexity of the mechanism of investment instruments (which makes it difficult to forecast their performance and return for investors). The most popular investment innovations include: hedge funds, Exchange Traded Funds, Real Estate Investment Trust, structured products, Residential Mortgage Backed Securities, Commercial Mortgage Backed Securities or Collateralized Debt Obligations.

Financial innovations applied in the risk management process limit the level of the financial risk, stabilizing cash flows and improving financial planning (risk management and pricing functions of the financial innovations). Risk-

transfer innovations can be applied to hedge against the unfavorable changes in the market parameter such as: stock prices, interest rates, foreign exchange rates or commodity prices. However, other risks can be also hedged, e.g.: credit default risk or catastrophic risk. The most popular hedging instruments are derivatives (plain vanilla and exotic ones), such as: options, futures, forwards and swaps and their combinations (second generation innovations) created by the financial engineering. The main motive of the risk-transfer innovations application is not only the reduction of risk, but also the reduction of transaction costs due to the standardization process. On the other hand, tailor-made innovations can be perfectly adjusted to the company's individual needs. Obviously, entering derivative contracts creates additional risk for the company, that is connected with the unfavorable changes in the value of the underlying assets. The situation called "perfect hedge" is the most advisable, as the loss incurred on the spot market can be covered by the profit generated by the derivative contract and in the opposite situation, the loss on derivatives can be balanced by the profit on the spot market. However, besides hedging, derivatives are often used for speculative purposes, in such situation, they give potential to generate high profits but simultaneously the expose company to additional risk. Thus, the effective usage of derivatives, particularly these characterized by higher complexity, requires professional knowledge about their construction and potential performance.

Table 1

Financial innovations impact on the corporate risk

Innovative financial strategy	
Factors increasing the level of corporate risk	Factors decreasing the level of corporate risk
– High complexity of innovations – Low liquidity of the market – Low transparency of the market – Increased market risk – Increased credit-default risk – Increased unsuccessful issue risk – Underestimation of the potential risk	– Better access to sources of funds – Lower financing cost – Lower transaction cost – Better access to investment opportunities – Higher rate of return on investment projects – Better adjustment to the company's needs and environmental conditions – Higher flexibility of the company's decisions

Source: Own study.

The financial innovations applied in the particular elements of the corporate financial strategy are bound together, similar to the connection that exists between its parts. Their specific construction makes it possible to use one innovative financial instrument in several fields of the corporate financial strategy, achieving simultaneously several results. This connection is visibly observed in

case of the financial innovations combining investment and risk management instruments or financing and risk management instruments (e.g. structured instruments). As a result of such solutions, the company can combine investment or financing decisions with the risk-transfer process, obtaining the effect of scale or reduced transaction costs.

Conclusion

The implementation of the financial innovations to the corporate financial strategy can have both positive and negative consequences, also for the level of the company's risk. The most important opportunities given by the financial innovations as compared to the traditional instruments, can be listed as follows: (1) lower financing costs, (2) better access to external sources of funds, (3) higher rate of return on investment projects, (4) increased flexibility of the company's decisions, (5) better adjustment to the company's needs and the environmental conditions.

Regarding the problem of risk, financial innovations give opportunity to decrease the level of the financial risk (liquidity and insolvency), business (operating) and investment risk. These positive results should improve the situation of the company and increase its value enhancing its long-term development better than in case of the traditional financial strategy.

However, to complete the picture of the financial innovations, their negative consequences should be also considered. The main problems connected with the financial innovations observed during the last financial crisis, occurred due to the underestimation of their risk. The most significant consequences were observed in case of the investment and risk-shifting instruments, as in many companies their inappropriate application resulted in the deterioration of their financial situation and in some cases even lead to the bankruptcy. The potential threats connected with the application of the financial innovations are mainly in the form of the increased risk: market risk, liquidity risk, credit-default risk or unsuccessful issue risk. These problems indicate the necessity of the thorough analysis of the financial innovations and their implications for the company's exposure to risk. Thus, the effectiveness of the innovative financial strategy is determined mainly by the professional knowledge of the company's managers about the construction and performance of the chosen instruments. Also, the financial institutions creating financial innovations should inform their clients about the potential consequences, both positive and negative. The problem of the reliable valuation of these instruments and improved transparency of the market is also important.

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PROBLEM PERCEPCJI RYZYKA W INNOWACYJNEJ STRATEGII FINANSOWEJ PRZEDSIĘBIORSTWA

Streszczenie

Cechą charakterystyczną współczesnych przedsiębiorstw jest funkcjonowanie w dynamicznie zmieniającym się otoczeniu oraz konieczność sprostania ciągle pojawiającym się nowym wyzwaniom. Rozwój przedsiębiorstwa i zwiększanie jego wartości nie są możliwe bez kreacji i implementacji różnorodnych rozwiązań innowacyjnych. Nowe

pomysły, instrumenty, techniki, procesy i metody są stosowane we wszystkich obszarach działalności przedsiębiorstwa, także w strategii finansowej. Innowacje finansowe mogą mieć różne formy, w związku z tym pełnione przez nie funkcje również mogą być różnorodne, a konsekwencje ich zastosowania dla sytuacji przedsiębiorstwa nie zawsze są pozytywne.

Celem artykułu jest prezentacja podstawowych możliwości i sposobów zastosowania innowacji finansowych w strategii finansowej przedsiębiorstwa z uwzględnieniem jej trzech głównych obszarów: strategii finansowania, strategii inwestowania oraz strategii zarządzania ryzykiem. W artykule przedstawiono także analizę skutków zastosowania innowacji finansowych dla sytuacji przedsiębiorstwa, ze szczególnym uwzględnieniem potencjalnych zmian w poziomie jego ryzyka. Problem ten jest szczególnie istotny ze względu na fakt, iż innowacje finansowe mogą być zarówno sposobem i narzędziem redukcji ryzyka, jak i źródłem dodatkowego ryzyka w działalności przedsiębiorstwa. Oznacza to konieczność przeprowadzania każdorazowej, szczegółowej analizy potencjalnych konsekwencji wykorzystania innowacji finansowych przed podjęciem decyzji o ich zastosowaniu w strategii finansowej przedsiębiorstwa.

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INTEREST RATE RISK IN NONFINANCIAL COMPANY

Introduction

Risk is one of the most fundamental concept in economics. It has exceptional meaning in corporate finance, because all companies are exposed to different types of risk. Increasing significance of risk (Kasiewicz, 2000, p. 23) in nonfinancial company is caused by:

- free flow of capital, goods, people and services – risk has a dual meaning for company; as a threat and as an opportunity,
- progressive process of globalization and market deregulation – enormous influence on taking decision in company (more complex),
- growing importance and dependence on financial market – funds obtained from financial institutions affect the level of risk in nonfinancial company,
- ever more advanced technologies and innovations – in the liberalized market there are many financial instruments, that allow company to both reduce the risk and expose them*.

All these aspects make, that better managing – risk company can achieve competitive edge. The issue of risk in contemporary, fast-paced market is so serious, that companies which do not take the impact of threat loses competition (or even be eliminated).

In the context of dependence on financial markets, interest rate risk has a special significance. Changes in interest rates have impact on the overall business. Not only indebted companies are vulnerable to adverse changes in interest rates – many balance sheet items are dependent on the direction of their changes (Gup, Brooks, 1997, p. 7). The overall effect of interest rate risk to the nonfinancial companies has been comprehensively presented this paper.

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* The recent financial crisis has highlighted this phenomenon. Incorrect assumption and expectations regarding the level of the exchange rates has led many polish companies, which used currency options, to multi – million zloty losses (including bankruptcy). The initial intention of eliminating the currency risk turned into toxic speculation. More on this subject can be found in: Boczkowski (2011, p. 9).

1. The concept of risk

Every decision taken in variable environment is associated with a greater or lesser risk. The issue of risk was subject of several studies and analysis over the centuries, especially the last century. Many economists attempted to determine definition of risk. Substantial contribution and also the distinction between risk and uncertainty brought F. Knight in 1921 (Borkowski, Hanisz, 2010, p. 26). According to him, the main feature which differentiates the risk and uncertainty is measurability, that is, uncertainty is category which cannot be measured while the risk can be estimated. The development of science in combination with modern technology and computerization of business processes enabled to risk assessment and management.

There are two essential factors, that have substantial impact on effective risk management. Firstly, access to information is the key issue in competitive, digital world. Asymmetry of information causes, that companies with better knowledge of threats can more precisely estimate the level of risks. Of course, having adequate and accurate information is related with costs (Bizon-Górecka, 2004, p. 48). Hence must be set the costs of acquiring and processing information with potential benefits. It is worth – emphasizing, that the time horizon has a crucial impact on the accuracy of information and the level of risk (Block, Hirt, 1987, p. 409). The chart below presents the relationship between the level of risk and time.

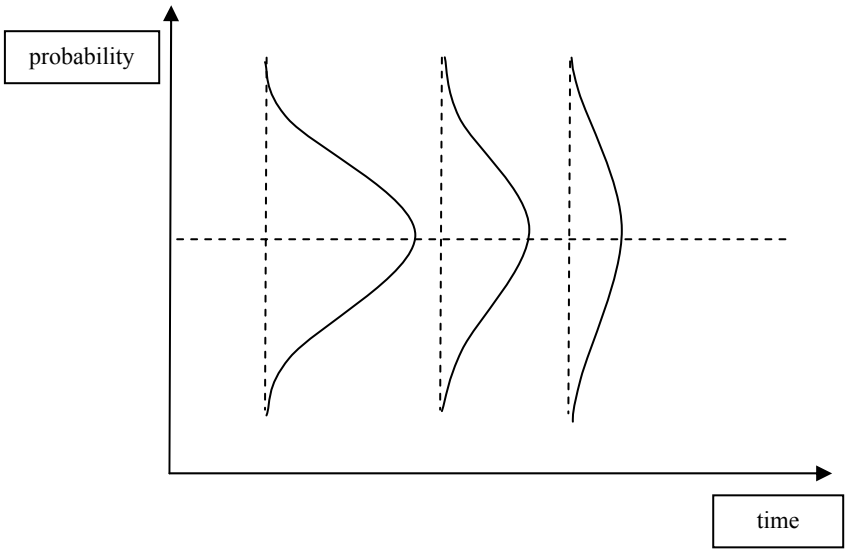

Fig. 1. Relationship between time and probability

Source: Block, Hirt (1987, p. 409).

The passage of time causes the normal distribution is more flattened, what is related with increased probability of obtaining the rate of return deviating from expected rate of return.

The second important factor is manager's attitude toward risk (Jajuga, 2009, p. 14). It is able to distinguish three main attitudes:

- risk aversion – manager expect additional compensation for taking additional part of risk,
- risk neutrality – the size of risk is indifferent when the decision is taken,
- risk seeking – manager can incur additional expenses when consider additional risk.

Generally, risk aversion prevail in economic activities. In companies such attitude has an impact on:

- investment decisions – each company carrying out investments is exposed to range of different risks; considering of these risks is important both in terms of short – term and long – term time horizon; investment decisions are particularly associated with financial decisions,
- financial decisions – the next area of business activity for development by the manager in the context of risk; particular relevance here is the level of interest rate risk, conditioning the proportions of equity and debt,
- decisions on dividend payment – taking a decision on allocation of net profit to pay dividends or retain in company constitutes an essential concern in company; however the decision is intrinsically linked to the risk that arises due to realization particular option (Damodaran, 2009, p. 56).

Above defined areas of business activity require additional division due to the potential impact of the entity for a particular kind of risk. Such distribution, proposed by Tarczyński and Mojsewicz (2001, p. 17), divide the total risk on systemic (external) and specific (internal). Systemic risk which the entity cannot eliminate is dependent among others, according to literal interpretation, of Monetary Authorities, Government, Capital (Commodity, etc.) Market. On the other hand, specific risk is the one, that is under the company's control. Sources of this risk should be sought in the management of the company, the decision taken. Furthermore, such an approach is consistent with the modern portfolio theory, widely used in investing in securities, allowing effectively reduce investment risk (Reilly, Brown, 2010, p. 241). Below presented the various types of risks, taking into account the impact of companies on them.

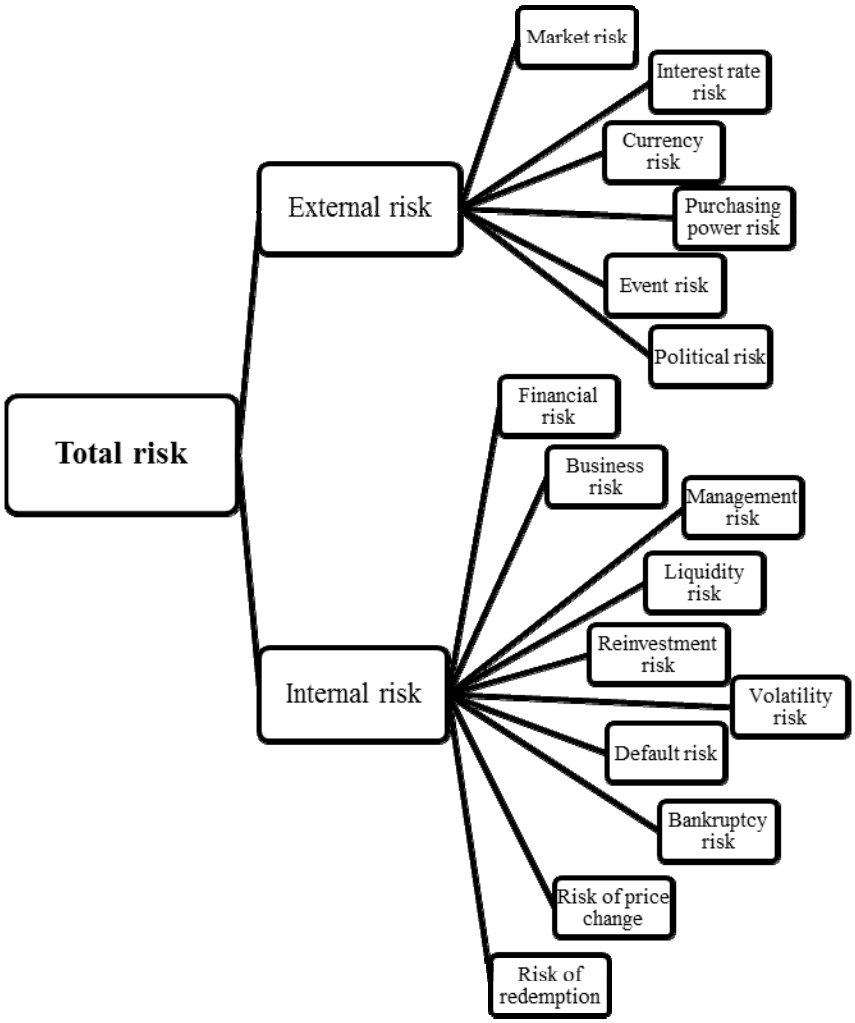

Fig. 2. Composition of total risk

Source: Own elaboration on the basis of Jajuga, Jajuga (1996, p. 99).

The risk of interest rate as a component of systematic risk, in context of three core areas of business, has been discussed in this article.

2. The importance of interest rate

The interest rate has a special importance in economy. Generally, it is the price paid for the use of money (http://www.britannica.com/), determined by:

– supply side (lender) – who demand compensation for lending money for a time,
– demand side (borrower) – who are willing to pay money for the disposal for some time.

There are many factors and institutions affecting the level of interest rates. The most important providers of the capital in each country are central banks. Fulfilling its main objective, by maintaining inflation on the low level*, they set interests rates, at which lend money to private banks. Hence autonomous monetary policy has an enormous influence on the indebted nonfinancial companies.

In the present turbulent world, increasingly impact on the level of interest rates have governments. Most developed countries carrying out its economic policy is forced to borrow money from investors**. Such a proceedings has certainly adverse influence on companies, also nonfinancial. Banks in the face of limited resources, investing in risk free securities issued by governments have fewer funds to credit companies. The degree of banks engagements in government – issued securities have a direct impact on interest rates level.

It is worth underlying, that such a factors like cyclicality of interest rates and the level of the economy's openness also affect the level of interest rates (Kalinowski, 2001, p. 23). Globalization of economies and financial markets caused that the business cycles of most developed countries are at the similar stage. Therefore the level of interest rates increase with economic recovery and decrease during recessions. Research have shown, that there are strong correlation of interest rates in most developed economies***.

The last important factor, which has enormous influence the level of interest rates are the expectations of investors. Demand and supply forces determine size and direction of interest rates changes.

Presently there are many types of interests rates. Figure 3 presents different types of them (Cichy, 2010, p. 145).

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* There are central banks, which in addition to the inflation target, have other immediate objectives. The typical example might be the Fed, in contrast to such a banks like European Central Bank or Polish Central Bank, where monetary policy is focused on both reducing inflation and maintaining long term economic growth. Such differences will certainly affect the situation in nonfinancial companies; the level of debt capital involvement in U.S. companies is higher than in European, mainly because of lower interest rates in last ten years

** Countries like USA, Japan, PIIGS (Portugal, Ireland, Italy, Greece, Spain) are so indebted, that most of them are facing insolvency, negative perspective of rating, necessity of implementing restructuring programs, etc.

*** Kalinowski M. (2001, p. 24). The recent financial crisis has confirmed coordinated action of Central Banks of most developed countries. During critical moment, which was the collapse of Lehman Brothers, Central Banks like the Fed, BoE, ECB, Switch Central Bank, BoC and Riksbank simultaneously decreased the interest rates and took other intervention steps. More: Przybylska-Kapuścińska (2004, p. 57) ; http://wiadomosci.gazeta.pl/Wiadomosci/1,80353,5785247.html.

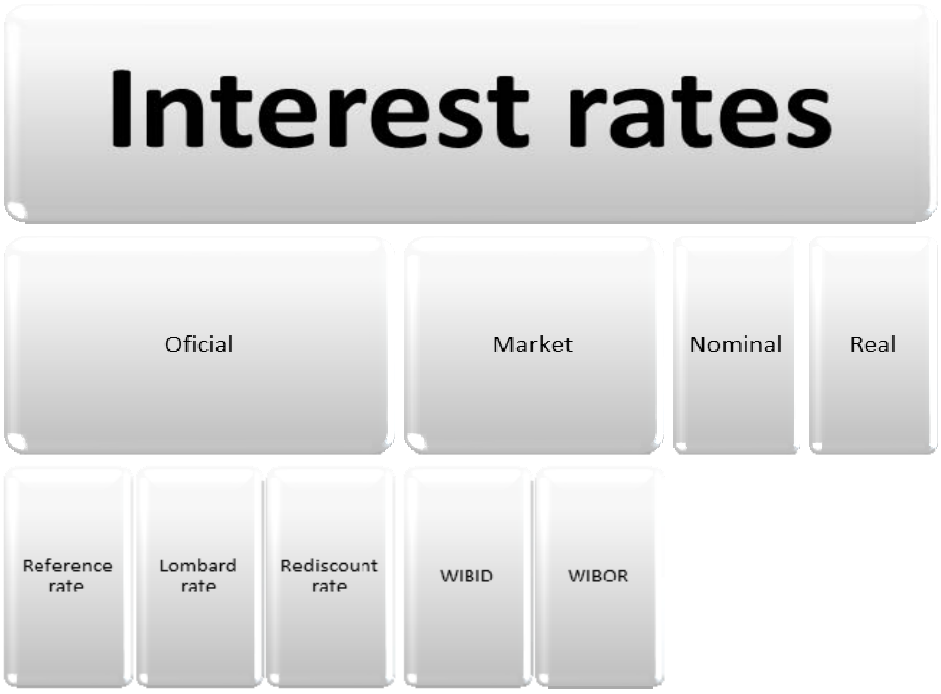

Fig. 3. The types of interest rates

Source: Own elaboration on the basis of Cichy (2010, p. 145).

Three main official interest rates set by Monetary Policy Council of National Bank of Poland are the most important for whole economy. They determine the minimum yield of open market operations (reference rate), the price of short term loan to banks against fixed collateral (lombard rate) and the compensation that central bank charge from commercial banks for short term loan (rediscount rate) (www.nbp.pl).

In addition, market sets other interest rates, for instance banks determine the price at which they lend (WIBOR – Warsaw Interbank Offered Rate) or borrow (WIBID – Warsaw Interbank Bid Rate) money to themselves. Time horizon of these rates ranges from 1 day to 12 months.

The last issues, which must be taken into consideration are inflation and its affect on the level of interest rates. Because the prices permanently change, distinction must be made to real and nominal interest rates (Lumby, Jones, 2011, p. 124-125). Especially important is to match different financial categories to proper interest rates; for example to discount real (nominal) cash flows, valuing real or financial investments, real (nominal) interest rates must be applied. Otherwise there is serious overestimation (underestimation) risk (Damodaran, 2007, p. 513).

Short description of interest rate aspects allow better understand its meaning and impact on nonfinancial companies.

3. The risk of interest rates in nonfinancial companies

3.1. The investment area

Investment activity is one of the most essential field in every company. Decisions undertaken within investment area affect future economic situation of company; what is more, such an activity has enormous impact on the other two: operational and financial. There are many reasons, why companies make capital expenditures in expectation of getting future, uncertain cash flows:

– company's capacity expansion,
– replacement used assets,
– gain competitive advantage (as a result of purchasing innovative or intangible assets),
– reduction of production costs,
– ensuring regular income in the form of dividend payments,
– the desire to earn on the purchased assets' value appreciation.

All above-mentioned aspects are consistent with the two main types of investments carried out by companies – physical and financial. The first one, from the perspective of nonfinancial company, determine the future operational activity. Business process complexity results, that every real investment must be preceded by effectiveness account (Krzemińska, 2000, p. 181). Generally there are two kinds of gauges: discounted and without taking into account the impact of interest rates. Generally, discounted methods are preferred, because they take into to account change in time value of money.

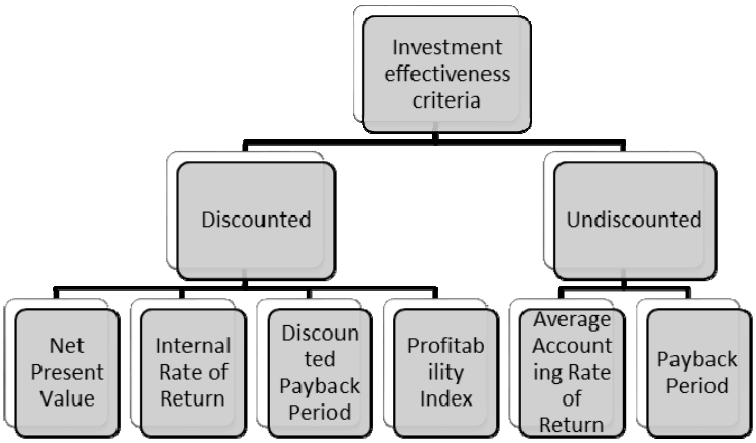

Fig. 4. The investment effectiveness criteria

Source: Own elaboration on the basis of: Smart, Megginson, Gitman (2004,, p. 227-252).

There are few key factors, which are sensitive to the changes of interest rates in all above methods. First of all, company make necessary outlay; while capital expenditures are not limited only to fixed assets but also to net working capital (Rogowski, Michalczewski, 2005, p. 59). Both current assets and liabilities are major components of company's balance sheet, therefore their size changes, indirectly depended on the level of interest rates, must be taken into account.

Current assets consist of three main components: stocks, current receivables and short term investments (including cash). Consideration of current assets investment in context of physical investment is significant enough, because maintain at some level decrease operational cash flows. Inventories are mainly necessary in production process, thus some stocks must be kept. However holding raw materials, work in process or finished goods is related with some costs. In theory there are highlighted carrying out and ordering costs (Brealey, Myers, Allen, 2008, p. 822). But in practice, what is often ignored, the considerable affect on stocks has the level of interest rates. Investment in inventories is related with the opportunity cost. This cost is crucial for economy and finance because reflects lost investment opportunities of being terminated. Generally all assets and liabilities maintained by companies are burdened opportunity costs[*]. The main issue is to undertake decision (considering opportunity costs and other) which maximize owner's welfare. In the context of stocks, there is inversely proportional relationship between the level of interest rates and the size of held stocks. This phenomenon is particularly noticeable, when company is financed by banks or other financial institution. Then high cost of money has a bearing on the size of stocks held. Also holding – stocks companies, that are not powered by debt capital, are depended on interest rates fluctuation[**]. Hence, in the face of volatile interest rates, increasing number of companies are focused on maintaining only necessary size of stocks. Certainly the cost of lost opportunity (closely related with interest rates) has inspired managers and other policymakers to implement *just in time* management (Brigham, Gapenski, 2000, p. 235). Through the use of cost – save policy, companies reduce risk, including interest rate, and allows gain competitive edge.

The next short – term item related with interest rates are current receivables. Besides the opportunity cost, which has the same impact as the stocks, the coun-

[*] Managers often does not take into consideration this issue. But every decision is alternative – cost related, e.g. holding some inventories excludes lending it's contractors (investment decision); the hypothetical allocation of generated earnings on dividend payment can be replaced by repayment of outstanding liabilities (financial decision), etc.

[**] It is widely recognized, that the cost of common equity is determined by, inter alia, interest rates; regardless of what approach to calculations assumed. More: Courtois, Lai, Peterson (2010, p. 74

terparties credit policy is also the subject to the movements of the interest rates*. Companies, which lend money, must take into account many parameters, including cost of trade credit. Because company operates within the framework of the free market and competition, its decision will be influenced by other entities (contractors, suppliers, financial institutions etc.). Therefore terms of the loan used by our suppliers and customers will have huge impact on company's credit policy (Dziawgo, Zawadzki, 1995, p. 28).

There are two possibilities of interest rate changes (and thus company must calculate of each interest rate risk):

- In case of the downward trend of interest rates (e.g. the central bank loosens monetary policy and reduces interest rates) the company may lose some of its existing contractors with unchanged trade credit policy**. On the other hand lower interest rates provide an opportunity to obtain lower interest – bearing source of funding also for given company,
- Inverse to the above situation poses risk of higher interest – bearing raising capital when company finance its contractors from debt. Hence, higher level of interest rates may cause that company tighten its lending policy, and lose some customers.

Above considerations lead to conclusion, that the volatility of interest rates requires immediate response from company; otherwise it could have negatively impact on company's market position (including the potential loss of revenue). Furthermore, very important issue in the context of the impact of interest rates on receivables are overdue receivables. There are commonly known, that companies often use aggressive lending policy to stimulate sales and gain competitive advantage. Such situation can arise particularly when the cost of raising additional funds is relatively small. Then companies treat trade credit as an investment made at low cost (interest rates on the low level) with low risk (assuming that contractors pay off their liabilities). Troubles appears when companies are unable to get their receivables at maturity or at all (Zawadzka, 2010, p. 148). Sometimes company, which lend money its contractors, may have enormous troubles because of the magnitude of such activities. Substantial portfolio made up of unpaid receivables poses danger for company's financial liquidity (measured by adjusted current ratio or quick ratio). The issue becomes important in case of interest rates' volatility. Then indebted companies, which took trade credit (when the cost of money was low) cannot pay off their obligations (when cost of money has risen)***. Worsening business cycle with weakening demand on go-

* Empirical studies have shown that, the larger funds involved in current receivables, the higher opportunity cost and lower rate of return on invested capital. More: Sierpińska (1995, p. 28).

** Such a situation may occur, when company's contractors find cheaper source of financing (bank or vendor) and lending strategy ceases to be competitive.

*** This can happens during short period, when the central bank can tighten monetary policy because of inflation risk.

ods and services, caused by interest rates changes, can also lead to payment backlogs (Bień, 2008, p. 232). Therefore lending money in the face of volatility of interest rates requires the prior economic calculation.

The last component of current assets is cash and short – term investments. Managing these type of current assets, in opposite to the variables directly affect the level of held cash:

- the development of financial markets,
- the volatility of company's cash flows (incomes and disbursements),
- actual cost of money and the interest rates expectations,
- the opportunity of speculative purchases.

There no doubts, that every company must maintain the appropriate level of money[*]. Optimal level is extrapolated by two variables: the liquidity and cost (Melvin, 2004, p. 215). Company should maintain a certain level of liquidity mainly due to transaction, precautionary and speculative motive. The first one ensures the necessary level of money to make ordinary transactions and payments resulting from the business; precautionary motive is related to the uncertainty of the future cash flows and the associated risks; the last refers to the possible opportunities for favorable price changes in the future (Golawska-Witkowska, Rzeczycka, Zalewski, 2006, p. 143). Simultaneously all these motives are strictly dependent on the cost and the level of interest rates. This means that the greater level of money company would like to maintain to make payments, to ensure against lack of liquidity or have opportunity to benefit from attractive purchases, the greater cost must bear. The cost will be higher if the level of the interest rates will be greater and vice versa (due to the higher opportunity cost and other costs related with the obtaining capital). Therefore, as in the case of stocks, greater level of money held by company increases liquidity and incurred costs. Hence changes of interest rates can lead to the changes of current and efficiency ratios. In the periods of low level of interest rates companies maintain substantial cash resources because the opportunity cost are respectively low; when interest rates are higher companies strive to purchase short – term securities (Sierpińska, Wędzki, 1997, p. 221).

The above-mentioned short-term securities, reported in the balance sheet, are common way of cash management. Companies often instead of holding money, engage in risky assets. The most popular securities are bills (mainly short – term Treasury bills), bonds and stocks (both long term securities). It is worth underlining, that all these assets are influenced by different types of risks, including the most important of them which is the interest rate risk (Ross, Westerfield, Jordan, 1999, p. 658). Valuation of these financial instruments refers to discounting by appropriate interest rate future cash flows. This approach result

[*] There are many patterns, which allow to calculate the optimal level of held money (e.g. the Baumol model, Miller – Orr model). More in: Leahigh (1999, p. 111).

that, the price of these assets is mainly dependent on the level of interest rate. Hence ceteris paribus, higher level of interest rates negatively affects the prices of debt securities, and inversely (Sierpińska, Jachna, 2007, p. 324). Therefore company's investment policy will brings outstanding gains, when managers purchase debt securities when interest rates at the higher level and sell when low. Below charts confirm the effectiveness of such investment decisions.

The first charts shows the relationship between federal fund rate and the US 2 – year note price on the most developed capital market, the US debt market*.

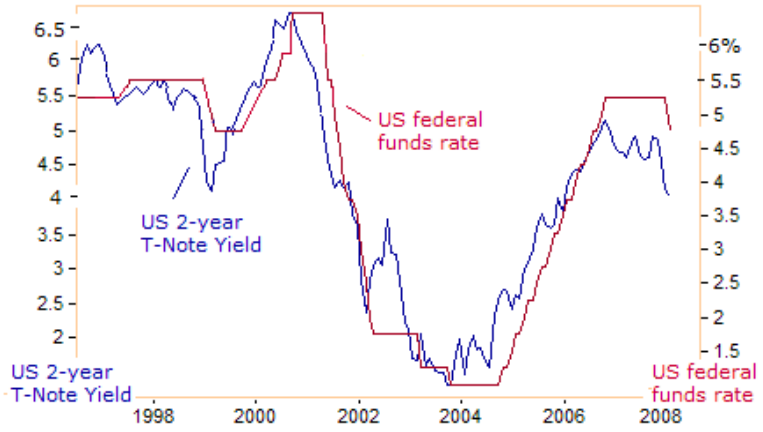

Fig. 5. The relationship between US federal funds rate and US 2 – year Note Yield

Source: Internet data.

There are strong correlation between these two curves. When the federal fund rate is on the low level, the 2 – year note yield is also on its minimum, what has an affection on the price of Treasury note (which is inversely correlated with price). The chart confirms, that this interest – rate's contrarian strategy enables to succeed. In terms of stocks the investment strategy is inverse. This mean that company can effectively manage its money by purchasing stocks when interest rates are on the low level and sell when high. Below chart shows changes of interest rates and stock's prices in last decade in US stock market.

* Charts comes from the Internet data.

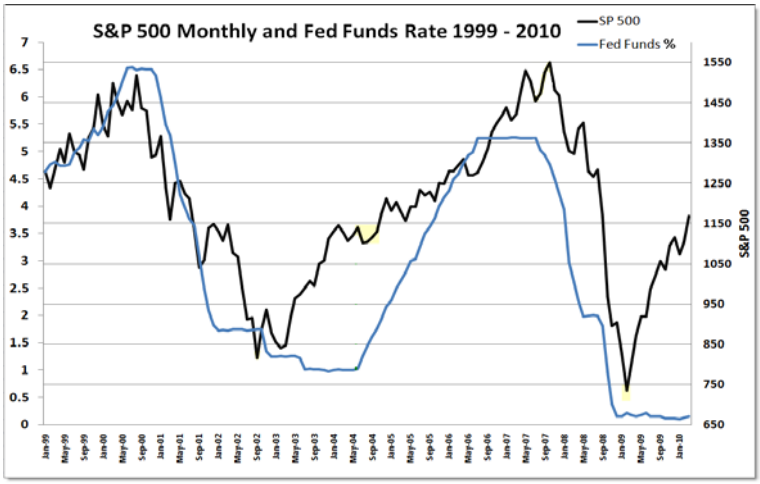

Fig. 6. The relationship between S & P 500 and federal funds rate

Source: Internet data.

All above consideration come down to current assets in the context of the level of interest rates. Regarding fixed assets, the interest rate dependence is slightly different than in the case of current assets. There is no basis to claim, as in the case of stocks or receivables, that greater fixed asset's expenditure are associated with the level of interest rates (and the opportunity cost). Company cannot minimize its fixed assets to a given level, because it is associated with reduction in size of business. Therefore this influence of the interest rate (in the context of opportunity cost) on the size of fixed assets is not relevant.

On the other hand, the issue of interest rate risk is significant, when the purchase of additional component of fixed assets is related with increasing debt. There is frequent situation, especially in the absence of equity. Then company incurring the debt, simultaneously increasing interest rate risk. The above considerations essentially exhaust the issues of interest rate risk in the company's investment area.

3.2. The financial area

The next area, in which the company is taking significant decisions influencing business, are finance. Capital is necessary to finance investments. There are several stages of activity each company, during which in many ways this activity is funded. The scarcity of resources causes, that at some stage there is a necessity to engage debt capital. This solution has consequences mainly in the form of interest rate risk. Due to various types of debt capital, the interest rate risk could have different impact. Generally there are two types of debt instruments:

– these, with fixed interest rate (e.g. bonds, loans) – interest rate risk is reduced to a decrease of interest rates; in this case company would pay higher costs than those resulting from market conditions (e.g. resulting from interest rate reduction by the Central Bank),
– the other ones, which interest is dependent on the level of interest rates; then increasing interest rate may lead to higher financial costs – risk of increasing interest rates.

The progressive globalization and the availability of foreign financial markets causes, that many companies take loans in foreign currencies. Companies often decide to this solution, because interest rates in other countries are on the lower level than domestic rates. But this approach carries dual risk. Besides loans in foreign currencies are associated with currency risk, companies are dependent on the changes of foreign interest rates. Therefore such decision should be preceded by future interest rate expectations and profit and loss account. Frequently the risk outweigh potential benefits (in the face of increasing volatility in the markets). The interest rate risk is surely higher in the case of companies not engaged in foreign trade (Najlepszy, 2007, p. 194). This can lead to situation, that company which does not achieve revenue in foreign currency, have to incur interest cost in currencies other than domestic. In the case of increasing level of foreign interest rates and depreciation of local currency, company may be exposed to default risk (Ryan, 2004, p. 468).

The debt issue (related with interest rate risk) should be also considered in terms of financial liquidity risk. Companies use debt to decrease the weighted average cost of capital (Fierla, 2008, p. 100). Thereby company exposing to the interest rate risk can accomplish higher rate of return on invested capital, increasing (also increasing financial leverage (Bulski, 2011). This rate of return can be even more enhanced when company use short-term debt capital to finance its investment. Then lower level of interest rate (compared to long-term debt) can cause negative net working capital (Krzemińska, 2005, p. 33), and thus decreasing level of current ratio below one. Hence the desire to achieve higher incomes, without regard the interest rate risk, can lead to loss of financial liquidity and bankruptcy.

The above characteristics highlights the importance of the problem. Uncontrolled growth of debt, increasing exposure of interest rate risk, might be the beginning of the end of company.

3.3. Dividend payment area

Some companies decides to payout the part of their earnings to shareholders. It is complex decision, which implies a range of consequences.

Firstly, the company which do such a step, diminish itself the part or all profits. Simultaneously some investment projects, which could be financed from earnings, will not be realized or financed by other type of capital. Thereby companies can choose debt capital and also expose themselves to the interest risk rate.

Moreover companies, which considering dividend payment must take into account the future levels of interest rates. It means, that increasing interest rates expectations may cause to retain earnings in company*. Then, company can make some savings and in the future generate higher profits. Companies which retain more earnings have chance to achieve higher rate of growth (Zadora, 2010, p. 80).

The next issue in the context of dividend payment is company life cycle. Basing on the analysis carried out by A. Damodaran (2007, p. 1022), companies decides to make dividend payment when they are at the maturity phase (noting stable rate of growth). On the other hand, companies being in this phase, are increasingly fueled by debt capital. Additionally investors are cautious when company lower the amount of dividend. Hence, companies which are indebted and make dividend payment, may face troubles in case of interest rates volatility.

Conclusions

Every company's decisions, taken in volatile conditions, is associated with risk. Companies which does not manage can expose to losses or even be eliminated. Among many types of risk, the interest rate risk deserves special attention. Although commonly associated with indebted companies, the issue also applies to companies which does not use debt capital. This risk is particularly apparent in ordinary company's decisions (concerning the investment and dividend awards). All these aspects and their impact on company's situation (in the context of interest rate risk) have been presented in this paper.

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* The above considerations take into account situation, in which company's return on investment is higher than the return, which owners could obtain on other investment (thereby company should payout all earnings)

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RYZYKO STOPY PROCENTOWEJ W PRZEDSIĘBIORSTWIE NIEFINANSOWYM

Streszczenie

Każde przedsiębiorstwo funkcjonujące w gospodarce wolnorynkowej jest narażone na czynnik ryzyka. Postępujące procesy globalizacji, rozwoju technologii informacyjnych oraz deregulacji rynków finansowych wymuszają na przedsiębiorstwie konieczność efektywnego zarządzania ryzykiem, zwłaszcza ryzykiem stopy procentowej. W powyższym artykule przedstawiono główne obszary przedsiębiorstwa, w których to ryzyko jest szczególnie widoczne. Dogłębna analiza problemu pozwala twierdzić, iż przedsiębiorstwo powinno w sposób ciągły i wielokryterialny monitorować i reagować na zmieniający się poziom ryzyka stopy procentowej.

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BANKRUPTCY RISK PERCEPTION IN SILESIAN COMPANIES IN THE AFTERMATH OF THE GLOBAL FINANCIAL CRISIS: SURVEY EVIDENCE*

Introduction

The global financial crisis exerted a strong impact on both the financial and the real sphere of the economy. In companies, the global financial crisis caused serious turbulences connected with the rapid changes of the business environment. This risen the risk of worsening financial situation of the companies and boosted the threat of bankruptcy.

In general, the worsening of financial performance tightens the decision-making processes in a company and thus may result in further difficulties. The most commonly known mechanisms indicate the role of capital structure decisions. The application of debt capital raises potential problems with the repayment of debt. Thus, the bankruptcy risk can be regarded as the consequences of the improper capital structure characterised by too high level of the financial leverage (so called over-leverage) (Shapiro, Balbirer, 2000, p. 464-465; Emery, Finnerty, Stowe, 2004, p.681; Megginson, Smart, 2006, p. 499-505; Fabozzi, Peterson, 2003, p. 591-594; Higgins, 2007, p. 204).

Accordingly, the problems within the operating performance of a company may increase the risk of bankruptcy. The unpredictable fluctuations of operating revenues and operating costs may lead to the decline of operating return rates, and also strengthen the over-leverage effect (Ehrhardt, Brigham, 2009, p. 606; Baker, Powell, 2005, p. 298; Lumby, Jones, 2011, p. 429). Finally, the problems

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of financial liquidity may arise, both as the result of the excessive debt burden and the improper current assets management (including inventory and accounts receivable management (Brigham, Houston; 2009, p. 490-491; Baker, Powell, 2005, p. 159-160; Alexander, Britton, Jorissen, 2011, p. 821; Damodaran, 2001, p. 397-398).

The threat of bankruptcy exerts further turbulences in a company's financial performance. This mechanism is often explained by means of the model of direct and indirect bankruptcy costs. The direct costs of bankruptcy are pretty visible for a company as they include the legal and administrative costs of bankruptcy announcement and are faced at the liquidation of a company. Far more dangerous are the indirect costs of bankruptcy that cover a vide range of costs (often immeasurable) associated with impaired ability to conduct the operating activity (Copeland, Weston, Shastri, 2005, p. 593-594; Myers, 1984, p. 147-148; Palepu, Headly, Bernard, 2004, p. 12-4-12-5).

The problem of the worsening of financial performance and increase of bankruptcy threat may be perceived and identified by means of the financial analysis. Also, valid conclusions spring from the researches based on the declarations of the companies. Such a two-tier approach to the problem under-pined the research project devoted to the analysis of the financial performance of companies operating in Silesian region with regard to selected issues (including liquidity, indebtedness, profitability and efficiency) as well as the general financial condition.

This paper aims at presenting the partial results of these researches narrowed to the perception of the worsening of the general financial situation and the perception of bankruptcy risk in Silesian companies. The analysis of general financial performance is provided here with the purpose of revealing the general trends observed in 2006 and 2007 as the pre-crisis indicators, then in 2008 as the in-crisis indicators and in 2009 as the post-crisis indicators. The financial performance assessment of the Silesian companies was framed in the general financial situation analysis and multidiscriminant analysis aiming at bankruptcy risk prediction. Also, the results of the questionnaire on 350 Silesian companies were applied to support the judgments on the perception of the financial performance and the bankruptcy risk. In particular, the collected data and applied research methodology aimed at supporting the following hypotheses:

1. With regard to the aggregated statistical data, in the Silesian companies the financial performance got worse and bankruptcy risk increased significantly during and after the period of the global financial crisis presence,
2. In the examined sample of Silesian companies, the perception of the worsening of the general financial condition and the threat of bankruptcy risk was higher in small companies as compared to the medium sized together with the larger ones,
3. The predominant group of the examined companies that declare the worsening of their financial performance, still perceives the results of the global financial crisis,
4. In the examined companies, the worsening of the financial situation is connected with the ability to manage corporate finance properly.

The paper is structured as follows. Section 1 presents the methodology of the study and introduces the variables tested. Section 2 presents the results of the researches with regard to both financial analysis and the questionnaire, whereas section 3 discusses the findings with regard to the hypotheses tested.

1. Methodology

The problem of the bankruptcy risk perception in Silesian companies was a subject of the researches conducted in the two separate layers (see Figure 1). In the first layer, the general statistical data were revised with regard to the problem of the improvement or worsening of the financial situation of Silesian companies, including the application of the bankruptcy prediction models. Here, the comparative and trend analysis was the basic method, and the main tool used were the aggregated financial data gathered by the Polish Central Statistical Office in the period of 2006-2009. The research period was chosen to conduct the comparative analysis of the financial situation of the companies in the period before crisis (2006-2007), during the crisis outbreak (2008) and after it (2009). The Polish Central Statistical Reports in 2009 included over 6 800 Silesian companies and over 53 000 Polish companies[*]. The data are structured with regard to numerous criteria, including the voivodship belonging.

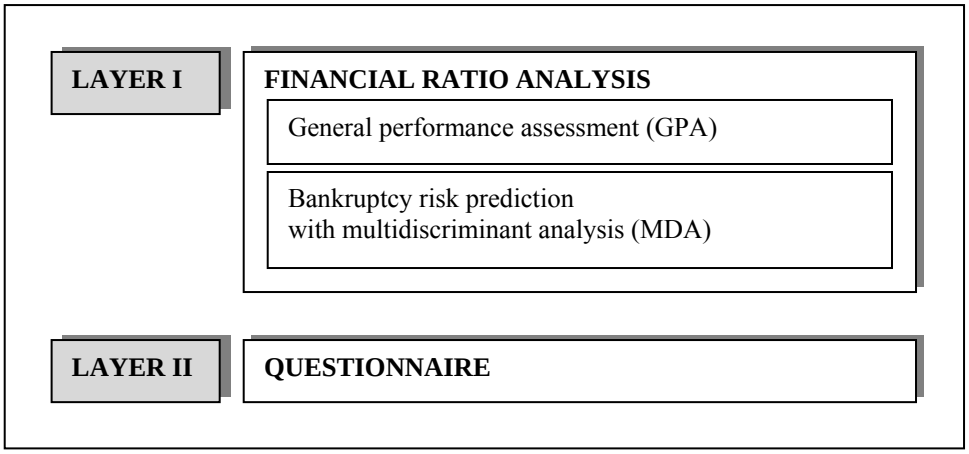

Fig. 1. Two layers of the research

Source: Own study.

[*] In the previous years the study covered as follows: in 2006 – 6042 Silesian and 47048 Polish companies; in 2007 – 6341 Silesian and 48165 Polish companies; in 2008 – 6740 Silesian and 53847 Polish companies. The companies revised by the Polish Central Statistical Office include business entities that keep account ledgers and where the number of employees exceeds 9. Also, the data cover all types of activity with the exception of banks, insurance institutions and private farms in agriculture. *Financial Results* (2007, 2008, 2009, 2010).

In the researches, the situation of companies operating in Silesian Region (hereafter denoted as Sample S) was compared with the situation of all companies operating in Poland (hereafter denoted as Sample P). In particular, the study covered the analysis of two set of financial ratios.

The first set of financial ratios describes the general financial performance of companies and forms a valid part of so called common-size analysis (Fabozzi, Peterson, 2003, p. 747-748; Higgins, 2007, p. 64-65). These ratios are based on the analysis of capital structure, assets structure and the adequacy of the capital structure with regard to assets structure. The last of these ratios – the synthetic ratio – is perceived as an early-warning indicator of the general financial performance of a company. The ratios applied in this layer of the researches, together with their core interpretation, are provided in Table 1.

Table 1

Ratios implemented in the general performance assessment

Ratio	Formula	Interpretation
F(1) capital structure ratio	equity to debt	F(1) > 1 means that the company uses more equity than debt and indicates relatively safe capital structure the decrease of F(1) indicates the increase of financial risk (due to higher level of debt implemented)
F(2) assets structure ratio	fixed assets to current assets	F(2) > 1 means that a company allocated more capital in fixed assets as than in current assets high level/increase of F(2) indicates: high level/increase of operating risk and low level/decrease of flexibility
F(3) long-term solvency ratio based on equity coverage	equity to fixed assets	F(3) ≥ 1 means that the company is relatively safe in the long run as it is able to maintain the long-term solvency the minimum acceptable level of F(2) is often defined as 0,5
F(4) long-term solvency ratio based on debt coverage	debt to current assets	F(4) < 1 is regarded as safe F(4) is complementary to F(3) and expresses the extent to which debt is involved in financing current assets
F(5) synthetic ratio of financial stability	either F(1) to F(2) or F(3) to F(4)	F(5) > 1 indicates the financial balance of a company and financial safety positive dynamics of F(5) indicates the improvement in the financial performance of a company

Source: Based on: Nowak (2008, p. 92-101); Jaworski (2010, p. 135); Błach (2009, p. 85-99); Sierpińska, Jachna (2007, p. 69-82); Micherda (2004, p. 214); Znaniecka, Gorczyńska, Wieczorek-Kosmala (2008, p. 49-56); Waśniewski, Bednarski (1996, p. 306-312); Błach (2010, p. 12-15).

The second set of financial ratios is based on the ratios applied in one of the bankruptcy prediction models. In the bankruptcy prediction numerous methods

might be applied. However, one of the most popular approaches is based on the application of so called multidiscriminant models. Such models use statistical techniques to identify discriminant coefficients for a set of financial ratios (see for example: Altman, 1968, p. 591-592; Wang, Campbell, 2010, p. 77-82). There are plenty of bankruptcy predictions models based on the multidiscriminant analysis (see: Kowalak, 2008, p. 201-265) with the pioneering Altman's Z-score model developed in 1968 for US companies. Since then, the Altman's methodology was a subject of further studies that aimed at redefining the discriminant coefficients and financial ratios and thus adjusting the model to the specifics of a particular economy (Wieczorek-Kosmala, Błach, Gorczyńska, 2010, p. 437-446).

With regard to the Polish adjustments, the research implemented the Hołda's ZH-score model. The Hołda's ZH-score model was developed in 1996 and was based on the analysis of a sample of 80 companies, out of which 40 announced bankruptcy. Based on these studies, Hołda presented the following multidiscriminant function for bankruptcy prediction (see: Hołda, 2006, p. 119-156; Walczak, 2007, p. 435; Nowak, 2008, p. 263):

$$ZH = 0{,}605 + 0{,}681X_1 - 0{,}0196X_2 + 0{,}00969X_3 + 0{,}000672X_4 + 0{,}157X_5$$

where:

X_1 – the current ratio (computed as current assets divided by current liabilities)

X_2 – the capital structure ratio (computed as debt to assets ratio)

X_3 – the profitability ratio (computed as earnings after taxes divided by total assets)

X_4 – the current liabilities management ratio (computed as current liabilities divided by cost of goods sold)

X_5 – the productivity of assets ratio (computed as total revenues divided by total assets).

The ZH-score is interpreted as follows:

- ZH-score>0 – company is classified as "non-bankrupt", which indicates the low threat of bankruptcy risk,
- ZH-score<0 – company is classified as "bankrupt", which indicates high bankruptcy risk.

Also, Hołda defined so called indifferent (grey) area indicating that companies with the ZH-score ranging between (0,1) and (-0,3) may be classified wrongly with high probability and thus their risk of bankruptcy should be assessed carefully. According to Nowak (2008, p. 264), the Hołda's model predicts bankruptcy with 92,5% accuracy.

The prime purpose of the Hołda's model in this research was to observe the trend of the ZH-score and thus identify the growing or decreasing risk of bankruptcy of Silesian companies. The research does not aim at predicting the ban-

kruptcy of Silesian companies with accuracy, thus the disputable elements of Hołda's model do not interfere the findings.

In the second layer of the researches the authors' questionnaire was applied (see Figure 1). In June/July of 2011 a sample of 350 companies operating in the Silesian Region was asked about the their opinion concerning the perception of their current financial strength and bankruptcy threat. The research sample included Silesian companies of different branch belonging, ownership structure and size with regard to the number of employees, the volume of profits and the volume of assets. The structure of examined companies with regard to their size is presented in Table 2.

Table 2

Structure of the examined sample of the Silesian companies

Specification	Number of examined companies	The percentage of the examined population
Employment:		
– to 9 persons	265	75,71%
– more than 9 persons	85	24,29%
Volume of assets:		
– to 1 mln of PLN	283	80,86%
– more than 1 mln of PLN	67	19,14%
Volume of sales revenues in 2010:		
– to 1 mln of PLN	275	78,57%
– more than 1 mln of PLN	75	21,43%

Source: Own study based on the questionnaire results.

The sample of examined companies, with regard to various criteria, included between 75% to 80% of small companies and 20% of the larger ones. Thus, the structure of the analysed sample is similar to the structure of all Silesian companies, as over 98% of them are classified as small enterprises and only 2% as larger ones (compare: *Działalność przedsiębiorstw*…, 2011, p. 67).

The questionnaire was conducted with the application of the PAPI (paper and pencil interview) method. With regard to the perception of the worsening of financial situation and bankruptcy threat the companies were asked a few questions concerning:

- the current state of the bankruptcy procedures,
- the general perception of the improvement or the worsening of financial situation in the aftermath of financial crisis,
- the assessment of the threat of the bankruptcy announcement in the following two years,
- the connection between the bankruptcy threat and the impact of the global financial crisis,

- the presence of a separate financial management department in the company's organisation structure and the engagement of external professional financial services providers.

The results of both layers of the research are presented in the remainder of the paper.

2. Results

2.1. The results of the general performance and multidiscriminant analysis

In the first layer of the research, the set of general performance assessment ratios and the Hołda's ZH-score model were computed. The results for the analysed variables are presented in Table 3.

Table 3

Financial ratio analysis results for examined samples of companies

Ratio	Sample S				Sample P			
	2006	2007	2008	2009	2006	2007	2008	2009
F(1)	0,993	1,175	1,011	1,101	1,043	1,135	1,019	1,065
F(2)	1,347	1,442	1,466	1,498	1,462	1,504	1,457	1,501
F(3)	0,868	0,915	0,846	0,874	0,860	0,885	0,851	0,859
F(4)	1,178	1,123	1,227	1,189	1,205	1,173	1,217	1,211
F(5)	**0,737**	**0,815**	**0,689**	**0,735**	**0,714**	**0,754**	**0,699**	**0,710**
ZH-score	**1,731**	**1,712**	**1,659**	**1,682**	**1,743**	**1,755**	**1,712**	**1,756**

Source: Own study and calculations based on: *Financial Results*…, (2007, 2008, 2009).

In both of the examined samples of companies the capital structure was comparable. The values of F(1) ratio above 1 indicate that both Silesian and Polish companies used more equity than debt which should be judged as a relatively safe strategy with regard to the financial risk. However, with regard to the assets structure ratio F(2), in both of the examined samples of companies there was a relatively high level of operating risk. In 2006 and 2007 in the Silesian companies the ratio was slightly lower as compared to all Polish companies, but since 2008 the observations indicated comparable results. The overall upward tendency of F(2) indicates the decreasing level of companies' flexibility. Over the analysed period the F(3) ratio did not achieve the recommended value of 1 in both of examined samples of companies. However, the ratio of ca 0,8 is satisfactory and do not indicate the threat to the long-term solvency. These findings are confirmed by the level of F(4) indicating that the debt in total was just a little higher than the level of current assets.

The changes of the ratios F(1), F(2), F(3) and F(4) influenced the observed level of the synthetic ratio of financial stability F(5). The observations, presented in Figure 2, indicate that in both samples of companies the ratio fluctuated slightly over the analysed period and these fluctuations were more significant in case of Silesian companies (Sample S). In both samples of companies the ratio did not reach the recommended level of 1 and thus the financial balance was not maintained. The worst situation was observed in 2008 and improved slightly in the following year.

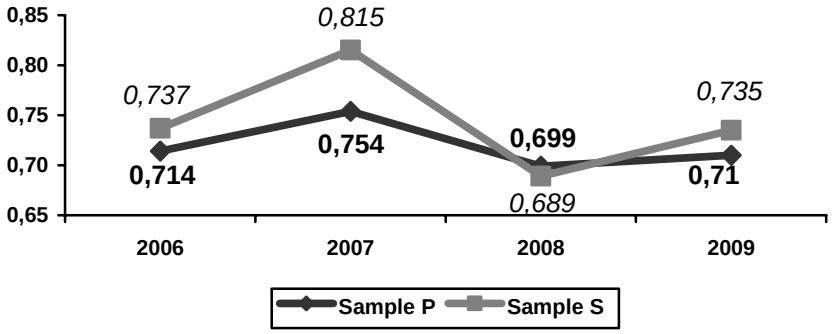

Fig. 2. Synthetic ratio of financial stability in examined samples of companies in 2006-2009

With regard to the bankruptcy prediction based on the application of the Hołda's ZH-score model it must be stated, that the level of ZH-score in both samples of companies indicates low bankruptcy risk. However, a slight downward trend was observed in the period of 2007 and 2008 (see Figure 3). In 2009 as compared to 2008 the situation improved slightly. It is also worth to notice that the Z-score is a little worse in case of the Silesian companies sample.

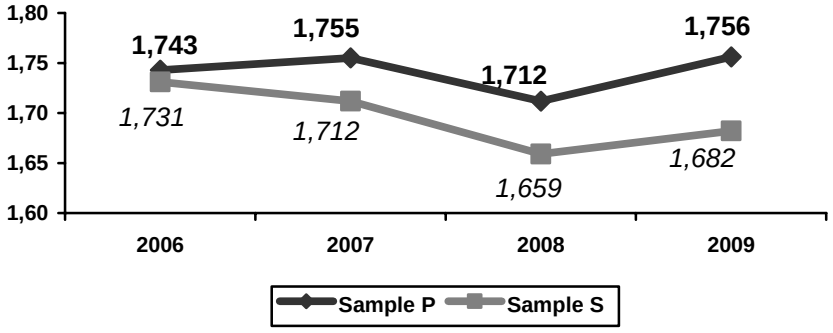

Fig. 3. ZH-score function in examined samples of companies in 2006-2009

In general, the ratio analysis revealed slight turbulences in the general financial performance in both of examined samples of companies. However, in 2009 the situation got better. The same observation is made with regard to the ZH-score result. After the decrease in 2008, the ZH-score increased in 2009 and was on a comparable level with 2006.

2.2. The results of the questionnaire

The sampled companies were asked about their perception of the worsening or improvement of the general financial situation in the time of the global financial crisis impact. Here 54,3% of the examined companies (190 out of 350) indicated that they perceived the worsening of the financial situation. It is worth to notice that almost 46% of the examined companies did not perceive the worsening of their financial situation, in this 35,7% declared that their situation remained stable (compare Figure 4).

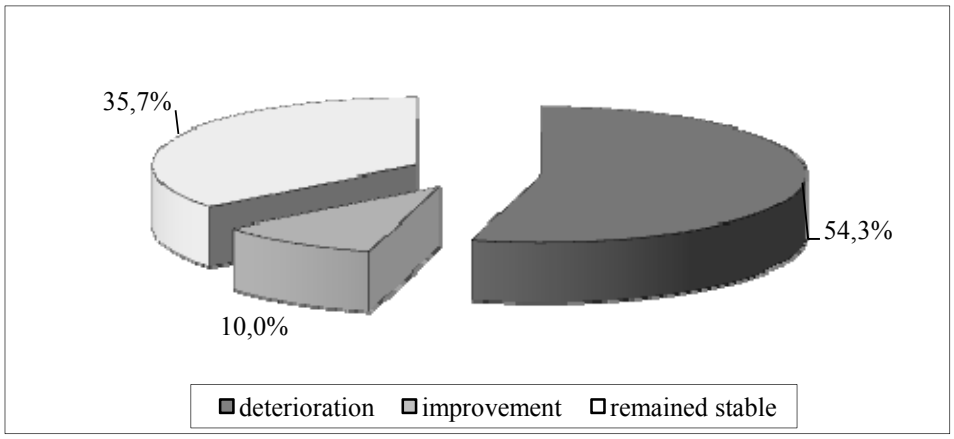

Fig. 4. Perception of the general financial situation in time of the global financial crisis

With regard to 190 companies that perceived the worsening of their financial performance, the connection with their size was examined. The perception of the deterioration of the general financial situation did not correlate relevantly with the size of companies within all of examined criteria, that is the number of employees, the volume of assets and the volume of revenues. The data are provided in Table 4.

Table 4

Connection between the deterioration of the financial situation and the company's size

Specification	Number of examined companies	Number of companies indicating the worsening of financial situation	Companies indicating the worsening of financial situation as a percentage of the total number of examined companies in each size category
Employment:			
– to 9 persons	265	145	54,72%
– more than 9 persons	85	45	52,94%
Volume of assets:			
– to 1 mln of PLN	283	162	57,24%
– more than 1 mln of PLN	67	28	41,79%
Volume of sales: revenues in 2010			
– to 1 mln of PLN	275	160	58,18%
– more than 1 mln of PLN	75	30	40,00%

Regardless the differences in the applied criteria, in each section in case of the smaller companies over 50% of them stated the deterioration of the financial situation. Similar perception of the changes in the financial situation was observed in larger companies regarding the number of employed. However, taking into account other criteria (volume of assets and sales), about 40% of larger companies stated the deterioration of the financial situation.

Also, the connection between the perception of the worsening of the financial performance and the perception of the global financial crisis results was examined (the results are provided in Table 5). The analysis of answers indicates that 170 out of 190 companies that observed the worsening of the financial situation (which gives almost 90%), declared that they still percept the results of the global financial crisis. In these 170 companies 108 declared, that the impact of the crisis got weaker, whereas 62 declared that the impact of the crisis was getting stronger (which gives 32% of all companies indicating the worsening of their financial performance). With regard to the general population of the examined companies 228 out of 350 (which gives 65%) declared the perception of the global financial crisis, and in this 72 indicated the increasing impact.

Table 5

Connection between the deterioration of the financial situation and the perception of the global financial crisis results

Specification			The results of the global financial crisis:				In total
			are still perceptible but get weaker	are still perceptible and get stronger	are not perceptible any more	were not perceptible at all	
The general financial condition:	get worse	number of companies	108	62	11	9	190
		as a percentage of the total indications	69,20%	86,10%	27,50%	11,00%	54,30%
	remained stable or improved	number of companies	48	10	29	73	160
		as a percentage of the total indications	30,77%	13,89%	72,50%	89,02%	45,71%
In total		number of companies	156	72	40	82	350
		as a percentage of the total indications	100,00%	100,00%	100,00%	100,00%	100,00%

Further, the connection between the declaration of the worsening of the financial situation and the threat of the bankruptcy was examined. Out of the 190 companies that perceived their financial situation as deteriorating, 11 companies indicated that in the forthcoming 2 years they may be forced to announce bankruptcy. It means that the vast majority of questioned companies do not feel the threat of going bankrupt soon and believe that the weaker financial situation is going to get better in the future.

Next question that was asked is connected with the changes of the financial situation and activity of the separate financial management department in the company's organisation structure (compare Table 6).

Table 6

Connection between the deterioration of the financial situation and the activity of the separate financial management department

Specification			Separate department of the financial management			In total
			yes	no	no – outsourcing of financial management services	
The general financial condition:	get worse	number of companies	21	116	53	190
		as a percentage of the total indications	51,2%	56,9%	50,5%	54,3%
	remained stable or improved	number of companies	20	88	52	160
		as a percentage of the total indications	48,8%	43,1%	49,5%	45,7%
In total		number of companies	41	204	105	350
		as a percentage of the total indications	100,00%	100,00%	100,00%	100,00%

With regard to the activity of the financial management department, the examined companies were divided into three groups:

1) with active separate financial management department (41 companies representing 11,7% of all respondents),
2) without separate financial management department (204 companies representing 58,3% of all respondents constituting the biggest group of companies),
3) without separate financial management department but using services provided by the financial management advisors (105 companies representing 30% of all respondents).

In all these three groups of companies more than 50% of respondents declared the deterioration of the financial situation. However, the highest results were achieved in case of the second group of companies, that is the companies neither with the separate financial management department nor with the outsourcing of the financial management services. Here 116 out of 190 companies (which gives ca 60%) noticed the worsening of the financial performance. However, similar structure of answers is observed with regard to companies that declared the improvement or stabilisation of the financial performance, as 88 out of 160 companies (which gives 55%) do not have a separate department of financial management.

The results of the question concerning the frequency of using services provided by the professional financial advisors are provided in Table 7.

Table 7

Connection between the deterioration of the financial situation and the engagement of professional financial advisors

Specification			Services provided by the professional financial advisers				In total
			yes, continuous cooperation	yes, often used	yes, rarely used	no, never used	
The general financial condition:	get worse	number of companies	22	15	43	110	190
		as a percentage of the total indications	46,8%	57,7%	46,2%	59,8%	54,3%
	remained stable or improved	number of companies	25	11	50	74	160
		as a percentage of the total indications	53,2%	42,3%	53,8%	40,2%	45,7%
In total		number of companies	47	26	93	184	350
		as a percentage of the total indications	100,00%	100,00%	100,00%	100,00%	100,00%

With regard to the differences in answers, the examined companies were divided into 4 groups:

1) companies continuously engaging professional financial advisors (47 companies representing 13,4% of all respondents),
2) companies often engaging professional financial advisors (26 companies representing 7,4% of all respondents),
3) companies rarely engaging professional financial advisors (93 companies representing 26,6% of all respondents),
4) companies that never engaged professional financial advisors (184 companies representing 53% of all respondents constituting the biggest group of companies).

In this last group almost 60% of companies indicated the worsening of the financial situation. Similar results (almost 58%) were achieved in case of the second group including companies that often engage financial services providers. Lower ratios were observed in the remained groups of companies, as about 46--47% of the first and third group companies indicated the worsening of the financial situation. Among the companies that declared the worsening of the fi-

nancial performance, 153 out of 190 (which gives ca 80%) do not engage the professional financial advisors or did it rarely. However, the comparable structure of answers was observed with regard to the companies that declared the stabilisation or improvement of their financial performance (as 124 out of 160 companies, which gives ca 75%, never engaged professional advisors or did it rarely).

3. Discussion

As mentioned in the introduction, the research aimed at testing four plausible hypotheses about the general performance and bankruptcy risk of Silesian companies. The study found partial support to the first hypothesis and the whole support to the third one, but no convincing evidence was found with regard to the second and the fourth one.

With regard to the first hypothesis about the worsening of financial performance of Silesian companies and significant increase of bankruptcy risk during and after the period of global financial crisis presence, only the partial evidence was found. The aggregated statistical data indicated that the financial performance of the Silesian companies got slightly worse and bankruptcy risk increased during the escalation of the global financial crisis in 2008. However, in 2009 the situation improved, the financial performance was better and the bankruptcy risk decreased.

With regard to the second hypothesis stating that in the examined sample of Silesian companies the perception of the general financial condition worsening and the threat of bankruptcy risk was higher in small companies as compared to the medium sized together with the larger ones, no convincing support was found as the results are ambiguous. With regard to the size of companies in terms of the assets and sales volume, the financial performance deterioration was indicated by ca 58% of small companies and ca 40% of the larger ones. Also, with regard to the number of employees, the percentage of companies indicating the deterioration of financial situation was comparable.

With regard to the third hypothesis stating that the predominant group of the examined companies that declared the worsening of their financial performance, still perceives the impact of the global financial crisis, the convincing evidence was found. Almost 90% of companies that declared the deterioration of the financial situation still perceive the results of the global financial crisis. Moreover, about 32% of them declares the increasing impact of the crisis.

With regard to the fourth hypothesis stating that in the examined companies the worsening of the financial situation is connected with the ability to manage corporate finance properly, no convincing evidence was found as the results are dubious. On the one hand, the predominant part of companies that declared the worsening of their financial performance, do not have the separate financial

department and did not engage the professional financial advisors or did it rarely (60% and 80% respectively). However, a comparable percentage of declarations is observed with regard to the improvement or stabilisation of financial performance (55% of such companies declared the separate financial management department and 75% of such companies never or rarely engaged the professional financial advisors). Thus, the results should be judged as ambiguous and do not indicate the connection between the proper management of finances and the worsening of financial performance.

Concluding remarks

Undoubtedly, the problem of the transmission of the global financial crisis to the real sphere of the economy is currently valid and any studies undertaken within this problem should be judged as important. The first layer of the presented research results provide the original set of data that might be further applied in other comparative studies, in particular on the cross-national basis. The results of the questionnaire (as the second layer of the research) provide the background for analysing the perception of the influence of the global financial crisis, here narrowed to the representative sample of Silesian companies and the problem of the worsening of financial performance and the threat of bankruptcy risk. The findings, however, not always provide clear and unambiguous results.

Assuming that the results of the global financial crisis are still perceptible and even get stronger both in the macro- and microeconomic scale, further researches within the transmission of the crisis to the performance of the real sphere of the economy are particularly relevant. The methodology under-pinning this study represents one of the possible methods of deepening such analysis.

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PERCEPCJA RYZYKA BANKRUCTWA W ŚLĄSKICH PRZEDSIĘBIORSTWACH W NASTĘPSTWIE ŚWIATOWEGO KRYZYSU FINANSOWEGO: WYNIKI BADAŃ

Streszczenie

Światowy kryzys finansowy wywarł silny wpływ zarówno na finansową, jak i na realną sferę gospodarki. Artykuł ma na celu prezentację cząstkowych wyników badań poświęconych problematyce wpływu kryzysu finansowego na sytuację finansową przedsiębiorstw działających na Śląsku. Wyniki badań odnoszą się do problemu stabilności finansowej i w tym zakresie zostały przeprowadzone w dwóch warstwach. Pierwsza to analiza zagregowanych danych finansowych dotyczących sytuacji finansowej i zagrożenia bankructwem śląskich przedsiębiorstw w latach 2006-2009. Druga warstwa badań to analiza wyników badania ankietowego dotyczącego percepcji zagrożenia bankructwem.

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THE RISK OF BUSINESS TRAININGS IN RELATION TO PRODUCTIVITY AND PROFITABILITY OF SMALL AND MEDIUM SIZED ENTERPRISES. AN EXPLORATORY ANALYSIS

Introduction

The business environment is characterised by increasing competitiveness, globalised trading markets and technological enhancements (Aragon-Sanchez et al., 2003; Lin and Jacobs, 2008). Organisational working practices have become increasingly sophisticated and as a consequence training provision and requirements have evolved. Birdthistle (2006) and Lin and Jacobs (2008) acknowledges the increasingly significant role undertaken by training and its association with enhanced business success and longevity. Kitching (2008) has noted that in contrast to larger organisations, the small and medium enterprise (SME) sector has been characterised as having, fewer dedicated training departments and budgets (Kitching and Blackburn, 2002), inferior levels of work based training provision (Hoque and Bacon, 2006) and lower numbers of qualified employees and limited participation in training schemes (Matlay, 2004).

Patton et al. (2000), Huang (2001) and Dewhurst et al. (2007) suggest, however, that there is a lack of quantifiable empirical evidence demonstrating a conclusive link between training impact and business performance. Indeed for SMEs with limited budgets there is a significant risk associated with investing in training if they are uncertain regarding its impact thereafter on business performance. Moreover, the existing evidence is inconclusive and somewhat contradictory (Heraty and Morley, 2003; Storey, 2004) especially in terms of the TA offered within SMEs. In a global recession, SMEs play a critical role in driving economic growth of due to their numerical significance and their contribution to

global economies (Birchall and Giambona, 2007). For example, in a UK context, SMEs account for 99.8% of enterprises, over 4.5 million enterprises and 52.4% of employment. Europe's population of SMEs accounts for 99.8% of all enterprises and 66.2% of employment (SBS, 2008). Indeed it is estimated that the SME sectors contribution to national economies accounted for 80% of all global economic growth (Jutla et al., 2002). Unfortunately, SMEs remain characterised by high failure rates (Dutta and Evrard, 1999), with a survival rate of 92% after one year and 66% after three years trading (SBS, 2005).

Walker et al. (2007) attribute small business failures and poor business performance with inferior management competencies, including a lack of preparedness and a failure to control operational running costs. Birchall and Giambona (2007) also suggest that SMEs are restricted in technological and management learning due to limited financial resources and size,. This is supported by Jayawarna et al. (2007) who noted the shortage of management skills and training provided within SMEs. Rigby (2004) suggests that adequate training will not occur within the SME sector without external intervention. In the SME sector, the skills and commitment of employees within the enterprise is significant to the success of the enterprise (Matlay, 1999a). Jayawarna et al. (2007) suggests more research needs to be undertaken to strengthen this link and inform SME Owner/Managers.

Motivated by the need to produce more empirical evidence, this study considers the relationship between the satisfaction SMEs have towards their training needs being met by a diverse range of training alternatives (TAs – for example training at a local college or distant learning), and the levels of impact the training being met has had on business performance (such as enterprise productivity and profitability business outcomes). One issue within this type of problem, and an antecedent to the general difficulty in studying the impact of training on SME productivity and profitability business outcomes, is that not all SMEs would have opted for training from all potential TAs. It follows, a survey data set including details on SME training satisfaction and productivity and profitability business outcomes could be sparse, since not every SME would have answered each of the individual TA based questions. The consequence being, traditional analysis techniques, such as regression and neural networks, would be unable to handle the inherent sparsity of the data (without some level of external management of the data). This study, in an analysis of a sparse data set, employs the nascent RCaRBS technique, since it is able to fully analyse a sparse data set, such as that described previously.

The RCaRBS (Regression-Classification and Ranking Believe Simplex) technique was introduced in Beynon et al. (2010), as a development on the CaRBS technique (Beynon, 2005a; 2005b), to undertake regression-type analyses. It is a technique whose analysis approach is based on 'uncertain reasoning'

(Roesmer, 2000), through its technical rudiments being based on the Dempster-Shafer theory of evidence (Dempster, 1967; Shafer, 1976). The underlying 'uncertain reasoning' is what allows RCaRBS to analyse sparse data, without the need to manage in anyway the incompleteness of the survey data studied.

Prior to the RCaRBS analysis, correlation analyses are undertaken to quantify the level of interdependence of training satisfaction from TAs and productivity and profitability business outcomes. The focus of RCaRBS, like regression in general, is to analyse the dependence of each of the productivity and profitability business outcomes (dependent variable) on the levels of satisfaction on training needs met by different training providers (exploratory/independent variables). Comparisons between the results from correlation and RCaRBS analyses offer strength to findings, and support for a new methodological approach in this area.

The structure of the rest of the chapter is as follows; in section one, a review of the literature related to SME TAs and outcomes is presented. In section two, the methodological issues involved (including the definitions of the variables and RCARBS method) are outlined. The results section then presents the RCaRBS analyses, one for productivity and one for profitability. In section four, the policy implications of the results are discussed.

1. The Experience of Training within the SME Sector

SMEs require resources, knowledge and skills to grow, enhance efficiency and operational effectiveness. Dollinger (1995) developed a typology that classified these resources as financial capital, human capital, social capital, technological resources, reputational capital and organisational resources. The human resource or employee represents a significant enterprise asset and a source of potential competitive advantage to any business (Rumelt, 1984; Wernerfelt, 1984, 1995; Barney 1986a, 1986b, 2001). The value of the human resource within the enterprise can be linked to Becker's (1993) research on human capital in its recognition of the individual skills, knowledge and competencies. Thus study focuses on the human resource within the enterprise and the impact of training to enhance organisational development.

Huang (2001) and Aragon-Sanchez et al. (2003) have identified the importance of training as a tool to assist enterprises grow and develop. Cassell (2002) suggests that training is offered to provide a tactical solution to business problems. Indeed, Patton and Marlow (2002) posit that training demand is linked to improving the enterprise efficiency, reducing costs and knowledge regarding protocols. Aragon-Sanchez et al. (2003) notes that the human resource within an enterprise possess specific characteristics namely knowledge, skills and attitudes (Barney and Wright, 1998), and enterprise knowledge (Lee and Yang, 2000; Alavi and Leidner, 2001) which can be exploited to provide competitive advan-

tage. Thus the training of the human resource is critical to have appropriately qualified, flexible, skilled and motivated employees (MacDuffie and Kochan, 1995).

Skinner et al. (2003) and Walker et al. (2007) state that the need for training provision is understood and accepted by the majority of SME Owner/Managers provided that they recognise its relevance. Aragon-Sanchez et al. (2003) identifies that enterprises typically adopt an ambiguous position regarding investing in training for their employees. Walker et al. (2007) suggest that SME Owner/Managers participate in training options for their employees provided they are accessible. The SME sector is characterised by under investment in training (Matlay, 1999b; Holden et al., 2003) due to the perception of risk associated with the financial investment in the training provision. Kitching and Blackburn's (2002) study supports this theory whereby they found that 52% of SMEs felt no need to offer training and 48% noted supply side reasons for not providing further training.

Employee training is accepted as a mechanism to improve enterprise business performance through enhanced profitability and productivity (Chandler and McEvoy, 2000; Litz and Stewart, 2000; Reid and Harris, 2002), organisational performance and capabilities (Chandler and McEvoy, 2000; Kotey and Folker, 2007), business survival and enable growth (Ibrahim and Ellis, 2003). Moreover, Kroon and Moolman (1992) have noted that training assists SME Owner/Managers in problem solving which would in turn reduce costs and increase profitability and knowledge of relevant legislature which would potentially improve operational efficiency. Chandler and McEvoy (2000) noted that enterprises that invested in training of their employees and engaged in regular performance appraisal were likely to benefit from lower employee turnover. However, Perren et al. (1999) has noted that the issue of improving SME training is complex and must be aligned to Owner/Managers immediate requirements providing relevant and practical business solutions.

Typically, SME training provision is subject to rigid cost control, reduction or even removal particularly during economic recession. Such a mindset suggests that SME Owner/Managers do not appreciate the value that training offers to business productivity and profitability (Aragon-Sanchez et al., 2003). Davidove and Schroeder (1992) posit that training evaluation is not undertaken in a professional or rigorous manner if at all. Where the experience and value of training is not effectively evaluated it is difficult to understand its impact (Carrier, 1999). This can potentially result in wasted or misallocated resources (Foot and Hook, 1996). Hallier and Butts (1999) confirmed that business performance can be constrained by neglect of training activity. Moreover, Storey and Westhead (1997) have suggested that SME Owner/Managers are making the decision not to invest in training opportunities The training construct has been defined by

Kitching and Blackburn (2002) and Jayawarna et al. (2007, p. 324) as: "Any attempt, within or outside the organisation, to increase job related knowledge and skills of either managers or employees".

The training requirements of the individual SME may be determined by the nature of that enterprises operation (Jayawarna et al., 2007). Hill and Stewart (2000), Anderson et al. (2001) and Jayawarna et al. (2007) notes that SMEs are more likely to prefer informal and reactive training provision for operational issues as opposed to formal strategically planned training initiatives. Patton and Marlow (2002 p. 261) define formal training as: "(…) initiatives which can be identified by both recipients and deliverers as an intervention which has a structured mode of delivery, where the aim is to impart new awareness or knowledge of a workplace process or activity".

Jayawarna et al. (2007) describe informal training as ad-hoc, fragmented and flexible. Hill and Stewart (2000) and Kotey and Folker (2007) describes informal training as unplanned, reactive with a short term focus. Jayawarna et al. (2007) found, that formal training was more significantly associated with enhanced business performance than informal training. Reid and Harris (2002) identified that enterprises operating in growing markets with increasing product/service demand would presumably be more likely to invest in TAs. The most effective formal training methods were recognised as use of outside providers for in-house courses and in-house designed and delivered courses. However, informal training was considered more relevant. Indeed the most effective informal TA was identified as attendance at seminars.

Kotey and Folker (2007) noted that SME training was typically undertaken in an informal on-the-job basis with minimal provision for employee development as confirmed by Marlow and Patton (1993) and Storey (1994). Hill and Stewart (2000) and Kotey and Folker (2007) claim that informal training is consistent with the strategic focus of the SME in that it is informal and flexible. Anderson et al. (2001) suggests SMEs have a preference for informal training provision through activities such as feedback, experience and social interactions between employees. Kitching and Blackburn (2002) identified three groupings of SME training behaviour. Firstly, 15% were classified as low or restrictive trainers which involved training as a last option if at all. Secondly, 55% were identified as tactical trainers whereby training was utilised as and when required. Finally, 30% were identified as strategic trainers with a positive and systematic approach to training deployment.

Kotey and Folker (2007) note SMEs are reluctant to engage in formal training which is exacerbated by limited evaluation and analysis of training requirements (McMahon and Murphy, 1999). This study considers both formal and informal training provision. Lynch (1992) distinguishes three training methods:

on the job training, training as an apprentice and off the job training. These classifications are transferable to the analysis provided by Aragon-Sanchez et al. (2003) who identified the following TAs, labelled T1, T2,.., T9, see Table 1.

Table 1

Provision Types of Training Methods

Training Methods	Training Provision
Learning at a local college (T1)	Formal
Through government programme (T2)	Formal
Learning provided by local college but within the workforce (T3)	Formal
Employee providing on the job training (T4)	Informal/Formal
Learning by doing (T5)	Informal
Private training provider in the workplace (T6)	Formal
Private training provider outside of the workplace (T7)	Formal
Distance Learning (T8)	Formal
E-Learning (T9)	Formal

Kotey and Folker (2007) identified on the job training was the predominant training method for SMEs. Westhead and Storey (1996), Hill and Stewart (2000), Kitching and Blackburn (2002) identified that in-house training could also be perceived as informal, flexible, relevant and convenient and also provided the benefit of being low cost. Aragon-Sanchez et al. (2003) noted a positive impact from in-house training with regard to productivity, quality, labour turnover and financial results. Dewhurst et al. (2007) noted such advantages as being particularly attractive to SMEs and their strategic imperatives. Westwood (2001) however, adds a note of caution claiming that in-house training is neither cost effective nor creative solution and lacks credibility with employees.

Aragon-Sanchez et al. (2003) noted a positive impact from training performed inside the enterprise with outside trainers had a positive impact in terms of productivity, quality, labour turnover and financial results. Chi et al. (2008) note that training requirements should be professionally undertaken and if the SME is not able to effectively internally resource should be externally sourced. Stewart and Beaver (2004) notes that government training schemes have actively promoted growth within SMEs and provided resources to support training provision. Smith et al. (2002) suggests that the SME sector remain unconvinced regarding the value of outside training provision and are deterred and constrained by the higher cost and associated risks of such provision (Lange *et al.,* 2000). Matlay's (2004) study of SMEs investigating supporting initiatives identified a high level of awareness amongst Owner/Managers but low usage rates. Kotey and Folker (2007) and Kotey and Slade (2005) found that the adoption of formal training provision increased with enterprise size.

In terms of the experience of distance training provision, a category including e-learning the SME experience was mixed (Matlay, 1999b). E-learning offers the SME significant advantages of anytime anyplace learning (Birchall and Giambona, 2007). Training through E-learning provision has held significant prominence in UK and European economies with numerous initiatives encouraging uptake (Blackburn and Athayade, 2000). Birchall and Giambona (2007) notes it suffers from the known disadvantages of self directed e-learning where a lack of priority and isolation can be significant inhibitors to effective learning. Blackburn and Athayde (2000) recognised the provision of training through government initiatives although Matlay (1999b) notes that the impact of such provision is mixed.

In cases of successful formal and informal training provision, the basis of the intervention was a tactical reaction to a crisis which thereafter impacted upon business performance. Kitching and Blackburn (2002) and Fielding (2008), suggest that SMEs were likely to be strategic trainers if they were larger, younger organisations that were innovative in their business practices and growth focused. Garavan et al. (1995) concurs with this perspective arguing that SMEs cannot achieve sustained competitive advantage without trained employees. Aragon-Sanchez et al. (2003) survey of SMEs considering the effects of training on business performance in terms of effectiveness and profitability and identified evidence of a significant relationship. Boothby et al. (2010) identified that enterprises that adopt new technologies and invest in training achieve productivity gains.

Literature supports the argument that training positively influences business performance through enhanced productivity, quality, labour turnover and financial results. However, there is also both inconclusive and contradictory evidence (Westhead and Storey, 1996; Wong et al., 1997; Devins and Johnson, 2002; Aragon-Sanchez et al., 2003), which Jayawarna et al. (2007) notes discourages policy makers and SME Owner/Managers from investing in training. Foreman-Peck et al. (2006) study found no association between skills/training with growth or profitability. Tharenou et al. (2007) research found that training was associated to human resource outcomes and business performance but only weakly related to financial performance. Garavan et al. (1995) and Stewart and McGoldrick (1996) indicate that SMEs are unable to achieve a potential sustained competitive advantage through a highly trained workforce from informal training approaches.

In conclusion, the extant literature is contradictory (Jayawarna et al., 2007) and disagreement remains in terms of which training type has the most significant impact (Aragon-Sanchez et al., 2003). Aragon-Sanchez et al. (2003) noted that both on the job and training provided by outside trainers had a positive impact. Conversely, specific training activities were not found to significantly impact the organisation although this depended on the nature of the training. They

concluded that on the job training had the most significant impact. Aragon-Sanchez et al. (2003), Jayawarna et al. (2007) and Walker et al. (2007) posit the need for further research to explore the impact of TAs on the SME sector. Figure 1 provides an insight into the variables that we are trying to connect, namely whether opinions on the satisfaction of the meeting of training needs from different TAs with their possible impact on business outcomes (increased profitability or increased profitability) of the training.

The key research questions that emerged from the literature analysis are therefore:

1. The perceived value of individual TAs towards business outcomes.
2. Is there a perceived positive relationship between the impact of specific training needs met towards increased productivity.
3. Is there a perceived positive relationship between the impact of specific training needs met towards increased profitability.

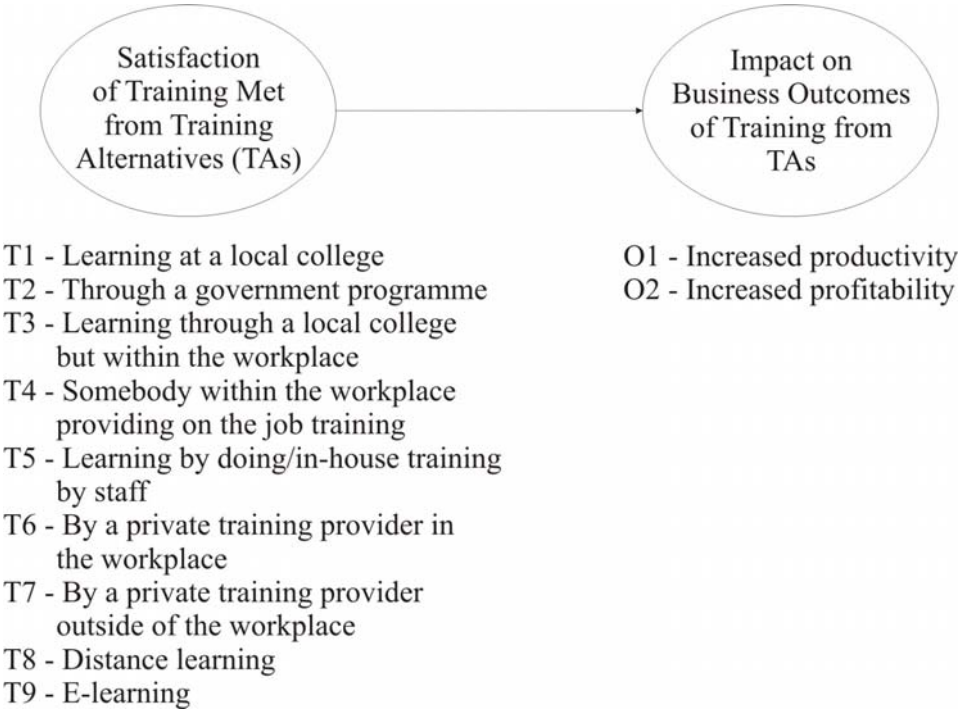

Fig. 1. A conceptualisation of the research analysis undertaken

2. Method

This section begins by defining the key concepts within this study, namely SME business performance and training. The chapter considers two measures of business performance namely productivity and profitability, and collectively

analyses them as business performance. Foreman-Peck et al. (2006) notes productivity (how much input is required to produce the businesses output) and profitability (relationship between cost and revenue) are standard objective measures of business performance, which SME Owner/Managers utilise to measure their operational performance. As indicated in the chapters introduction, SMEs play a significant role in the global economy. Kotey and Folker (2007) identified that SME attitudes to training can be influenced by enterprise size. Whilst Skinner et al. (2003) and Webster et al. (2005) note that micro SMEs, with no employees, face additional barriers to training due to their limited resources, restricted time, deficiency of off-the-shelf training packages and lack of training engagement. The European Commission (EC) produced a widely utilised definition of SMEs (EC, 1996), subsequently updated in 2003 (EC, 2003), as identified within Table 2. This study focuses on SMEs with between 1 and 249 employees in line with the EU definition (Downie, 2003). SMEs with no employees are excluded due to the limited applicability of employee training to such enterprises as previously noted by (Kotey and Sheridan, 2004; Kotey and Folker, 2007).

Table 2

European Community Definitions of SMEs

Criterion	Micro	Small	Medium
Maximum Number of employees	< 10	< 50	≤ 249
Maximum annual turnover	2 million Euros	10 million Euros	43 million Euros
Maximum annual balance sheet total	2 million Euros	10 million Euros	27 million Euros

Source: EC, 2003

Data and Sample

Data was taken from the 2008 Federation of Small Businesses (FSB) survey. The survey is a bi-annual survey of the FSBs 200,000 plus SMEs members to examine their business performance, key issues and challenges. The 2008 survey was conducted by the University of Glamorgan Business School staff. The questionnaire itself was developed over a number of months, in consultation with a number of the FSB's committees, and was piloted with FSB members and academics prior to finalisation, to try to ensure both that the correct mix of questions were being asked and that these were clearly understood by respondents. This survey was sent out to the FSB's 200,000 plus members and received 8,742 responses. SMEs were considered the unit of analysis with the Owner/Manager the main spokesperson for the company.

In this study, a sample of 3,521 SMEs was considered representing 40.28% of the full dataset. The sample selected was drawn from SMEs with between 1 and 249 employees as indicated in the previous section. Moreover, a further selection criterion was imposed whereby the individual SME had to have em-

ployees both two years ago and currently. This was imposed to ensure that an equal comparison was made between all SMEs in the survey and focused on only SMEs who had employees who could receive some form of training. In examining the issue of representativeness, the FSB data was compared with that of the two most recent BERR's UK Small Business Surveys (2007, 2008). Where available, data for firms under four years was also compared. Table 3 summarises the results which indicate that it is reasonable to assume that the enterprises in the FSB dataset are broadly representative of UK SMEs as a whole in terms of these variables.

Table 3

Comparison of FSB and BERR Survey Datasets

Variables	FSB Survey (2008) n = 8,742	BERR's Small Business Survey (2006)	BERR's Small Business Survey (2007)
Whole sample			
Age SME owners are under 45	25%	n/a	30%
Age between 45 and 54	32%	n/a	33%
Over the age of 55	43%	n/a	36%
Industry: primary industries	3%	4%	n/a
Industry: production industries	11%	10%	n/a
Industry: construction	12%	10%	n/a
Industry: services	74%	76%	n/a
Firms under four years old	19.8%		18%
Young firms in sample			
Gender (female)	29.1%	26%	n/a
Anticipated growth	85.2%	82%	n/a
Young firms with fewer than 10 employees	91.4%	89%	n/a

Areas of Inquiry

In this study it is the relationship between the levels of satisfaction SMEs have towards their training needs met by a diverse range of TAs, and the levels of impact the training needs influence on certain business outcomes. These related issues were explored in specific questions (Questions 37 and 38) within the FSB research instrument (see Figure 2 and Figure 3).

Due to the novelty of the RCaRBS analyses later undertaken, an interpretation to these questions (and response structure) is next expressed. Within the RCaRBS analysis, the 'training needs met' questions, T1, T2,.., T9, form the independent variables consistently employed (and also correlated against a SME business performance measure). For each TA question, the response allowed encompasses two separate issues (for a single SME):

i) Whether or not a specific TA was utilised by a SME, where a cross in the 'Did not use' box indicates not utilised.

Question 37

How have the training needs of your business been met over the past two years and how satisfied were you with the results?

	Did not use	Very dissatisfied 1	2	3	4	Very satisfied 5
T1- Learning at a local college	☐	☐	☐	☐	☐	☐
T2- Through a government programme	☐	☐	☐	☐	☐	☐
T3- Learning through a local college but within the workplace	☐	☐	☐	☐	☐	☐
T4- Somebody within the workplace providing on the job training	☐	☐	☐	☐	☐	☐
T5- Learning by doing/in-house training by staff	☐	☐	☐	☐	☐	☐
T6- By a private training provider in the workplace	☐	☐	☐	☐	☐	☐
T7- By a private training provider outside of the workplace	☐	☐	☐	☐	☐	☐
T8- Distance learning	☐	☐	☐	☐	☐	☐
T9- E-learning	☐	☐	☐	☐	☐	☐

Fig. 2. Description of FSB Research Question 37

Question 38

Please rate the extent to which each of the following outcomes have occurred as a result of training within your business in the last two years

	No impact from training 1	2	3	4	Strong impact from training 5
O1- Increased productivity	☐	☐	☐	☐	☐
O2- Increased profitability	☐	☐	☐	☐	☐

Fig. 3. Productivity or Profitability Impact Due to Training (Question 38)

ii) If a TA was utilised, the 'Did not use' box is left empty, then what was the level of satisfaction felt about the SME's training needs met, where a response to indicate their opinion on a five point Likert scale ranging from 'Very dissatisfied' (1) to 'Very satisfied' (5) is given.

Clearly, these two issues cannot take place at the same time. In a RCaRBS analysis, one data entry is used to represent both of the above issues (either a numerical value (1 to 5) or a '-' simply registering the TA was not utilised). Of the 3,521 SMEs considered in this study, the breakdown of them, based on the number of different TAs they utilised, was (in ascending order of number utilised); 747 (1), 1110 (2), 757 (3), 463 (4), 226 (5), 110 (6), 44 (7), 33 (8) and 31 (9). From this breakdown of numbers of TAs employed, the limits include 747 and 31 SMEs who utilised only one and all nine TAs, respectively.

For each business outcome question, increased productivity (O1) and increased profitability (O2), a numerical value of 1 to 5 is expected, denoting the qualitative expressions of, no impact from training (1) up to strong impact from training (5)*. To aid the reader in understanding the type of data analysed in this study, the response details of six respondents (SMEs) are next reported, see Table 4.

Table 4

Response details of six SMEs

Variable	T1	T2	T3	T4	T5	T6	T7	T8	T9		O1	O2
S1	-	-	-	-	-	3	-	-	-		3	3
S2	1	-	-	-	-	-	-	-	-		4	4
S3	2	-	-	3	4	5	5	-	-		4	3
S4	3	3	-	3	3	-	3	-	3		3	3
S5	3	1	4	5	5	5	5	5	5		4	4
S6	2	2	2	2	2	2	2	1	1		3	3

In Table 4, each row represents the response details of a single SME to the training T1, T2,.., T9 and performance questions. Inspection shows a number of values to the TA questions are denoted by '-'. The two extreme cases of SMEs shown in Table 3, are when they utilised only one available TA (S1 and S2) or when they used all the available TAs (S5 and S6), in the last two years.

3. Analyses of Business Training and Productivity and Profitability Data Set

* In this study, without loss of generality, only those SMEs which gave responses to both business outcomes were considered (to allow across business outcome comparison of results).

This section undertakes two forms of analyses on the productivity and profitability data set, firstly a correlation analysis and secondly a RCaRBS analysis.

Correlation

The correlation analysis undertaken here, considers separately the 'training needs met' questions T1, T2,.., T9, against the increased productivity and increased profitability business outcome measures. Since this analysis needs to work on complete data, for each TA question, only the SMEs who answered the respective question are considered. Here, Spearman's rank correlation is initially intended to be employed, where the SMEs S1, S2 … are first ranked based on their Likert scale. Clearly there is will a large amount of ties, since only the 1 to 5 scale values used, in this circumstance Pearson's correlation coefficient can be used, see Table 5.

Table 5

Pearson's Correlation (and Significance) Analysis of SME Training and Productivity and Profitability Data Set

Training Alternative	Increased Productivity (O1)	Increased Profitability (O2)
T1 (940)	.1612 (.7675 10-6)	.1385 (.2161 10-4)
T2 (346)	.1825 (.6867 10-3)	.1330 (.1334 10-1)
T3 (556)	.1633 (.1176 10-3)	.0897 (.3443 10-1)
T4 (2054)	.2223 (.7235 10-23)	.2028 (.3851 10-19)
T5 (2661)	.2402 (.2943 10-34)	.2264 (.1647 10-30)
T6 (835)	.2172 (.3491 10-9)	.1697 (.9364 10-6)
T7 (1229)	.2165 (.3229 10-13)	.1655 (.6530 10-8)
T8 (505)	.1586 (.3639 10-3)	.1610 (.2976 10-3)
T9 (605)	.2647 (.7457 10-10)	.2218 (.4858 10-7)

In Table 4, the correlation results are presented between each TA question and the productivity and profitability business outcomes. The variation in the numbers of SMEs considered is noticeable, with 346 SMEs in the considered data using T2 training (Through a government programme), in contrast 2,661 out of the 3,521 used the T5 training (Learning by doing/in-house training by staff). These results (and significance values in brackets) are reported in the discussions and conclusions section of this paper.

These correlation results offer findings on the presence of interdependence between individual TAs and productivity and profitability business outcomes, the RCaRBS analysis next undertaken, as with regression based analyses, looks at dependence of the individual business outcomes on the TAs.

RCaRBS Analysis of Productivity and Profitability

Two RCaRBS analyses are undertaken in this section, one for Increased productivity (O1) and one for Increased profitability (O2). The type of data represented in Table 4, for all considered SMEs, is employed without any further external management of the '-' no values present. Put simply, with RCaRBS, the presence of a '-' no value is a level of ignorance in the information describing that SME, and that the technique can accommodate such ignorant pieces of evidence.

Results with business outcome 'Increased productivity'

This subbsection considers the business outcome increased productivity (O1). The first set of results presented concern the level of model fit of the configured RCaRBS system (model). That is, can the responses of the 'training needs met' questions T1, T2,.., T9 from SMEs be used to characterise the understood level of impact of the training on the business outcome increased productivity, see Figure 4.

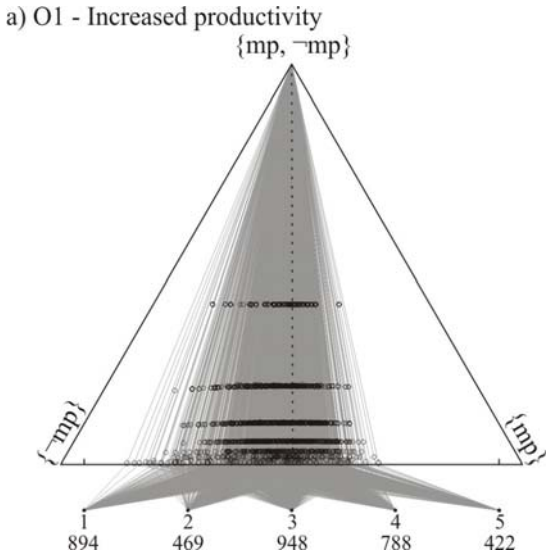

Fig. 4. Graphical elucidation of results from RCaRBS analysis on business outcome 'Increased Productivity' (O1), based on levels of training needs met by TAs

Figure 4 shows the simplex plot stage of the RCaRBS based modelling of the SMEs' increased productivity business outcome. Each circle shown in the simplex plot represents the simplex coordinate form of a SME's final business-outcome body of evidence (BOE), in this case increased productivity, found from the combination of its series of training-met BOEs (see Beynon, 2010 for technical details). For this simplex plot, the base vertices are labelled, from left to right, {¬mp} and {mp} (¬mp representing not-impacting), signifying the li-

mits of the domain, from not-impacting to impacting, of the impact response value (v_i) for O1, with the top vertex the concomitant ignorance {mp, ¬mp}. The predicted outcome value for a SME is then simply a mapping down from the {mp, ¬mp} vertex through the respective simplex coordinate down to the base line*.

Mapping these simplex coordinates down to the base line of the simplex plot results in a predominantly narrow range of predicted values found for the impact of training on the business outcome increased productivity. The vertical spread of business-outcome BOEs is a direct consequence of the variation in the number of TAs utilised by the SMEs, see Table 4 and surrounding discussion. The fewer the number of TAs utilised by a SME the more ignorance in the resultant training-met BOE (the higher up in the simplex plot the BOE would be positioned). The purpose of presenting this simplex plot is to highlight that all SMEs (3,521) were considered in this analysis.

On the bottom of the figure are the actual business outcome response values. One way of offering a statistical measure of the model fit is by looking at the correlation of the predicted values to the actual impact response values from the 3,521 SMEs, here it was found that R = 0.276 ($0.4\ 10^{-59}$), indicating a positive correlation between the sets of values, and importantly, a very significant level of correlation. This correlation result suggests the RCaRBS model has captured the underlying trend of the actual impact of business response values, any understanding of the contribution of the training needs met questions to the business outcome increased productivity should have in mind that they have been able to follow the trend of the impact business outcome response values.

Although a RCaRBS analysis does not derive explicit parameters for modelling model fit, it can nevertheless provide information on TAs 'training needs met' contribution. In particular, graphs can be constructed formulating the evidence in a training-met BOE directly from the 'training needs met' question values describing the responses from SMEs, see Figure 5.

In Figure 5, each graph denotes a visual elucidation of the contribution of one 'training needs met' question, one of T1, T2,.., T9. In each graph, up to three lines joining circles are drawn showing the mass values $m_{j,T?}(\{mp\})$ and $m_{j,T?}(\{\neg mp\})$ denoting evidence towards impact and not-impact of the TA to increased productivity, respectively and ignorance $m_{j,T?}(\{mp, \neg mp\})$ (the lines are shown to exhibit the underlying structure of the progression of evidence change from one response value to the next – see Beynon, 2010 for technical

* With the business outcome questions' responses all based on a 1 to 5 scale, the tick marks on the base line, from left to right, signify these scale values. The 1 (left hand side) and 5 (right hand side) are just in from the left and right vertices to allow for a level of open bounds on these limiting values.

details). Shown at the top of each graph are the number of responses to this TA, and the breakdown of these responses across the Likert scale.

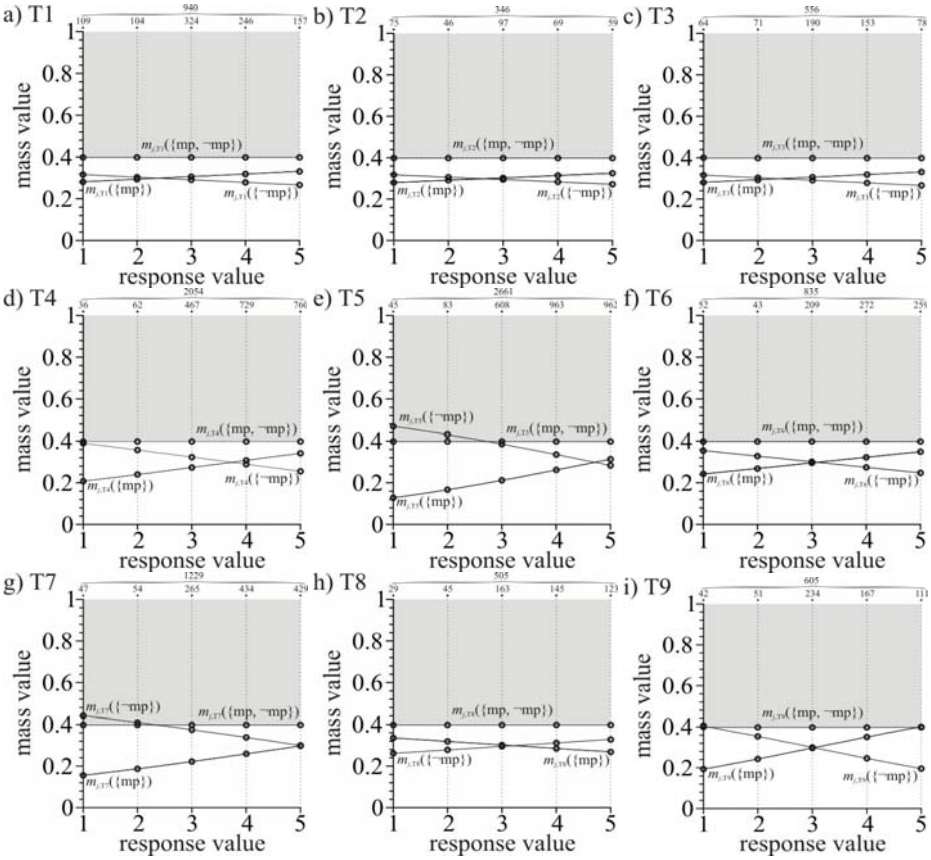

Fig. 5. Contribution graphs of how training needs have been met, over the training alternatives T1,.., T9, for the business outcome of 'Increased Productivity' (O1) (where 1 – Very dissatisfied up to 5 – Very Satisfied)

To further understand these graphs, the graph 5a is next fully described. In graph 5a, the evidential contribution of the 'training needs met' question T1 'Learning at a local college' is reported in respect of the impact on the business outcome increased productivity. There are two lines 'with circles' signifying the mass values of belief towards their being impact ($m_{j,T1}(\{mp\})$) and not-impact ($m_{j,T1}(\{\neg mp\})$) of the TA towards increased productivity. The increasing value of $m_{j,T3}(\{mp\})$ over the scale value 1 (Very dissatisfied) to 5 (Very satisfied) indicates a positive contribution of this TA. This positive contribution is supported by the respective correlation results shown in Table 4. Comparing the results for T1 against T5 (Learning by doing/in-house training by staff), shows for T5 a much more steeper increasing line of points representing $m_{j,T5}(\{mp\})$ (in Figu-

re 5e) than for $m_{j,T5}(\{mp\})$ considered previously. The implication here is that the T5 has a stronger contribution since it is more discerning in the evidence from the different response values to the 'training needs met' question T5.

Results with business outcome 'Increased profitability'

This section describes the RCaRBS analysis of the relationship between the levels of satisfaction towards training needs met by different TAs and the impact the training had on the business outcome increased profitability (O2), see Figure 6.

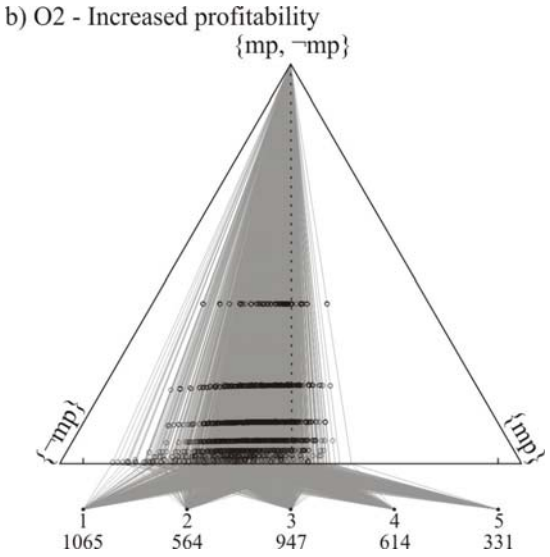

Fig. 6. Graphical elucidation of results from RCaRBS analysis on business outcome 'Increased Profitability' (O2), based on levels of training needs met by training alternatives

The correlation between the predicted values and actual impact response values was found to be R = 0.258 ($0.5\ 10^{-52}$), which, as in the previous analysis, indicates a strong significant correlation – but less than that with O1. This results, similarly, allows us to believe the RCaRBS model has captured the underlying trend of the training needs met response values to their impact on the increase profitability business outcome. Therefore, it follows, as in the previous analysis, but here with respect to the increased profitability business outcome, graphs can be constructed formulating the evidence in the training-met BOEs directly from the training needs met response values describing the responses from SMEs, see Figure 7.

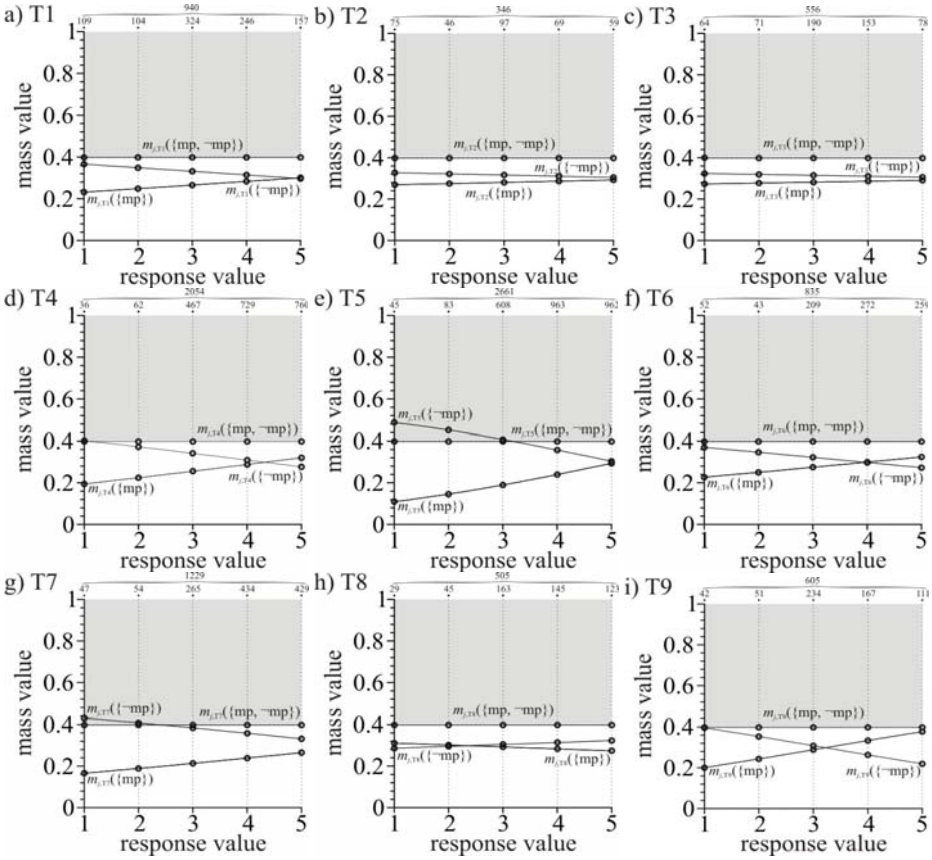

Fig. 7. Contribution graphs of how training needs have been met, over the training alternatives T1,.., T9, for the business outcome of 'Increased Profitability' (O2) (where 1 – Very dissatisfied up to 5 – Very satisfied)

The results in Figure 7 follow similarly the results in Figure 5.

4. Discussion

In summary, the key findings identified within this study suggest that Owner/Manager were able to discern differences between the impacts of TAs towards business performance. It is interesting to note the utilisation by SMEs of a range of TAs whereby a significant number of SMEs within the sample undertake, two (n = 1110), three (757), or even four (463) alternatives. Indeed, 31 had utilised all nine TAs during the last year. This suggests that SME Owner/Managers are not afraid to explore their TAs if they can access them. Owner/Managers recognised that some TAs provided benefit towards their business performance. However, the differences between the perceived value of TAs towards either increased profitability or increased profitability were not overly

apparent. Put more simplistically, the evidence suggests Owner/Managers choice of TA is not particularly discerning between either increased profitability or increased productivity business outcomes.

With regard to the increased productivity outcome, Owner/Managers considered "Learning by doing/in house training by staff" as the TA which contributed towards enhanced productivity. Other noticeable positive associations were identified between "Somebody within the workplace providing on the job training" and "By a private training provider outside of the workplace". It is interesting to note that greater importance was paid to informal training methods with the exception of external formal training provision. Owner/Managers were not convinced by the value of local college provision either within the workplace or college. This result suggests that local college provision is either not meeting the training requirements of the SME sector or they are not aware of their curriculum and the opportunities it offers. Moreover training provided through government programme was also judged by Owner/Managers to lack perceived value towards increased productivity.

When the result of the increased profitability outcome was considered in terms of their association with TAs the results were not dissimilar to that of the productivity outcome. Positive associations were apparent between "Somebody within the workplace providing on the job training", "Learning by doing/in-house training by staff" and "by a private training provider outside of the workplace" towards the business profitability outcome. Thus it is apparent that Owner/Managers have a preference for informal training provision with the exception of the private training provider provision outside the workplace. As previously only a limited association was identified between the more formal types of learning which included distance learning, local college provision and training through a government programme.

Conclusions

The evidence that has emerged within this study suggests SME Owner/Managers believe that TAs provide benefit towards business performance in the form of enhanced productivity and profitability. This result confirms the prior studies Birdthistle (2006) and Lin and Jacobs (2008) although conflicts with Foreman-Peck et al. (2006). This study makes a contribution to a limited literature (Dewhurst et al., 2007) in evaluating the impact of TAs on the SME sector. The study through the novel RCaRBS technique deployed, enables an evaluation of the effectiveness of individual TAs towards enhanced business performance namely productivity or profitability outcomes.

It was apparent that the differences between the perceived value of TAs towards either increased productivity or increased profitability were marginal and

there were similarities in the results. In response to the research questions stated in Section Four the evidence suggests that Owner/Managers choice of TA is not particularly discerning towards either profitability or productivity business outcomes but towards the overall outcome of enhanced business performance.

With regard to the increased productivity outcome it was apparent that there was greater belief that the informal TAs (e.g. learning by doing/in house training) offered greater benefit towards enhanced productivity. The exception to this was the training provided by a private training provider outside the workplace. The increased profitability outcome identified similar findings in that positive associations were apparent between "Somebody within the workplace providing on the job training", "Learning by doing/in-house training by staff" and "by a private training provider outside of the workplace" towards the business profitability outcome.

The results suggest that Owner/Managers have a belief that informal TAs (e.g. learning by doing) provide the most value towards enhanced business performance (in terms of productivity and profitability) in contrast to formal methods of delivery (e.g. local college). How informed and accurate this Owner/Manager perception is remains debateable and further research must be undertaken to fully explore it. External environmental influences such as a difficult economic situation may indeed influence Owner/Manager choices towards TAs.

The literature confirms that many SMEs especially micro-size classifications have limited financial resources (Birchall and Giambona, 2007) to access effective training solutions. In such cases, informal training options may take precedence over formal alternatives. Thus the informal option becomes the default selection without the alternatives being awarded due consideration. Owner/Managers are potentially making immediate operational and reactive decisions opting for low cost informal training options (Kotey and Folker, 2007). Such decisions might result in missed business opportunities and restricted growth aspirations. Previously, Walker et al. (2007) has noted that SMEs lack managerial competencies which would impact about Owner/Managers evaluation and adoption of TAs. However, it must be noted that there is undoubtedly good practice occurring in the provision of informal education within SMEs as noted by Aragon-Sanchez et al. (2003). This best practice must be captured and disseminated to the SME community and training providers.

The results of this study suggest that the experience and attitude of Owner/Managers towards formal TAs is unsatisfactory. There is also significant extant criticism (Westwood, 2001) towards the effectiveness of informal TA provision. This study presents notable evidence of uptake of formal training options including "Learning at a local college" (n = 940), "Through a government programme" (n = 346), "Learning through a local college but within the

workplace" (n = 556) and "Distance learning" (n = 505) suggesting SMEs will participate if the formal TA is available as claimed by Walker et al. (2007). The evidence within this study suggests that formal training options are failing to meet the expectations of SMEs (Smith et al., 2002) although it would be interesting to investigate the evaluation underpinning this response (McMahon and Murphy, 1999). Innovative and acclaimed formal TAs including distance learning, e-learning and work based learning alternatives all underperform (Matlay, 1999b; Birchall and Giambona, 2007). It is worth noting that formal training undertaken by private training providers were judged more beneficial than other alternatives (Reid and Harris, 2002). Therefore, if the appropriate formal training is provided it can indeed by viewed as beneficial (Reid and Harris, 2002). Such evidence would assist SME Owner/Managers assess the risk associated with both informal and formal TAs. Further research is required to explore these issues and provide evidence whether the problem is within the SME, associated with the formal provider or a combination of the two. In conclusion, SMEs must be made to understand the benefits and be able to effectively access formal TAs to appreciate there is a return on investment risk. Alternatively training providers to the SME sector must understand their market and provide appropriate and relevant training is an accessible manner.

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RYZYKO SZKOLEŃ W SEKTORZE MSP: ANALIZA EKSPLORACYJNA Z ZASTOSOWANIEM TECHNIKI RCARBS

Streszczenie

Środowisko biznesowe charakteryzuje się wzrostem konkurencyjności, postępującą globalizacją rynków oraz wzrostem skali usprawnień technologicznych. Działalność organizacji w tych warunkach staje się bardziej wyrafinowana, co skutkuje między innymi ewolucją usług szkoleniowych. Artykuł podejmuje problem ewaluacji szkoleń na rzecz sektora małych i średnich przedsiębiorstw. Analizie empirycznej poddano zależność pomiędzy satysfakcją ze szkoleń a zgłaszanymi potrzebami szkoleniowymi, a także pomiędzy wpływem odbytych szkoleń na działalność przedsiębiorstw sektora MSP. Studium opiera się na zastosowaniu pionierskiej metody analitycznej, tzw. RCaRBS (Regression-Classification and Ranking Believe Simplex), która pozwala na analizowanie rozrzuconej próby badawczej przy niekompletnych danych. W części pierwszej artykułu omówiono doświadczenia z zakresu szkoleń w sektorze MSP, w części drugiej przybliżono meandry zastosowanej metody badawczej, zaś w części trzeciej zaprezentowano wyniki przeprowadzonej analizy. Artykuł zamyka dyskusja nad otrzymanymi rezultatami, które wykazały, że właściciele bądź menedżerowie badanych przedsiębiorstw byli w stanie rozpoznać wpływ alternatyw szkoleniowych na wyniki ich działalności.

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RISK APPETITE – CRITICAL ELEMENT OF ENTERPRISE RISK MANAGEMENT PROCESS

Introduction

Enterprise risk management (ERM) is now considered to be a leading approach to risk management and is being widely promoted worldwide and in Poland[*]. In general, the adoption of ERM approach allows the organisation to clarify its risk appetite and embed it into the business strategy. Also, ERM helps to refine the identification of risk-bearing events and determining the risk-response strategies in case of risk occurrence. The idea of ERM is to implement the risk management process across the organisation and ensure that it is carried out by people at every level of organisation. Its main objective is to create a complete picture of all internal and external threats and to develop strategies that determine the response to so called key risks. The process should be anchored in the main strategy of the organization as well as in the strategies of its individual units. The effectiveness of risk management process in an integrated approach depends on its clear definition and communication to all levels of an organisation. Also, the effectiveness of risk management activities is dependant on the definition of risk appetite which provides a platform for a comparative analysis with the organisation's current risk profile.

The prime purpose of this study is to highlight the ambiguities of risk appetite definitions and to indicate the importance of risk appetite concept in the risk management process. In particular, the study is based on the recommendations included in popular applicative documents that are accessible to end-users. As the problem is a novel one, the literature often does not follow the details included in applicative documents and remains focused more on the general concepts.

The first section of the paper provides an explanation of enterprise risk management process with regard to its specific features. In the second of the paper

[*] Compare the findings presented in: *The Risk Intelligent Enterprise* (2006); *Global Risk Management Survey* (2009), Słobosz and Ziomko [2009]).

the overview of different approaches to risk appetite definitions is conducted whereas section four discusses the utility of risk appetite concept. Section five presents some empirical evidence on the practices within the definition of risk appetite and the sixth section concludes the study.

1. The key elements of enterprise risk management (ERM) process

For the proper understanding of the concept of risk appetite, the key elements of the enterprise risk management process should be revised as the term 'risk appetite' refers to these elements. In this study, the concept of enterprise risk management will be under-pinned to one of the leading and latest risk management standards – the ISO 31000:2009 standard, which is increasingly recognised and applied in the world*. The standard recommends that the risk management process should be an active element of the strategy, planning, management, reporting, principles, values and culture of the organisation. The risk management process in ISO 31000:2009 standard consists of seven interlinked stages, as presented in Figure 1, where the "glue" are two sets of activities: the constant communication and consultation and the monitoring and reviewing actions.

* According to FERMA's (Federation of European Risk Management Associations) *European Risk Management Benchmarking Survey 2010*, the practical application of ISO 31000:2009 standard declared 13% of respondents (N = 782). The ISO 31000:2009 standard was published in December 2009 and the FERMA's research was conducted in the first half year of 2010 (*European Risk Manangement Benchmarking*, 2010, p. 3).

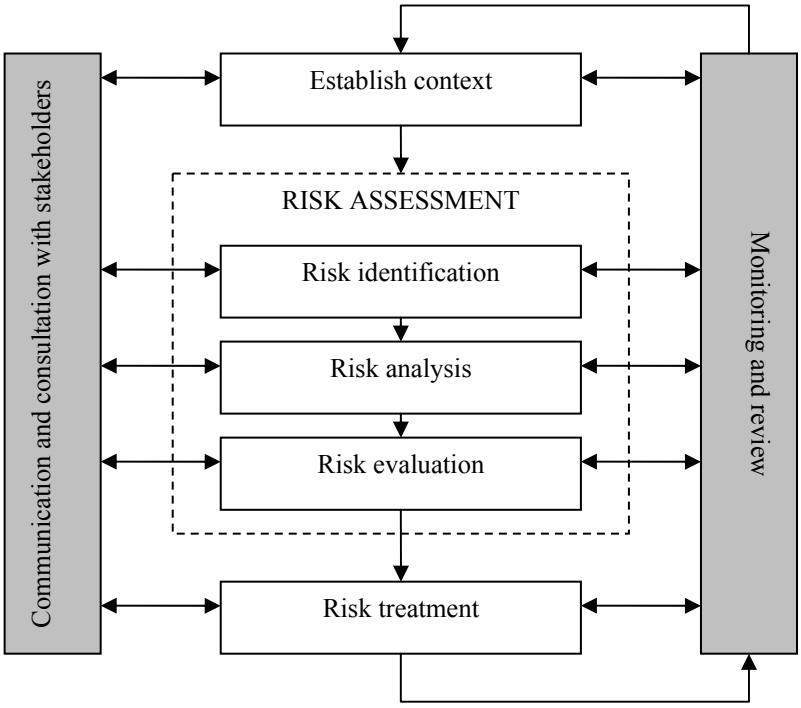

Fig. 1. Risk management process

Source: Own study based on: *Risk Management – Principles and Guidelines* (2009, p.vii).

The focus on communication and consultation with stakeholders (both internal and external) indicates the input of stakeholders in determining the risk criteria, in this in shaping risk appetite. Also, it guarantees the transparency of the process. The monitoring and review of risks enables an organisation to respond appropriately in case of the emergence of new risks as well as in case of the changes in the level of existing risk factors (which may result from the changes in the organisation's objectives or its external or internal environment).

The domain part of the risk assessment stage is preceded by what the organisation plans to achieve and how the external and internal factors may affect the achievement of organisation's objectives. According to ISO 31000:2009, the risk assessment stage consists of the three sub-stages: risk identification, risk analysis and risk evaluation. All of these sub-stages require a systematic approach (interactions at each level of risk analysis – see Figure 1). At the same time, it is recommended that the manner in which risk is expressed (with regard to the combined probability and results of risk occurrence) and the degree of details in risk analysis are adjusted to the type of risk, the availability of information and predefined goals. Also, it is required to inform decision-makers and stakeholders

about the acceptable level of risk and the sensitivity of these levels to the changes in the organisation's environment.

The risk assessment procedure aims at supporting the choice of appropriate risk treatment methods. Here the costs and benefits of each method should be carefully revised, with regard to the risk accompanying each of alternatives. If these actions are continuous in nature, it may be assumed that the risk management process is efficient and allows to obtain the expected results.

2. Risk appetite – definitional and methodological problems

Risk appetite is an extremely ambiguously defined concept as it is often considered in different contexts. In literature, it is sometimes associated with risk tolerance, risk willingness or risk attitudes (Hopkin, 2010, p. 233-243; Chapman, 2007, p. 186-188; Moeller, 2007, p. 61-67). In the popular applicative enterprise risk management standards, risk appetite is associated with the maximum risk exposure that the organisation is able to accept in achieving its goals. Such a concept is followed in the above mentioned ISO 31000:2009 standard, where the appetite for risk is defined as the amount and type of risk that an organisation is prepared to pursue, retain or take. At the same time, the standard provides the definition of risk tolerance which is understood as the organization's or stakeholder readiness to bear the risk after treatment in order to achieve its objectives (see: *Risk Management – Principles and Guidelines*, 2009, p. 2; *Risk Management – Vocabulary*, 2009, p. 9). The latter is mainly determined by the regulatory and legal requirements, as well as the size of an organization. Accordingly, the ISO standard clearly indicates that the appetite for risk should be considered from the perspective of the interests of all groups of stakeholders, such as organizations, owners and management. The ISO standard defines the risk appetite quite generally, especially with regard to the need to establish criteria for assessing the risks (risk criteria) and to assess the risks in terms of these criteria (risk evaluation). This definition was adopted also in the UK's leading risk management standard BS ISO 31100:2011[*].

In turn, according to the Orange Book developed by HM Treasury's[**] (recommended for use in the Polish public sector) risk appetite is „(…) the amount of risk that an organization is prepared to accept, tolerate, or be exposed to at any point in time" (*The Orange Book...*, 2004, p. 49). The concept of risk appeti-

[*] BS ISO 31100:2011 replaces BS ISO 31100: 2008. The definition of risk appetite has not changed and refers (as in ISO 31000) to ISO 7/IEC Guide 73 (*Risk Management – Vocabulary*, 2009), see: BSI (2011, p. 7).

[**] The HM Treasury is a commonly used abbreviation for "Her Majesty's Treasury" which is the United Kingdom's economics and finance ministry, http://www.hm-treasury.gov.uk/about_index.htm [Accessed 15.08.2011]

te adopted in this document refers both to an acceptable level of risk and so called residual risk*. The document clearly highlights that the definition of risk appetite across the organisation can be complex. In addition, the Orange Book indicates three levels of risk appetite. The corporate risk appetite is the overall amount of risk judged appropriate for an organisation to tolerate, which should be agreed at board level. Delegated risk appetite is the risk appetite agreed on different levels of the organisation. The project risk appetite is attached to the projects that fall outside of day-to-day business operations of an organisation (*The Orange Book...,* 2004, p. 24). The approach to determining risk appetite for particular risk groups makes it easier to define the acceptable level of risk exposure, both in value and frequency.

Risk appetite is also a subject of considerations in another risk management standard providing recommendations of ERM implementation – The COS** standard titled *Enterprise Risk Management – Integrated Framework* (COSO, 2004a; COSO, 2004b). The document provides two approaches to understanding the risk appetite. The first one states that risk appetite is the degree of risk (on a broad-based level) that an entity is willing to accept in pursuit of its goals. The second approach says that the risk appetite is the amount of risk an entity is willing to accept in pursuit of its goals (COSO, 2004b, p. 19-20, 124). Such definitions indicate that the risk appetite can be expressed qualitatively and quantitatively by the use of indicators such as market risk or risk capital. However, from the methodical point of view, it is important to determine the risk limit which expresses the acceptable level of variation in the implementation of individual goals.

The definition of risk appetite is also provided in a consultation document *Risk Appetite and Risk Tolerance* developed by Institute of Risk Management (IRM)*** and published in May 2011 r. (IRM, 2011). The document provides the definitions based on the ISO31000:2009 and the British Standards (BS BS31100) issued in 2011 (BSI, 2011, p. 7). According to this document, the concept of risk appetite is clearly a tendency to take risks (propensity to take risk) and the tendency to risk control (propensity to exercise control). Moreover, these two concepts cannot be analysed in isolation from each other. Appetite for risk must be measurable and the type of measurement depends on the level of governance at

* The term "residual risk" means the risk that remaining after the controls put in place to mitigate the inherent risk (the risk linked to the activity itself) (*The Orange Book...*, [2004, p.49]; *Risk Management – Vocabulary* [2009, p.11]).

** The Committee of Sponsoring Organizations of the Treadway Commission (known as COSO) is a voluntary private sector organisation gathering professional associations dealing with accounting and internal auditing. In particular, the COSO is famous for the guidelines on the proper financial reporting, corporate governance, business ethics, risk management and internal control. http://www.coso.org/ [Accessed: 15.08.2011]

*** The Institute of Risk Management (IRM) is the independent, world's leading enterprise-wide risk education institute. http://www.theirm.org/ [Accessed 15.08.2011].

which risk is considered (i.e. strategic, tactical or operational). At the strategic level, appetite for risk should focus on risks that may shape the organisation's competitive advantages. The key point of reference should be the shareholders value creation. At the tactical level, the appetite for risk relates to the risks normally associated with the implementation of already established organisation's strategy. Here, the recommended way to measure risk appetite is the establishment of the Key Risk Indicators (KRI). At the operational level, the appetite for risk is a set of recommendations on the procedure in the event of specific threats, without having to consult with the senior management. At this level, as a measure of risk appetite Key Control Indicators (KCI) are suggested (IRM, 2011, p. 32-34). Also, the IRM standard states that the determination of risk appetite requires an organisation's maturity in the area of ERM. The maturity in risk management means here the advanced level in ERM implementation. The organisation which is immature in risk management, exposes itself to the additional risk while trying to define the risk appetite. The IRM, however, provides a few recommendations on how to independently evaluate the maturity of risk management and thus check the preparedness to evaluate risk appetite. There are four areas of evaluation (IRM, 2011, p. 19-20):

1. Business context: i.a. the state of development, size, industry sector, geographical spread, complexity of business model;
2. Risk management culture: i.a. the extent to which the board (and its relevant committees), management, staff and relevant regulators understand and embrace the risk management systems and processes of the organisation;
3. Risk management processes: i.a. the extent to which there are processes for identifying, assessing, responding to and reporting on risks and risk responses within the organisation;
4. Risk management systems: i.a. the extent to which there are appropriate IT and other systems to support the risk management processes.

In 2009 AIRMIC* coordinated the research which was devoted to the problem of defining risk appetite. The report confirmed that definitions of risk appetite vary between practitioners. Some organisations prefer the definition of risk tolerance which is associated with the maximum risk that can be taken before financial distress. Accordingly, such organisations tend to define risk appetite as the amount of risk that is actually taken for reward (*Research into...*, 2009, p. 5).

The above conducted overview of the definition of risk appetite leads to the conclusion, that there are distinct differences in interpreting this crucial term.

* AIRMIC is a members' association operating in United Kingdom which supports those responsible for risk management and insurance within their own companies. The association provides research, training and networking for the benefit of its members. http://www.airmic.com/about/about-airmic [Accessed: 15.08.2011]

However, the core problem for defining risk appetite is the understanding of risk which influences the further approaches to risk management. If the risk is perceived as a threat, then the risk appetite is associated with the acceptable and reasonable level of risk exposure for a particular organisation. The level of risk exposure might be expressed as the balance between the cost of risk mitigation (financial or other costs) and the cost of risk occurrence (the loss). However, if the risk is considered as an opportunity, risk appetite expresses a proactive approach to risk in order to obtain the benefits of risk occurrence. In this case, the level of risk exposure is established by the comparison of potential benefits (financial or other) with the burden of potential losses. Such a concept of risk appetite is consistent with the concept included in *The Orange Book...*, (2004).

The Standard & Poor's (2007) indicates that the establishment of risk appetite definition (also referred to as risk tolerance) should be done both in quantitative and qualitative terms, in direct connection with the strategy of the organisation. This is under the assumption, that the adoption of any strategy carries the uncertainty of its accomplishment. Clear definition of risk appetite allows to specify a framework for a decision-making. Thus, it can be concluded, that the determination of the organisation's risk appetite is a managerial tool. However, business practice indicates that there are significant difficulties in defining risk appetite and the adoption of effective risk appetite measures in the organisation (*Research into...*, 2009; Kamiya et al., 2007, p. 29-31). The effectiveness of ERM is assured only if the risk appetite is embedded into the planning process and if it is not just a way of risk reporting or risk control. In addition, there is a growing tendency for greater transparency in the activities of the organisation, which is connected with informing stakeholders about the current and target levels of risk taking.

3. The utility of risk appetite declaration

Despite the reported differences in defining risk appetite, it is undoubtedly the core of enterprise risk management process, being a comparative platform of the desired and the current risk profile of the organisation. Defining risk appetite means providing the "point of risk exposure" clarifying the real size of the risk area. Also, the risk appetite provides information about the possible responses to risk in the specific decision-making situations.

With regard to the risk perceived through likelihood – impact lenses, risk appetite represents a border line for risk taking. The risk which is above risk appetite is simply too high for an organisation with regard to the scale of its possible outcomes (compare Figure 2). Accordingly, an organisation may take the risk which is below its risk appetite without worrying about too excessive burden of risk.

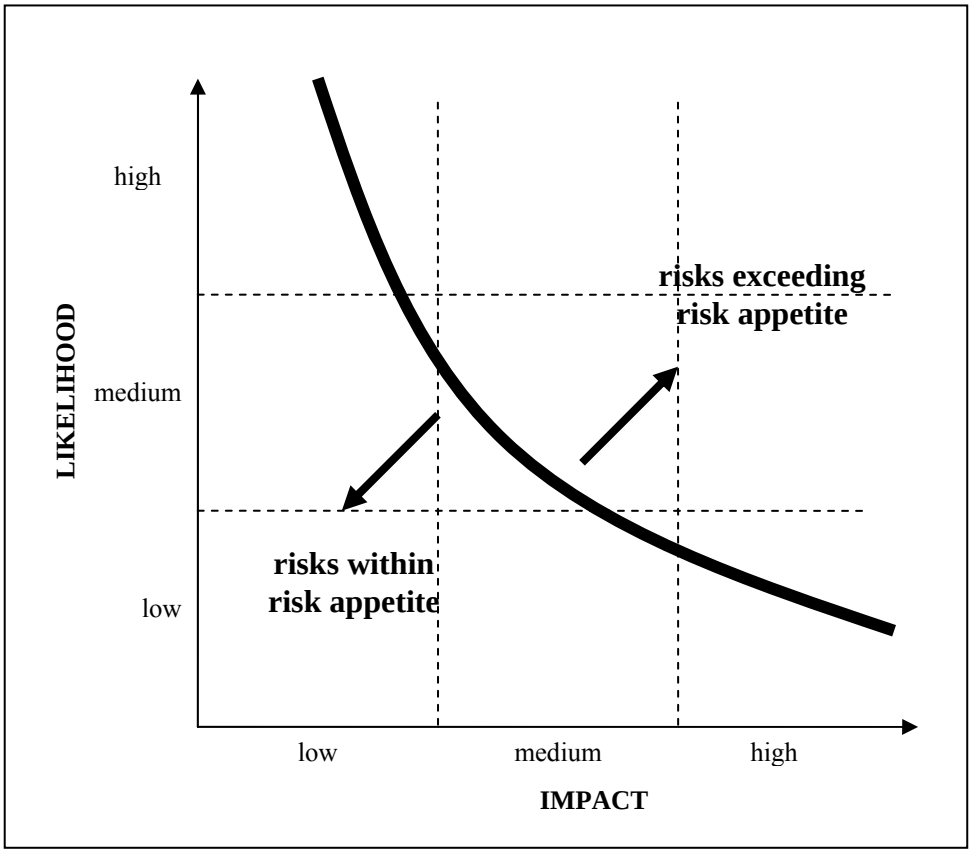

Fig. 2. Risk appetite and the likelihood-impact perception of risk

Source: Own study based on: Mestchian, Makarov, and Mirzai 2005, p. 21).

The vision of risk appetite presented in Figure 2 underlines also the importance of proper conduction of risk assessment stage (which is presented above in Figure 1) as any mistakes in risk assessment result in improper definition of risk appetite. Obviously, such a situation might be very dangerous for an organisation if it leads to taking over-excessive risk.

The proper declaration of risk appetite supports the efficiency of an organisation in numerous ways. However, the key areas of activity which benefit from the declaration of risk appetite level are presented in Figure 3. and discussed further briefly.

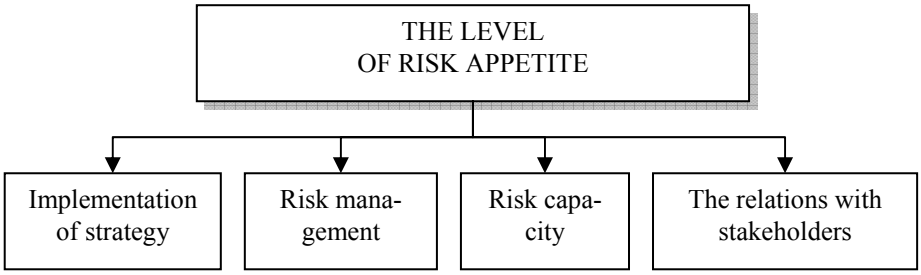

Fig. 3. The key areas in which an organisation may benefit from defining its risk appetite

Source: Own study.

With regard to the implementation of strategy, the correctly defined risk appetite supports the accomplishment of the strategy by increasing the efficiency of decision making. Also, it improves the planning process by clear identification of risks which the is willing to take and which should be avoided. Furthermore, risk appetite presents a balanced picture of risk an organisation identified, and among these it may seek the opportunities to create added value.

The definition of risk appetite is also valid from the risk management efficiency point of view. The organisation may focus on protection of more risky areas while maximising the resources to secure less risky areas. Also, it obtains greater clarity in the indication of the benefits of risk management, which is a valid argument in a better understanding of risk management and the need for expenses on it.

Determination of risk appetite is also important for stakeholders of an organisation, as it makes its activities more transparent. Accordingly, it ensures the cohesion of the decisions concerning the approved risk bearing capacity. Risk bearing capacity means the risk that an organisation may take with respect to the implemented risk control mechanisms. It should be underlined, that risk capacity is not always synonymous to risk appetite. If the risk bearing capacity is slightly higher or similar to the risk appetite, the organisation represents the balanced (neutral) approach to risk. If the risk appetite is greatly exceeding the risk bearing capacity, the organisation represents the aggressive attitude to risk and is often called a risk taker. In a contrary situation, the organisation manifests its risk aversion.

Assuming that the organisation tends to continuously improve the relations with its stakeholders (as it helps to increase the value maximisation), the stakeholders' risk preferences should also be taken into account. In this context, the role of risk appetite is also valid. If risk appetite is set correctly, then it can be a subject of deeper consideration in terms of combination of risk preferences of particular stakeholders groups.

4. Risk appetite – Some evidence of European practices

In practice, the problem of the implementation of risk appetite concept is of great importance and represents a valuable subject of empirical studies. Such a research was commissioned and coordinated by AIRMIC and undertaken in 2009 by Marsh Risk Consulting and the University of Nottingham Business School. To gain a reasonable perspective of the development and application of the risk appetite, AIRMIC questioned all its members (over 800 entities). However, the return rate was just over 13% but the respondents come from various industries. The results of the study were published in (*Research into*..., 2009). For the purposes of the presentation in this study, only a few relevant aspects were chosen and among these:

1) the definition of risk appetite followed in the questioned organisation,
2) the methods of defining risk appetite (including qualitative or quantitative techniques),
3) the level of management at which risk appetite is shaped,
4) identification of benefits and barriers of determining risk appetite.

Within the definition of risk management, most of the respondents rely on definitions of risk appetite included in risk management standards. Accordingly, 37% of respondents rely on the definition of risk appetite stating that risk appetite is the amount and type of risk that an organisation is prepared to seek, accept or tolerate, and declare that such a definition is very useful* (*Research in...,* 2009, p. 18).

The research confirmed that risk appetite is perceived as an important tool of planning and strategic decision-making, which was indicated by 29% of the survey's respondents. Moreover, 24% of questioned entities indicated that risk appetite is a valid tool of monitoring. Also, 24% of respondents claimed that risk appetite is an instruction how to conduct a decision-making process with regard to the applied risk management approach (*Research in...*, 2009, p. 19). Such results indicate that risk appetite is plays an important function in the strategic and planning areas as well as in controlling.

With regard to type of methods applied in defining risk appetite, 88% of respondents indicated the application of qualitative methods, whereas 78% quantitative methods. However, the proportions of the application of these methods depend on the level of decision making and risk to which they are applied to. The quantitative methods were preferred by the respondents for operational and financial risk. Accordingly, the strategic, compliance and reputation exposures were assessed by means of quantitative methods by less of the respondents (66%) (*Research into*..., 2009, p. 20). As for the application of risk appetite in practice,

* Such a definition of risk appetite is promoted in ISO 31000:2009 and the British Standard BS 31100, as mentioned above in section 2 of the paper.

65% of respondents indicated a probability-impact analysis and 39% the establishment of limits, targets or thresholds for key risk indicators. The 30% of respondents rely on the comparison with industry benchmarks or loss experience whereas 26% analyses impact on profit and loss account (*Research into...,* 2009, p. 22).

In the analysed sample of companies, risk appetite was shaped by predominantly at the leadership level as 50% of respondents indicated the top down approach from the senior management level and 42% – the top down approach from the board level. However, 38% of respondents indicated that risk appetite is shaped during the risk assessment workshops (*Research in*…, 2009, p. 20).

Finally, the research included identification of the benefits and barriers of determining the risk appetite level. The most frequently indicated benefits and barriers in this field are presented in Figure 4 and 5 respectively.

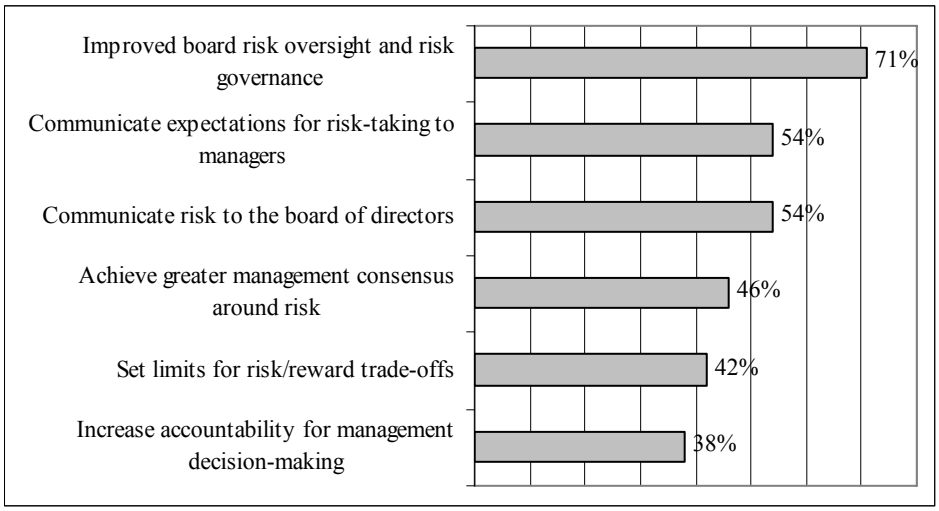

Fig. 4. Core benefits of determining risk appetite level

Source: Own study based on: *Research into*..., 2009, p. 20-21).

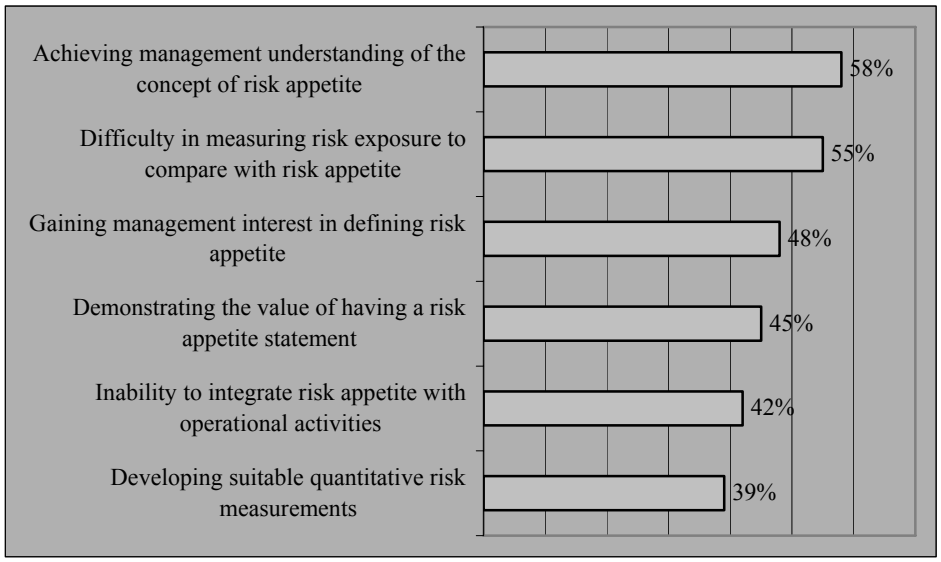

Fig. 5. Core barriers of determining risk appetite level

Source: Own study based on: *Research into*..., 2009, p. 21).

The most frequently indicated benefits of determining risk appetite level are connected with improvement of managerial capabilities and transparency (communication). The domain barriers are connected with both the understanding of risk appetite concept as well as with measuring its level.

The discussed research results revealed some valid disparities in the conceptual and methodological aspects of risk appetite. Accordingly, they confirmed the need to extend the concept of risk appetite and proved the importance of education in this area. Not surprisingly, risk appetite issue is a substantial element of various recommendations of activities within enterprise risk management.

Conclusions

The above considerations lead to the general conclusion, that the problem of risk appetite still requires extension within theoretical, methodological and applicative area. The definitions provided in popular risk management standards are ambiguous and thus raise confusion among the organisations willing to implement properly the idea of enterprise risk management. Thus, the prime concern is to provide a clear and applicative definition of risk appetite that will truly follow its idea. The experiences of practitioners, however, suggest that it is particularly interesting problem on a management board level.

The ambiguities of risk appetite definitions result in the difficulties in measuring risk appetite which raises the discussion over the possible risk indicators

that might and/or should be applied. The problem is even more demanding as it is beyond doubt that the correctness of risk appetite level is the core for the effective risk management implementation. Also, it may rise some valid benefits in various areas of organisation's activity, such as accomplishment of strategy, risk management, risk capacity and relations with stakeholders.

The considerations presented in the study are non-exhaustive and attempted only to highlight the importance of risk appetite problem and to provide a convincing start point for further discussions and researches in this field. Surely, the problem of defining and measuring risk appetite will be in the centre of most of the risk management related studies, as it is the essence of the proper risk assessment and risk response strategies.

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APETYT NA RYZYKO – KRYTYCZNY ELEMENT PROCESU ZARZĄDZANIA RYZYKIEM

Streszczenie

Zarządzanie ryzykiem staje się w obecnej dobie ważnym elementem działań zarządczych podejmowanych w różnych jednostkach. Ważnym elementem tego procesu jest określenie poziomu apetytu na ryzyko, również ze względu na efektywność ogółu działań w obrębie zarządzania ryzykiem. Celem niniejszego artykułu jest przybliżenie definicji apetytu na ryzyko oraz ukazanie roli, jaką pełni on właśnie w zarządzaniu ryzykiem. Przyjmując za podstawę aplikacyjne ujęcie problemu, w artykule podniesiono problem niejednoznaczności definicji apetytu na ryzyko w regulacjach podstawowych standardów zarządzania ryzykiem. Omówiono również użyteczność prawidłowego określenia poziomu apetytu na ryzyko z punktu widzenia możliwej poprawy różnych aspektów funkcjonowania organizacji. Całość rozważań uzupełniono syntetyczną prezentacją wyników badań odnoszących się do zaobserwowanych praktyk w zakresie określania apetytu na ryzyko.

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MERTON'S AND KMV MODELS IN CREDIT RISK MANAGEMENT

Introduction

Contemporary economy, hidden in shade of world crisis, tries to renew it's attitude to various aspects of financial risk. A strong tension of bad debts, both in micro and macro scale emphasizes the menace to financial stability not only of particular entities, but also for whole markets and even states. Credit reliability of debtors becomes the main point of interest for growing number of frightened creditors. Owners of credit instruments more often consider them as even riskier then other types of securities. Awareness of shifting main risk determinants stimulates investigating of more effective methods of credit risk management. Over the last decade, a large number of models have been developed to estimate and price credit risk. In most cases, credit models concentrate on one single important issue – default risk. Investigating its characteristic (mostly finding statistical distribution) analytics can transform it into related dilemmas: how to measure it and how to price credit risk. The first one gives a chance of proper distinguishing more risky investments from the saver ones, the second one allows to calculate the value of the debt considering yield margin reflecting risk undertaken.

Many categories of models may be distinguished on the basis of the approach they adopt. Specific ones can be considered as "structural". They treat the firm's liabilities as contingent claim issued against underlying assets. As the market value of a firm liabilities approaches the market value of assets, the probability of default increases. Intuitively perceived estimation of market values can be revealed from book values of assets and liabilities, thus probability of default of firm's liabilities (credit risk) derives from the capital structure of the firm. Well known structural models of credit risk come origin mostly from theoretical Merton's works (1974, p. 449-470), which became theoretically extended and practically implemented by the KMV Corporation.

1. The Merton Model – basic concepts

Following Merton's model for the valuation of corporate securities we usually consider a simplified case of a firm with risky assets valued today by the market at A_0 level. The value at time t in the future A_t is uncertain, due to many external and internal factors (economic risk, business risk, foreign exchange risk, industry risk, etc.). Typically we assume, that the returns on the firm's assets are distributed normally and their behavior can be described with Brownian motion formulation (1).

$$\frac{dA_t}{A_t} = \mu dt + \sigma_A dz \tag{1}$$

Symbol σ_A stands for constant assets volatility and μ for constant drift*. Value dz denotes for random value taken from standardized normal distribution (Figure 1).

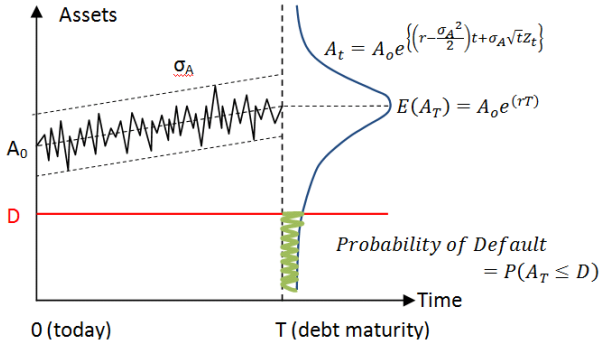

Fig. 1. Basic concept of Merton's model.

Consequently, the firm's assets value assumed to obey a lognormal diffusion process with a constant volatility is given by (2).

$$A_t = A_0 e^{\left\{\left(r-\frac{\sigma_A^2}{2}\right)t+\sigma_A\sqrt{t}z_t\right\}} \tag{2}$$

Value A_0 is initial value of the assets specified at $t = 0$. The expected value of the assets at the time t can be given by (3):

$$E(A_t) = A_0 e^{(rt)} \tag{3}$$

"In the presence of perfect markets free of transaction costs, taxes and informational differences between market participants, the value of the firm is indepen-

* Considering it in detail μ as risk free rate of growth r or expected rate of return μA is one of the future discussed factors distinguishing KMV model from pure Merton's idea.

dent of its capital structure and is simply given by the sum of the debt and equity values." (Ong, 2005, p. 81). That assumption allows to consider situation, that firm has issued two classes of securities: equity and zero-coupon bond. The equity receives no dividends. The bonds represent the firm's debt obligation maturing at time T with principal value D. If at time T the firm's asset value exceeds the promised payment D, the lenders are paid the promised amount and the shareholders receive the residual asset value. If the asset value is lower than the promised payment, the firm defaults, the lenders receive a payment equal to the asset value, and the shareholders get nothing (Hull, Nelken, White, 2004).

Let's assume notation:

1. A_0 denotes value of the firm's assets today and A_T on date T.
2. E_0 denotes value of the firm's equity today and E_T on date T.

When the debt matures on date T provided, there is enough value in the firm to meet this payment ($A_T > D$), debtholders will receive the full face value D due to them and equityholders receive the balance $A_T - D$. However, if the value of the firm's assets on date T is insufficient to meet the debtholders[1] claims (i.e. $A_T < D$), the debtholders receive total assets value, and the equityholders receive nothing (Figure 2). Thus, the amount D_T received by the debtholders on date T can be expressed with (4):

$$D_T = \begin{cases} D & \text{if } A_T \geq D \\ A_T & \text{otherwise} \end{cases} \tag{4}$$

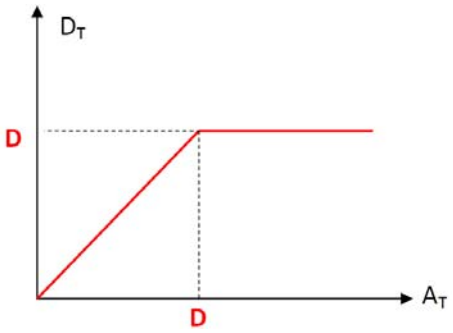

Fig. 2. Payoff from debt at maturity period T related to value of assets

The key insight in Merton's paper is that (4) can be rewritten as the payoff from an option position, and thus option-pricing techniques can then be brought to bear on the problem of pricing risky debt. Instead of conditional formula (4), payoffs received by the debtholders at the time T may also be expressed with unconditional expression (5):

$$D_T = D - \max[D - A_T, 0] \tag{5}$$

The most significant advantage of that representation (Sundarman, 2001, p. 3) is drawn from the readable interpretation (Figure 3):

1. The first component of formula (D), represents the payoff from investing in a risk-free zero coupon bond maturing at time T with a face value of D.
2. The second one $(— max[D — A_T,0])$, is the payoff from a short position in a put option on the firm's assets with a strike price of D and a maturity date of T.

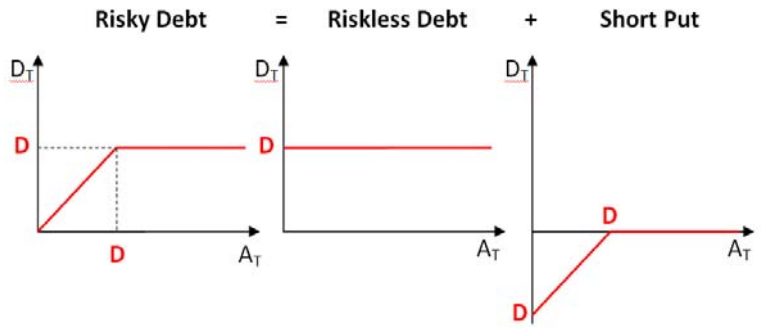

Fig. 3. Decomposition of debt value at the time T

Decomposition illustrated in Figure 3. defines a procedure to valuate present value of risky debt, consisting of two steps:

1) identifying present value D of the risk-free debt,
2) subtracting the present value of the PUT option.

The first step of procedure is straightforward (typically the formula of continuous compounding of interest is used instead of discrete one). The second step is clearly valuing the put option, for which we need an option pricing model. Merton invoked the Black-Scholes model assuming that the firm value A_t follows a lognormal diffusion with constant volatility σ_A, and that the risk-free rate of interest r is constant. Under these assumptions, the value of the PUT option may be obtained from the Black-Scholes pricing formula:

$$PUT = De^{-rT}N(-d_2) - A_0N(-d_1) \tag{6}$$

$$d_1 = \frac{ln\left(\frac{A_0}{D}\right) + \left(r + \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}} \tag{7}$$

$$d_2 = \frac{ln\left(\frac{A_0}{D}\right) + \left(r - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}} = d_1 - \sigma_A\sqrt{T} \tag{8}$$

where:

– E_0 – market value of the firm's equity (today),

- A_0 – market value of the firm's assets (today),
- σ_A – volatility of the firm's assets (std.dev. of annualized rate of return),
- σ_E – volatility of the firm's equity (std.dev. of annualized rate of return),
- D – total amount of the firm's debt,
- T – time to maturity of the firm's debt,
- r – risk free interest rate,
- $N(*)$ – cumulative normal distribution function.

The value of the put option determines the price differential between today's risky and riskless value of the debt, so the market value of debt D_0 can be identified with the equation (9):

$$D_0 = De^{-rT} - (PUT) \tag{9}$$

A higher value of the *PUT* determines the greater distance between the price of risky and riskless bonds, increasing the interest rate spread. Thus, for example, as volatility of the firm value increases, the spread on risky debt must grow, alongside with the value of the put option. Similarly, as the risk-free interest rate increases, the spread on risky debt must decrease as well.

2. Unobservability of the firm value process

The significant problem appearing while attempting a practical implementation of the Merton's model of debt valuation is, that both: the firm value A_0 and its volatility σ_A are usually unobservable. Although the firm value process and its volatility are themselves directly unobservable, it is possible to use prices of traded securities issued by the firm to identify these quantities implicitly. Lets suppose that the firm is publicly traded with observable equity prices. Let E_0 denote the present value of the firm's equity, and σ_E explains volatility of equity (can easily be estimated from the data on equity prices). Both: E_0 and σ_E can be used to obtain estimates of A_0 and σ_A. The first step in this procedure is to express equity value E_0 itself as an option on the firm value. Equityholders receive only an amount remaining after paying the debtholders on date T (10):

$$E_T = \begin{cases} A_T - D & if \quad A_T \geq D \\ 0 & otherwise \end{cases} \tag{10}$$

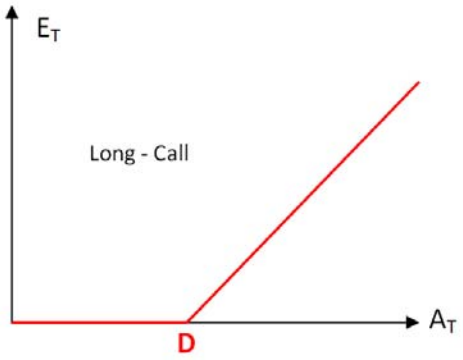

Fig. 4. Payoff from equity at debt maturity period T

It is simply the payoff from holding a long position in a call option on the firm's assets with strike point D and maturity T:

$$E_T = max[0, A_T - D] \tag{11}$$

Following similar procedure as for debt pricing, present value of the firm (equity) can also be defined in accordance to Black-Scholes assumptions. The Merton's model links the market value of the equity and the market value of the assets as follows (12):

$$E_0 = CALL = A_0 N(d_1) - De^{-rT} N(d_2) \tag{12}$$

Since the equity prices E_0 are observable, we got one equation with the two unknowns A_0 and σ_A. To be able to solve for these quantities, we need a second equation. One can proof, that volatility of equity and asset are related according to expression (13):

$$\sigma_E = \frac{A_0}{E_0} N(d_1) \sigma_A \tag{13}$$

Once we have risk-free interest rate and the time horizon of the debt, the only unknown quantities are the value of the firm's assets A_0 and its volatility σ_A. Thus now we can solve the two nonlinear simultaneous equation (12) and (13) to determine A_0 and σ_A by the equity value, volatility value and capital structure (Lu, 2008, p. 12).

3. Implied credit spread of risky debt

Merton's model can be used to explain "credit spread", defined as difference between the yield on the risky debt and the risk – free rate. Let's define D_0 as the market price of the debt at time zero. The value of the assets is equal to total

value of the two sources of financing: equity and debt, so that present value of the debt can be expressed with expression (14):

$$D_0 = A_0 - E_0 \tag{14}$$

Replacing E_0 with (12) drives to (15), and finally to (16):

$$\begin{aligned} D_0 &= A_0 - A_0 N(d_1) + De^{-rT} N(d_2) = A_0(1 - N(d_1)) + De^{-rT} N(d_2) \\ &= A_0 N(-d_1) + De^{-rT} N(d_2) \end{aligned} \tag{15}$$

$$D_0 = A_0 N(-d_1) + De^{-rT} N(d_2) \tag{16}$$

The yield to maturity for the debt can alternatively be defined implicitly by (17):

$$D_0 = De^{-yT} \tag{17}$$

Comparing right sides of equations (16) and (17) we can derive the value of yield rate y (18):

$$\begin{aligned} De^{-yT} &= A_0 N(-d_1) + De^{-rT} N(d_2) \\ y &= -\frac{1}{T} ln\left(\frac{A_0}{D} N(-d_1) + e^{-rT} N(d_2)\right) \end{aligned} \tag{18}$$

The same result can be gained from the fundamental formula on rate of return with continuous compounding (19):

$$y = \frac{1}{T} ln\left(\frac{D}{D_0}\right) = \frac{1}{T} ln\left(\frac{D}{A_0 N(-d_1) + De^{-rT} N(d_2)}\right) \tag{19}$$

The credit spread implied by the Merton model can be finally obtained by reducing the yield rate with the risk – free rate (20):

$$s = y - r \tag{20}$$

In summary, a creditworthiness of a firm (level of credit risk related to its obligations), can be displayed with implied credit spread for its debt which is dependent on three important ingredients: leverage ratio, assets volatility σ_A, and the time to repayment T (Debt maturity). Figures 5 to 7 illustrate three examples of credit spread calculation.

Black - Scholes - Merton Model
Calculating implied credit spread

100,00	A_0	market value of the firm's assets (today)	
25,00%	S_A	volatility of the firm's assets (std.dev. of annualized rate of return)	
50,00	D	total amount of the firm's notional debt	
5,00%	r	risk free interest rate	
1	T	time to maturity of the firm's debt	
3,097588722	d_1	$d_1 = \frac{ln\left(\frac{A_0}{D}\right) + \left(r + \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}}$	$d_2 = \frac{ln\left(\frac{V_A}{D}\right) + \left(r - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}} = d_1 - \sigma_A\sqrt{T}$
2,847588722	d_2		
0,01	PUT	differential between today's risky and riskless debt	$PUT = De^{-rT}N(-d_2) - A_0N(-d_1)$
47,55	D_0	market value of the firm's debt (today)	$D_0 = De^{-rT}$ – differential between risky and riskless debt
47,55	D_0	market value of the firm's debt (today)	$D_0 = A_0N(-d_1) + De^{-rT}N(d_2)$
5,02%	y	annualized continuous yield of return	$y = \frac{1}{T}ln\left(\frac{D}{D_0}\right)$
0,02%	s	implied credit spread	$s = y - r$

Fig. 5. Example of "save" structure of capital, resulting with close to zero implied credit spread

Black - Scholes - Merton Model
Calculating implied credit spread

100,00	A_0	market value of the firm's assets (today)	
25,00%	S_A	volatility of the firm's assets (std.dev. of annualized rate of return)	
80,00	D	total amount of the firm's notional debt	
5,00%	r	risk free interest rate	
1	T	time to maturity of the firm's debt	
1,217574205	d_1	$d_1 = \frac{ln\left(\frac{A_0}{D}\right) + \left(r + \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}}$	$d_2 = \frac{ln\left(\frac{V_A}{D}\right) + \left(r - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}} = d_1 - \sigma_A\sqrt{T}$
0,967574205	d_2		
1,51	PUT	differential between today's risky and riskless debt	$PUT = De^{-rT}N(-d_2) - A_0N(-d_1)$
74,59	D_0	market value of the firm's debt (today)	$D_0 = De^{-rT}$ – differential between risky and riskless debt
74,59	D_0	market value of the firm's debt (today)	$D_0 = A_0N(-d_1) + De^{-rT}N(d_2)$
7,01%	y	annualized continuous yield of return	$y = \frac{1}{T}ln\left(\frac{D}{D_0}\right)$
2,01%	s	implied credit spread	$s = y - r$

Fig. 6. Example of large debt contribution, resulting with 2 p.p. implied credit spread

Black - Scholes - Merton Model
Calculating implied credit spread

100,00	A_0	market value of the firm's assets (today)	
50,00%	S_A	volatility of the firm's assets (std.dev. of annualized rate of return)	
50,00	D	total amount of the firm's notional debt	
5,00%	r	risk free interest rate	
1	T	time to maturity of the firm's debt	
1,736294361	d_1	$d_1 = \frac{ln\left(\frac{A_0}{D}\right) + \left(r + \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}}$	$d_2 = \frac{ln\left(\frac{V_A}{D}\right) + \left(r - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}} = d_1 - \sigma_A\sqrt{T}$
1,236294361	d_2		
1,02	PUT	differential between today's risky and riskless debt	$PUT = De^{-rT}N(-d_2) - A_0N(-d_1)$
46,54	D_0	market value of the firm's debt (today)	$D_0 = De^{-rT}$ – differential between risky and riskless debt
46,54	D_0	market value of the firm's debt (today)	$D_0 = A_0N(-d_1) + De^{-rT}N(d_2)$
7,17%	y	annualized continuous yield of return	$y = \frac{1}{T}ln\left(\frac{D}{D_0}\right)$
2,17%	s	implied credit spread	$s = y - r$

Fig. 7. Example of "save" structure of capital related to large assets volatility, resulting also with 2 p.p. implied credit spread

Initial model presented at Figure 5 illustrates rather comfortable situations for creditors. Calculated credit spread is close to zero confirming a low level of the credit risk. Changing the structure of financing firm's activity by blowing up debt contribution (80 in place of 50 – Figure 6) increases probability that the market value of the assets drop below the debt value causing default situation. It results with implied credit spread over 2 p.p. greater then previously. Analogical situation could happen for initial value of the debt, but higher volatility of the assets (50% in place of 25% – Figure 7). Also in that case, market value of the firm's debt become lower then initially and consequently, the realized yield of return is higher, compensating increased credit risk.

4. The KMV Model

The practical implementation of Merton's model, has received considerable commercial attention in recent years. One of them is KMV model which in fact is a modified version of the Merton's concept, varying from the original with a few aspects.

According to preceding discussion, in the Merton's model, a nominal value of firm's obligation was considered as a terminal value for firm's assets. "KMV Corporation has observed from a sample of several hundred companies that firms are generally more likely to default when their asset values reach a certain critical level somewhere between the value of total liabilities and the value of short-term debt. Therefore, in practice, using D alone as the threshold in the tail distribution might not be an accurate measure of the actual probability of default. KMV implements an additional step and refers to this critical threshold for defaulting as the Default Point." (Ong, 2005, p. 84). The ambiguity of formal bankruptcy state and the situation, when assets value fall below the value of liabilities makes theory of determining accurate threshold level for default situation quite soft. For KMV model Default Point (DPT) is roughly approximated by the sum of all the Short Term Debt (STD) and half of the Long Term Debt (LTD) (21):

$$DPT = STD + 0{,}5LTD \tag{21}$$

Another point is, that for practical reasons, before computing the probability of default, the KMV approach implements an intermediate phase of computation of an index called Distance to Default (DD) (Lu, 2008, p. 12). "It is defined as the distance between the expected assets value of the firm at the analysis horizon, (...) and the default point, normalized by standard deviation of the future asset returns." (Ong, 2005, p. 84). Formally it is defined as follows (22).

$$DD = \frac{E(A_T) - DPT}{\sigma} \tag{22}$$

Following that idea, to derive the probability of default for a particular firm, we must calculate the distance to default first. The probability of default for any time horizon is strongly related to *DD*. The larger *DD*, the smaller *PD* that means the less chance the company will default.

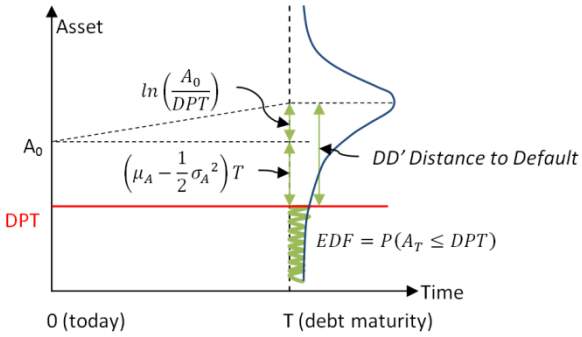

Fig. 8. Distribution of the firm's asset value at maturity of the debt

Calculating *Distance to Default* can be decomposed into two stages, derived from Figure 8:

1) calculating absolute Distance to Default – DD',
2) calculating relative Distance to Default – DD.

Absolute Distance to Default (DD') it is expressed (in percents of expected assets) as a distance between expected assets and Default Point (DPT). It can be displayed as a sum of initial distance and the growth of that distance within the period T (23).

$$DD' = ln\left(\frac{A_0}{DPT}\right) + \left(\mu_A - \frac{1}{2}\sigma_A{}^2\right)T \tag{23}$$

Not as in pure Merton concept, in KMV model μ_A is no longer risk-free rate but expected rate of the return of the firm's asset and DPT is Default Point instead of nominal value *D* (the face value of the debt). A little confusing is considering in formula (23) expected growth of assets as equal to $\left(\mu_A - \frac{1}{2}\sigma_A{}^2\right)$ instead of simply μ_A. While rate of return is normally distributed, consequently future value of investment (or effective yield of return) is distributed lognormaly. Relation between those two distributions is explained with (24), where, as previously, μ_A is the drift rate (expected rate of return) and σ_A is the volatility of the underlying (*The Professional*..., 2004).

$$ln\left(\frac{S_T}{S}\right) \sim N\left(\left(\mu_A - \frac{\sigma_A{}^2}{2}\right)T, \sigma_A\sqrt{T}\right) \tag{24}$$

Dividing absolute value *DD'* with calibrated (according to *T* – usually annualized) volatility of assets, we can calculate *DD* in relative terms as a multiplier of standard deviation (25).

$$DD = d_2 = \frac{\ln\left(\frac{A_0}{DPT}\right) + \left(\mu_A - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}} \tag{25}$$

It is easy to notice, that such estimation of *Distance to Default* is very similar to d_2 (considering mentioned above replacement of *r* with μ_A and *D* with DPT). "The similarity is not an accident and is the result of a relationship between the risk – neutral probability and the actual probability. The actual probability uses the expected return of the assets in the drift term, while the risk-neutral probability uses the risk free rate r." (Ong, 2005, p. 86).

5. Probability of Default vs. Expected Default Frequency

Considering the most simplified situation of normally distributed assets value after period *T*, according to the definition of default (value of firm's asset falls below the value of *DPT*), we can estimate the probability of default with formula (26).

$$PD = 1 - N(d_2) = N(-d_2) \tag{26}$$

Because of well known problem of fatter tails in real credit loss distribution, that type of estimation (even with lognormal distribution instead of normal) is underappreciated. In that situation, one more distinguishing feature of KMV model is, that it operates on the historical set of frequencies of default rather then on theoretical normal or log-normal distribution. Consequently, in KMV model Probabilility of Default (PD) is replaced with Expected Default Frequency (EDF). "Using historical information about large sample of firms, including firms that have defaulted, one can track, for each time horizon, the proportion of firms of a given ranking (...) that actually defaulted after one year." (Crouchy, Galai, Mark, 2006, p. 277). An example of that dependence is shown at Figure 9. For *DD* = 3, Expected Default Frequency is equal to 40 basic points. That means, that according to data base analysis, 0.4% of registered firms with *DD* = 3 defaulted after one year. At the same time, for *DD* = 1, *EDF* grows to 120 b.p. = 1.2%.

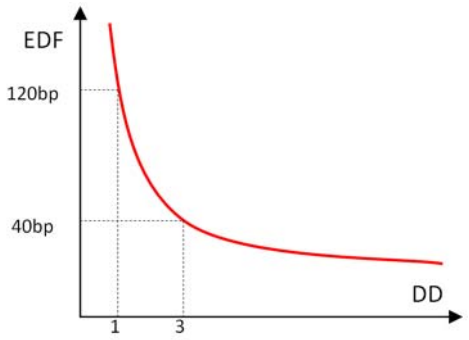

Fig. 9. Correlation between Distance to Default and Expected Default Frequency

Simplicity of using EDF vs. DD curve makes concept of KMV model very comprehensive and easy to implement.

Conclusion

As the theoretical idea of Merton's and KMV model seems to be very convincing, the most important question arises, whether the results given by this approach is really any better then the probabilities empirically derived by rating agencies, and related to popular rating grades. Very limited credibility of the rating agencies being accused widely for undermining financial stability of contemporary economies is a strong incentive for searching more transparent and based on clear fundamental assumptions models of risk assessment. Even since using a sound, theoretical foundation, in practice, using discussed models boils down to a subjective estimation of the most input parameters making gained results not fully convincing. Thus, not undermining the credibility neither pure Merton's conception nor KMV model, it should be always recommended to use them with caution and an open mind.

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MODEL MERTONA I KMV W ZARZĄDZANIU RYZYKIEM KREDYTOWYM

Streszczenie

Widmo kryzysu finansowego, w którym są pogrążone współczesne gospodarki, wywiera rosnącą presję na inwestorów poszukujących coraz efektywniejszych narzędzi zarządzania ryzykiem kredytowym. Czynnikiem szczególnie mobilizującym do tych poszukiwań stała się znaczna utrata wiarygodności przez instytucje ratingowe, których oceny były dotychczas głównym wyznacznikiem zdolności kredytowej kredytobiorców. Alternatywą zdają się być modele strukturalne bazujące na fundamentalnych przesłankach odwołujących się głównie do relacji aktywów dłużnika do wielkości jego długu wraz z prognozowaną zmiennością wartości rynkowej aktywów. Do najbardziej znanych modeli tej kategorii należą model Mertona i jego praktyczna implementacja określana mianem modelu KMV. Opracowanie zawiera zarys koncepcji powyższych modeli, ze szczególnym wskazaniem na przesłanki ich wykorzystania.

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THE RISK OF COOPERATION BETWEEN BANKS AND INSURANCE COMPANIES

Introduction

The cooperation between financial market entities, in particular the cooperation between banks and insurers, is the field of rapid development and constant innovation. Both the high growth rate and the intensity of changes leave open the area of bancassurance to creation, exposure and implementation of risks associated with the nature of financial market and operational risks arising from the involvement of several entities in the business undertaking. The bancassurance is a reaction to trends that are taking place in the sector of financial institutions. This reaction is primarily based on adjusting the structure of financial institutions to services and products offered to customers, but also on entering the financial market by non-banking institutions, striving for providing all services by one institution and the development of direct distribution channels for financial services. The main topic of the undertaken discussion is to determine whether a specific activity of a commercial bank and an insurance company has a positive effect on the ability to manage various risks that may arise from the bancassurance operations, or else specific rules governing the activities of these entities to expand the scope of risks involving both: cooperating entities and service users of bancassurance.

1. Banking and insurance activities – observations from the bancassurance and risk perspective

Defining the insurance and banking cooperation can be done from a number of perspectives. The broadest platform of links between banks and insurers is the fact that they belong to the financial system, and especially create the system of financial markets along with other entities conducting monetary operations. An important platform of cooperation of banking and insurance entities is also the presence of connections between these entities of organizational and capital nature, as well as offering complementary, substitute or neutral product solu-

tions. It should be noted that both the banking as well as insurance entities are business oriented establishments that operate to increase the value of these specific entities, of which seeking a profit is the primary symptom. When a synthetic overview of factors affecting the bancassurance relationships is carried out then a need arises to identify the motivators and financial consequences of banks and insurers liaison.

The applied bancassurance definitions are in many cases vague and imprecise. The bancassurance, despite the fact that is common, is not always unequivocally diagnosed, and its shape, manner of operation and characteristics depend on the location of this development, as well as on the local market nature. In the broadest terms, the bancassurance is defined as an activity of utilizing a bank, its facilities, services and customers to sell insurance with the initiative for such operations derived from commercial banks specializing in retail banking (Śliperski, 2002, p. 21).

There are other approaches to the synthetic description of bancassurance phenomena. These approaches suggest that the banking and insurance relationship provides a permanent connection of these institutions, and therefore the objective of the relationship is to offer common products within the structures of banking institutions. The definitions of this kind clearly indicate the dominant role of the bank in the bancassurance connection.

Another attempt to define the bancassurance is to underline the legal factors which indicate that the banking and insurance alliance is based on all kinds of legal relationships, which are entered into by banks and insurers in order to obtain insurance coverage for bank customers. However legal aspects can be considered as a part of various factors influencing the bancassurance concept (Czechowska, 2004, p. 161; Orlicki, 2008, p. 66).

The identification of terms and conditions of the cooperation of the financial sector entities within the frame of bancassurance allows to indicate the levels of bancassurance, which include:

- the objective scope of activities and operations conducted by banks and insurers, the scope and purpose of financial operations conducted by these entities are similar, and even in some cases identical,
- the interrelationship between the capital base and forms of supervision of the entities making up banking and insurance partnerships; the predominant is the principle according to which both the capital base and the supervision should be consolidated with the increasing scale and accumulation of bancassurance relationships,
- legal standards, which allow partners to connect both types of financial services,
- a product platform, products offered by bancassurance entities are often complementary, enrich the offer, or are mutually competitive (Cichy, 2002, p. 102).

The history of development and current stage of banking and insurance cooperation make possible to indicate the main objective of bancassurance in general, which is providing insurance services to the clients who have used the services of banking entities beforehand. Depending on the form and scope of cooperation the insurance offer can be integrated with banking services, or may constitute a separate range. It is assumed that the purpose of banking and insurance cooperation is to achieve financial gain, but in the decision process on the cooperation it is necessary to examine the effectiveness of such an alliance. The crucial issue is to examine whether the benefits of cooperation will be higher than the results achieved independently by potential partners. Most frequently the benefits of the bank and insurer cooperation may occur in areas of: a financial result, legal aspects and operational activities (Grygutis, 2002, p. 76).

A key element taken into account in the study of bancassurance processes is a synergy effect. This effect indicates the presence of greater benefits from integration than the sum of the benefits of both companies reached in the case of their separate operation (Swacha-Lech, 2009, p. 15). The basic scope of synergy from the perspective of bancassurance includes financial, functional and marketing areas.

The financial synergy effect concerns achieving profitability and improving cash flow of cooperating institutions. The integration of banks and insurance companies in terms of financial synergy means that fixed costs are distributed over a larger number of products and customer service costs are reduced as a result of the total sales of services. Bancassurance activities improve the effective use of technical infrastructure and intangible assets of the bank, and the promotion of insurance, or its sales in the bank branches increases staff efficiency. The effect is stabilization of the financial result in the long run.

The functional effects of synergy are related to operating activities of banks and strengthening the processes of product development, its sales and after sales by the cooperating entities. Since the implementation of new financial products is very expensive and severely limited under the highly developed market conditions this phenomenon is especially important. The synergy in the area of functional cooperation in bancassurance means an access to technology and knowledge of a partner. Another important area of functional synergy is the impact on sales processes. An active product policy contributes to an increase in the volume of banking services sold. A wide range of banking products offered helps to improve the image of the bank and contributes to increased confidence, which is not without significance in offering insurance, especially life assurance.

The banking and insurance cooperation can also positively influence the strategies and marketing activities of banks and insurers. It should be noted that aspects of the marketing synergies in bancassurance concern not only the image of cooperating entities, but also the pricing policy, the overall communications

strategy as well as the market and customer knowledge. The benefits achieved through the bancassurance in marketing are generated by the mutual research, development, advertising, joint analysis, the use of brand and partner's goodwill to improve own image and the use of bank's databases to sell insurance policies.

Considering the processes of bancassurance from the financial, functional and marketing angle some attention should be paid to aspects of risk associated with cooperation. Carrying out activities targeted at developing offers, conducting sales and organizing operational areas of cooperation within the bancassurance require special precautions to avoid a situation in which the operational problems of one of the entities involved in the bancassurance will be transferred to the level of customer service of the other of the cooperating partners. Also in the field of financial synergy there is a risk of adverse effects on profitability and liquidity of the cooperating bank and insurance company. It is also important to address the implications of taking action to achieve synergy in marketing field. A special area that should be subject to intensive monitoring is the impact of bancassurance cooperation on the brand name of each of the cooperating entities, in particular the problems that may occur in the market image of the bank or insurer related to changes in the bank's image-bearing a negative impact on the insurer, and vice versa.

The analysis of the effects of the bank and insurer cooperation in the context of widely presumed risks that may affect the bancassurance relationships should be carried out also from the perspective of organizational and legal conditions. The fact that the structure of bancassurance cooperation stays in conformity with the applicable law on possibilities for cooperation by the two entities, whose activities are subject to special legal regulations, is of major importance.

Analyzing the formal and organizational aspects of cooperation aimed at identification the potential areas of risk in banking and insurance cooperation, the purely distributional ties should be distinguished in which the bank arranges the sales of insurance products through the bank's distribution channels. Considering the organizational aspects of bancassurance, a form of links can also be identified, in which the distribution of insurance products is not entirely based on the availability of bank branches to conduct sales activities in the field of insurance, but also bank employees have adequate training and knowledge necessary to carry outtrading in insurance products. In this situation, the bank's employees play the role of intermediaries in the conclusion of insurance contracts within the bancassurance. The most advanced form of cooperation between banking and insurance entities, in terms of organization, is the integrated model, in which the merger of front and back office processes occur, a comprehensive look at the customers' needs is taken, a single commission and remuneration policy and a plan to sell bancassurance products are implemented.

Each of the identified organizational forms of banking and insurance cooperation results in different consequences in terms of specific risks that may occur in the implementation phases of distribution, or the use of bancassurance products. The day-to-day practice shows that the diversity of forms of cooperation in the bancassurance requires risk management, the use of different procedures for the operational management, as well as cost allocation and use of analytical measurements allowing for precise determination of cost- and revenue- effectiveness of the relationship between the insurer and the bank, also taking into account the marketing consequences of business activity.

Considering the bank's relationship with the insurer from the perspective of legal regulations, it must be remembered that the banking law allows bank entities to conduct banking intermediation in insurance services (*Ustawa Prawo bankowe*…, 1997, art. 6). What matters is the fact that the bank as an entity is permitted to conduct insurance intermediation in the form of an insurance agency (*Ustawa o pośrednictwie ubezpieczeniowym*…, 2003). At the same time it should be noted that the mentioned legal regulations do not include the detailed rules for organizing risk management associated with this type of cooperation. Given the practical approach, it should be noted that the formation and functioning of banking and insurance relationships is mainly due to market conditions in which the entities of the financial system operate. Changes in the financial services sector, aimed at tailoring a product offer into customer's needs, accounting for the financial benefits of the entities offering these products, have caused development within the ways of regulating the forms of cooperation of related entities.

The risk analysis, which occurs in the cooperation between banks and insurance companies may cover the area of joint initiatives and common services. The primary factor that affects both the essence of bancassurance, as well as the approach to the risk of this cooperation is the issue of capital links between cooperating entities. The commonly accepted standard for distinguishing forms of bancassurance is the capital and non-capital approach (Swacha-Lech, 2009, p. 24).

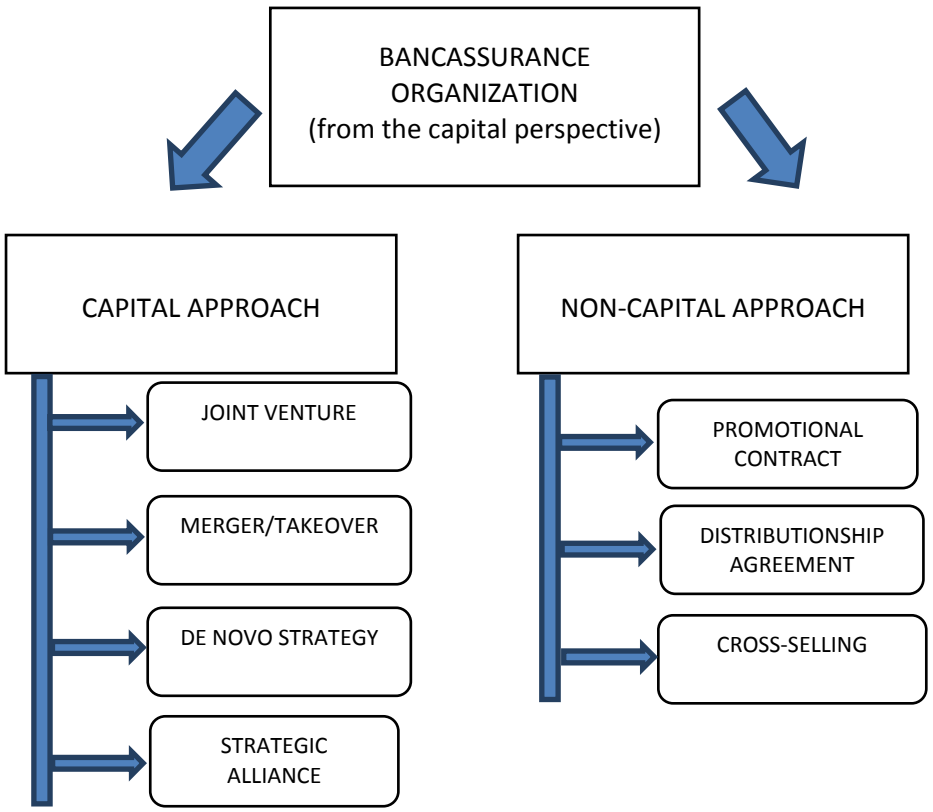

Fig. 1. Legal and organizational forms of bancassurance

The acceptance of specific organizational and legal rules in a model of co-operation between the bank and insurer means at the same time a decision to take the risks associated with a specific form of cooperation. The risk level of cooperation within the various bancassurance models depends directly on the legal structure of banking and insurance arrangements, as well as the subsequent implementation of the cooperation agreement. Specific rules for cooperation determine the scope and intensity of risk.

The capital approach in banking and insurance cooperation is limited to the establishment of bank and insurance company cooperation of an objective nature. However, in the capital approach there is a capital commitment. A decision on the choice of forms of cooperation depends on factors, both dependent on a bank or insurance company as well as the economic policy of the country or institutional competition in the market. The particular forms of bancassurance have their advantages and disadvantages that are associated with specific start-up costs. Therefore, choosing a model of cooperation may depend on the capabilities of cooperating entities and the conditions created by the environment.

The banking and insurance cooperation organized on the non-capital principle means that banks joined forces with insurance companies in order to sell common products and services. The cooperation within the bancassurance in the form of a distributionship agreement concerns the mutual distribution of products and services. Depending on the bancassurance contract the insurance company sells its services through the bank distribution channels under its brand name or the insurance company offers banking products to customers through its distribution channels. The main areas of risk in this model of cooperation are the limitations in the level of sales of own products associated with the availability of distribution channels for sales of the partner's products. Each institution is responsible for its own products and the agreement partner is accountable for the distribution channels.

The specific situation applies to promotional contracts, in which the bank offers selected insurance products of a business partner in its branches. The promotional initiatives can be of active and passive nature. The passive approach is primarily to inform the bank's customers of partner's products through the use of: ATMs, electronic banking as well as through bank branches displaying various information materials on insurance. Unlike in the active form where there is an engagement of bank's employees in promotional activities, in particular, by accepting and checking insurance documents or encouraging a client to contact a partner insurance company. Several key types of risk are identified here, and above all, the level of remuneration the bank employees are offered by the insurance partner, the engagement level of staff governing the promotion, the need for continuous and meticulous monitoring of the promotional contract, and the risk of incurring significant costs of training the bank staff in the field of insurance products.

In a different way the cooperation model is shaped in the form of objective character – cross-selling. This model involves the sale of one service, while offering another one, often complementary, in a single, mutual, integrated offer. The impact of risk in this bancassurance model can be based on the fact that the customer's dissatisfaction with a product triggers further dissatisfaction into the products supplied by another entity within the bancassurance.

The capital approach is characterized by much broader influence of the bank over the nature of products sold and services offered than in the non-capital approach. The non-capital strategy means that banks have also significantly greater capacity to generate revenue.

The acceptance of a joint-venture model as a capital model of banking and insurance cooperation means a mutual undertaking of several business entities. The main pillar of the joint-venture model is setting off selected funds from bank and insurer and appoint a legally and organizationally independent entity to

achieve certain goals. Functioning of the joint-venture for the bancassurance needs is usually characterized bya dominant bank position, whose branches, agencies and database are used to sell insurance products. The advantage of joint-venture cooperation of banks and insurance companies is the desire to expand into a new markets or to focus on a particular segment of the insurance or banking business. The risk of joint-venture use in the bancassurance is the necessity of conducting market tests, which only allow us to decide to expand into this market.

Mergers and acquisitions in the bancassurance are used relatively rarely. This model requires the transfer of all assets of the acquired company to another acquiring company in the exchange for the shares and contributions, which the acquiring company gives to the shareholders of acquired company – merger by acquisition, or the formation of a capital company, onto which all assets of merging companies go in the exchange for the shares and contributions of the new company – or joining forces by setting a new company (*Ustawa Kodeks spółek handlowych*…, 2000, art. 492). Unfavorable aspect of this type of cooperation is the risk associated with losses that the bank may incur in the event of a failure of such a strategy, because in case of poor financial situation and growing liabilities of the insurance company, the bank may be forced to sell it below its purchase price.

The strategic alliance is an agreement between the bank and the insurer on the common use of distribution channels. The cooperation within the strategic alliance does not result in a loss of organizational and functional independence of the partners, and contributes to the acquisition of additional customer portfolio, allowing partners to maintain a competitive advantage in the financial market. The main risk of the alliance strategy is the lack of sufficient sales and financial effects resulting from the relatively low level of formality of cooperation. The bank gains experience in the field of insurance and may regard this as a transitional stage strategy for creating its own insurance company.

The de novo strategy is based on the funding operations by using own financial resources. This method makes it possible to develop complementary products in relation to the already offered ones, and the more profitable products are further developed. In this method the risks are associated with high costs of the initial phase connected with the acquisition of technology, personnel and know-how, and the long time needed to develop the introduced operation.

Each of the organizational and legal forms of cooperation generates the possibility of the formation and implementation of various types of risk. These risks are focused on areas of operational and financial activities of the bank and the insurer. The accurate identification of these risk groups and attempt to estimate the impact of the risk on the future situation of cooperating entities are of significant importance for the bancassurance.

2. The risk identification and management in bancassurance business

The analysis of risk issues in the field of banking and insurance cooperation focuses on two main areas:

– identification and management of risk associated with the organization and development of cooperation between the bank and the insurance company,
– assessment of a specific risk arising from banks' and insurers' operations and its impact on the principles, the form, the course and the consequences of co-operation within bancassurance.

The risk in the operations of the financial sector entities is defined in many ways, but mostly these definitions refer to the risk as the threat of achieving the intended objectives, what might be seen in the reduction of potential profits, equity, the loss of liquidity and credibility in the financial services market, even with the possible ultimate result of bankruptcy (Zawadzka, 1995, p. 9).

The specific risk to the activities of banks and insurance entities exist regardless of the participation of these entities in bancassurance agreements. Some of specific risk types are similar to both the bank and the insurer. However, the basic risks vary. It should be noted that the prevalence of banking and insurance relationships does not substantially affect the existence and implementation of the essential risks driven from own bank's and insurance's activities, which means that, in practice, bancassurance is not used as a tool for enhancing the risk management of the entities participating in the agreement. At the same time it is worth to notice the fact that the topic of using the cooperation within bancassurance framework for the diversification of financial market operators, which sought to demonstrate that the diversification enhances the market risk management, the concentration risk and the different types of risk in the area of marketing and sales has been tackled. The conducted studies on the mentioned topics do not show, however, that this kind of diversification has a positive effect on the value of entities from a banking and insurance sector. The increase in the value of these entities, resulting from bancassurance, has its source not in the diversification of activities, but in a better use of resources held by banks and insurance sector entities, in particular the process of organizing the integrated distribution of financial products.

The specific risk of the commercial bank operations is centered around the basic functions of this entity, namely: the collection of deposits, loans and clearing operations. The risk group of bank operations includes, above all, the systematic and unsystematic risks, in particular the ones regarding the interest rate, the insolvency of a borrower, the volatility of exchange rates, changes in purchasing power, changes in market valuation of financial instruments as well as the

political risk, the risk of default, the management field risk, the operational risk, or the risk of bankruptcy (Dobosiewicz, 1999, p. 207). The risk relating directly to specific activities of the bank is a subject of management processes in accordance with bank policies and procedures. The coexistence of banking and insurance products does not, in this case, have any significant impact on the emergence and implementation of the identified risk groups, despite the existence of references and boundary points with the operations of insurance sector entities. The specific place of a significant connection between banking and insurance products is the bancassurance offer, where the insurance products are connected with the loans granted by banks, what is an example of bank's risk management with the application of insurance tools.

Conducting insurance operations is done in the conditions of risks inherent from offering insurance coverage. This risk is grouped into the areas of insurance risk and insurer's risk. Among the types of insurance risk the basic risks are identified in personal insurance – the risk of death, sickness, sudden illness resulting in a lack of income-earning opportunities, as well as in non-life insurance – the risk of losses in tangible assets and financial assets of an individual or an entity affected by a random event. The insurer's risk primarily relates to an insurance company as an entity conducting business activity, so the insurer's business risk typology is similar to other entities operating in the financial markets. The main risks affecting the insurer's business are: operational risk, market risk (the valuation of financial instruments), liquidity risk, solvency risk, risk premium calculation, the risk of default, political risk and others.

A special feature of the insurer's operations is a constant risk analysis and proactive risk management of both risks: of the insurance cover and of the insurer, which are conditioned by the fact of conducting the insurance activity that is aimed at offering services in the form of intangible asset, namely: a combination of current cash flows from premium contributions, future payments of compensations and benefits, and the probability of random events occurrence covered by insurance. The analysis of risk characteristics in the cooperation of banks and insurers within bancassurance framework covers several basic areas (Rule, 2001, p. 137-159):

- risk of selection of cooperating partners,
- transfer of risk between the banking and insurance sectors,
- mutual accumulation or interference of risk specific for the bank and insurance operations,
- development and complexity of risk management procedures in the group of entities cooperating within bancassurance,
- marketing risk associated with the image of each of the entities involved in bancassurance.

The cooperation of bank and insurer, depending on the model of bancassurance, remains under the influence of groups of risk, whose significance depends

on the organizational and legal form of cooperation, the scale and the capital interdependence between the bank and insurer, and also on the influence of external factors which influence cooperating entities. It is possible to identify the risk associated with banking and insurance cooperation, in most cases, before deciding on setting off for bancassurance, but some risks have already emerged in the process of entities' cooperation. It is important, therefore, such shaping of relationships in bancassurance agreements that during the implementation of the agreement, each entity has the possibility of quick and adequate response to identified risks. These agreements should show flexibility, so that the cooperation of both parties involved has a real impact on the management of diagnosed risk areas. The risk of banking and insurance cooperation outside the mentioned areas in the general business of the bank and insurer also relates to specific aspects of the activity generated by the determinants of cooperation (Benoist, 2002, p. 300-301):

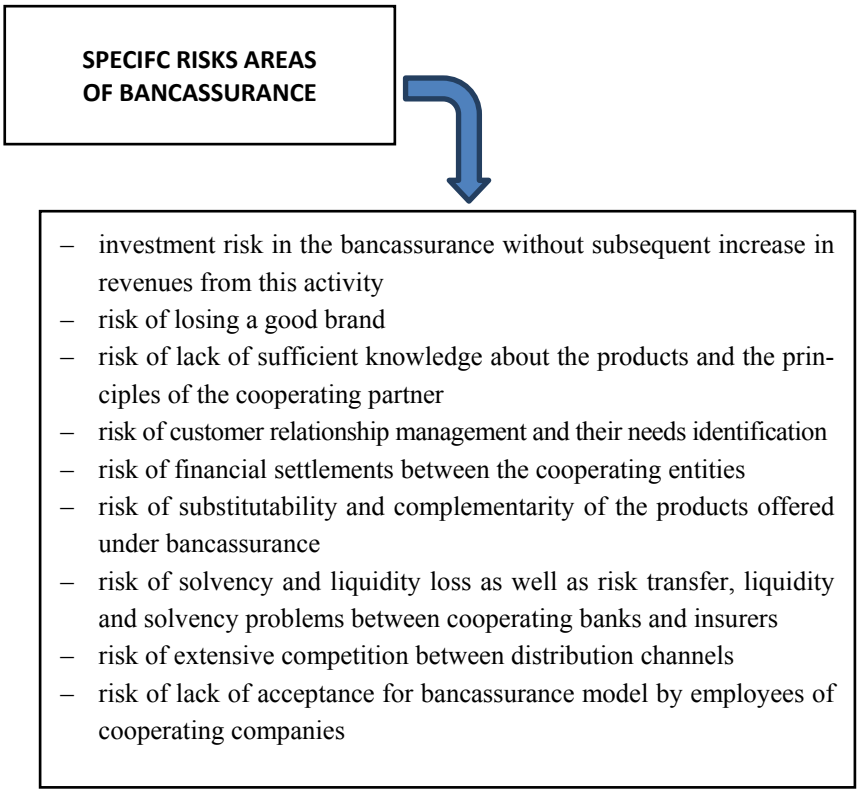

Fig. 2. Specific areas of risk in banking and insurance cooperation

The effects of implementation of the identified types of risks in bancassurance can affect several areas of business activity and cooperating entities. The

main area, in which the effects of the bancassurance risk can be experienced by the owners of banking and insurance entities, is the sphere of financial results achieved by the cooperating entities. Significant changes are also possible at the level of sales and customer satisfaction. At the same time very serious consequences may arise for both the bank and the insurer in the event of an excessive scale of cooperation development, or a very fast pace of this development. These factors affect the solvency and liquidity of participants of an agreement. An important effect of risk associated with bancassurance is the need to reconcile the long-term effects of offering insurance solutions to customers with the short-term expectations in the use of many banking services. Despite the identified risk the cooperation within bancassurance brings substantial benefits to the co-operating entities. Attention should be paid here mainly to:

- possibility of stimulating and increasing sales of products,
- increasing the offer competitiveness of each of the cooperating entities,
- reducing costs both in the area of distribution as well as in areas of operations, resulting in increased profitability of all bancassurance agreement participants,
- expansion and diversification of cooperating entities distribution channels,
- increase efficiency in use of contacts and customers database,
- reduction of risk specific to banks by the use of insurance products offered by bancassurance,
- bilateral expansion of surplus placement by each entity of bancassurance agreement by allowing access to a specific market sector of banking and insurance.

The areas of existence of banking and insurance cooperation risk may be subject to development, which is linked to both the changes in the financial services market, as well as changes in models of banks' and insurers' operations. The primary factor remains constantly the scope and intensity of cooperation within bancassurance, as well as expectations about the financial benefits (earnings growth), which bancassurance is expected to bring. The increasing level of expectations for financial results of bancassurance usually increases the risk generated by this kind of cooperation.

Conclusions

A risk exists in the operations of all entities operating in the financial markets, as well as in other areas of business. The specificity of banks' and insurers' operations is the existence of typical risk groups for the banking and insurance markets only, but at the same time these entities are subject to risks impacting upon other entities. A particularly important aspect is to study the influence of

banking and insurance relationships on the level and extent of the risks of cooperating entities. The conducted analysis showed that building a banking and insurance cooperation within bancassurance causes that both the types and the extent of risks affecting the cooperating entities are greater than the risk occurring in separate banking or insurance operations. It should be noted that some risks have also been identified, in which bancassurance cooperation causes risk reduction to the bank and insurer, mainly by splitting it between two cooperating entities. This process is associated with the effect of diversification of banking and insurance relationships and the synergy effect in bancassurance.

The basic, identified areas of risk in bancassurance refer to the operations of cooperating entities, as well as the areas of customer relationship management, building and maintaining the market image of the bank and the insurer. Changes in the existing scope of risk and its new areas also affect the financial sphere of cooperating entities, especially in terms of profitability and solvency. It is also important that concluding bancassurance agreements is aimed at, in the significant number of cases, achieving additional profits, which initiates and increases the risk of irregularities in the distribution processes of banking products through the bank channels, but also creates the risk of irregularities and fraud in the mutual settlements between the cooperating entities. The negative effect of the realization of the mentioned groups of risk may be worsening a client's position while using the services of both the bank and the insurance company. The bancassurance partners striving for making a profit may increase the risk of mismatches in bancassurance services to customer needs and expectations, and ultimately lead to their dissatisfaction, or in special cases to the emergence of claims from customers.

The risk analysis of banking and insurance cooperation also points to the possible transfer of risk across sectors, resulting in charging the bank or insurance company with the consequences of adverse events and trends in bancassurance partner operations.

The possibility of distinguishing all areas of risk emerging in banking and insurance cooperation is also strongly influenced by the possibilities and merits of risk-sharing based on the fact of the existence of a bancassurance agreement. It is particularly important, therefore, to extend further the knowledge of factors that indicate whether the cooperation of the bank and the insurer increases, limits or remains neutral to the type and extent of the operational risk of these entities.

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RYZYKO WE WSPÓŁPRACY BANKOWO-UBEZPIECZENIOWEJ

Streszczenie

Zasadnicza treść artykułu jest skoncentrowana na tematyce ryzyka występującego we współpracy podmiotów rynku finansowego, a w szczególności we współpracy podmiotów bankowych i ubezpieczeniowych w ramach bancassurance. Bancassurance jest obszarem szczególnie istotnym, gdyż charakteryzuje się szybkim tempem rozwoju i wysoką innowacyjnością, co często jest powiązane z występowaniem szczególnego typu ryzyka. Podstawowym dylematem, na którego rozstrzygnięcie jest nakierowana treść opracowania, jest wskazanie, czy szczególny rodzaj działalności prowadzonej według specyficznych zadań przez banki i ubezpieczycieli wspomaga, czy też przeciwnie utrudnia zarządzanie ryzykiem charakterystycznym dla współpracy podmiotów w ramach bancassurance.

Analiza ryzyka charakterystycznego dla procesów współpracy bankowo-ubezpieczeniowej w ramach bancassurance dotyczy kilku obszarów. Kluczowe obszary obejmują ryzyko wyboru partnerów tworzących związek bancassurance, możliwość transferu ryzyka pomiędzy sektorami ubezpieczeń i bankowości, ryzyko wzmacniania oraz interferowania w ramach związku bankowo-ubezpieczeniowego ryzyka specyficznego dla każdego z sektorów objętych współpracą, a także ryzyko pogorszenia wizerunku rynkowego jednego z uczestników bancassurance w następstwie negatywnych skutków działań drugiego kooperanta.

Uwzględniając istotę ryzyka, warty zauważenia jest fakt, iż jednym z głównych powodów tworzenia związków ubezpieczeniowo-bankowych jest dążenie współpracują-

cych podmiotów do osiągnięcia dodatkowych zysków, co powoduje, że wzrasta poziom ryzyka zaburzeń procesów dystrybucji produktów w ramach bancassurance. Dążenie do osiągnięcia oczekiwanego poziomu sprzedaży usług bancassurance w bankowych kanałach dystrybucji generuje z kolei ryzyko niedopasowania oferty bancassurance do rzeczywistych potrzeb klientów banków, co negatywnie wpływa na satysfakcję klientów z korzystania usług zarówno banku, jak i ubezpieczyciela.

Wyniki analizy poszczególnych aspektów bancassurance wskazują też, że pomimo wielu zalet tego rodzaju rozwiązań związki bankowo-ubezpieczeniowe mogą się przyczynić do rozprzestrzeniania zagrożeń pomiędzy sektorami bankowym i ubezpieczeniowym, powodując negatywne konsekwencje zarówno dla procesów zarządzania współpracujących podmiotów, jak i dla klientów tych podmiotów.

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THE FINANCING RISK OF A BANK'S OPERATING ACTIVITIES

Introduction

Banks are financial market institutions that are regarded by real economy actors, such as businesses and households, as first contact points for loans. Lending constitutes each bank's primary area of activity, and a wide range of loans and credit facilities offered enables it to cater to all sorts of financing needs, be it daily operations or investment. Lending by a bank is conditional on a borrower's creditworthiness as well as on the bank's own capital, which must be large enough to sustain financing of the loan. Funds can be raised by banks from a variety of sources, while their suitable combination provides for an adequate capital structure, i.e. one that represents an optimum given the bank's costs and financial risk exposure.

Within their operating activities, construed as their core activities aiming at producing a profit, banks have to manage not only active risk, to minimize losses on lending operations, but also – and just as importantly – passive risk which is characteristic of re-financing operations. Risk management at a bank must be effective, ensuring that liquidity is at all times maintained at a required level, since any failure could threaten the bank's safety and its ability to achieve the expected rate of profit.

1. Financing Instruments for the Operating Activities of a Bank

For a bank to be able to perform its operating activities, it is necessary to have an adequate amount of capital. In the banking sector, equity capital accounts for not more than approximately 10% of the balance-sheet total, which means that banks tend to rely on the use of debt capital. Although a steady growth of equity figures has been reported in recent years, stemming from prudential measures imposed on banks, the proportion of own funds still seems far from adequate if it is realized that this growth has been fed by profit accumulation and therefore has not produced any cash flows. As a result, banks are involved in

activities aimed at raising funds in the financial market and rely on liabilities toward the financial sector and the state budget (see Table 1).

Table 1

Primary sources of financing for operating activities (PLN bn)

	Dec 2006	Dec 2007	Dec 2008	Dec 2009	Dec 2010
Total capital	59.2*	68.3*	88.1	103.3	116.2
Total liabilities, including:	Not available	Not available	947.2	954.1	1041.8
Financial sector deposits and loans	123.9	161.4	230.8	216.8	244.5
Non-financial sector deposits	383.9	428.2	499.0	567.2	620.4
Public sector deposits	32.5	44.7	52.7	52.0	53.0
Liabilities due to own debt issue	15.9	12.4	12.5	19.4	24.4
Subordinated debts			7.6	8.9	9.7

* Including subordinated debt.

Source: *Raport o sytuacji banków w Polsce w 2010 r.* (2011, p. 29); *Raport o sytuacji banków w 2008 r.* (2008, p. 85).

In choosing the financing source, banks follow certain strategies for covering the costs of their own activities. Three financing strategies are distinguished: one based on deposits, one based on foreign sources of funding, and a mixed one. Within the deposit-based strategy, most capital (around 70%) comes from deposits placed by the bank's customers; under this strategy, other sources of financing account for a small proportion of the bank's liabilities and include debt toward domestic and foreign financial institutions, debt attributable to transactions with the central bank, equity capital, and other liabilities. The foreign financing strategy, on the other hand, is characterized by a sizeable proportion (55-70%) of capital contributed by foreign financial institutions. Mixed strategies are combinations of the former two, where the proportions of funds from the two financing sources are fairly balanced (*Raport o stabilności systemu finansowego*, 2010, p. 67).

Banks are free to choose their financing strategies. The adoption of a specific strategy depends on the bank's position in the financial market as well as on its links with foreign banks and on foreign participation in its capital stock. Hence, Getin Noble Bank S.A., whose capital is 100% Polish-owned, will probably follow a different strategy than Bank Pekao S.A., which is wholly controlled by an Italian investor.

Whatever financing strategy is selected, at banks debt capital is chiefly represented by deposits, primarily from the non-financial sector, which are conducive to capital mobilization and allocation. A cash deposit with a bank is com-

monly identified with funds received by a bank from its customer and placed in an account on agreed terms, but it has not been defined as such in Polish legal regulations. Articles 725-726 of the Civil Code (*Ustawa z dnia 23 kwietnia 1964 r. Kodeks cywilny*, 2004) only define the bank account contract, at the same time authorizing the bank to use funds deposited in the account in transacting its own business, while Article 49 of the Banking Law (*Ustawa z dnia 29 sierpnia 1997 r. Prawo bankowe*, 2002) stipulates that bank accounts may be kept as either time deposit accounts or time savings accounts.

Table 1 shows that in 2010 non-financial sector deposits represented nearly 60% of liabilities in the banking sector. Most banks offer a rich array of deposit options, however, they need to yield a certain rate of return to be attractive. The value of deposits collected by a bank is not merely a function of the interest rate. The volume of deposits placed with banks also reflects the condition of the capital market, since an economic recession accompanied by a slump on stock exchanges will normally compel investors to divest of stocks and investment fund units in favor of bank deposits. Households are another factor stimulating the growth of bank deposits, because they tend to save part of their incomes to hedge against a decline in their financial standing in anticipation of an economic downturn. On the other hand, the value of corporate deposits is contingent on their financial performance, the amount of liquid cash on hand, as well as on the lending policies of banks themselves. Under stringent credit policies, the volume of funds deposited with banks will diminish, as companies are forced to increasingly employ their own money toward the financing of their operations.

Among the ways available to commercial banks to raise capital in the market, interbank deposits play a central role. Interbank deposits are defined as operations whereby a bank receives from, or hands over to, another bank an amount of money for a given time at an agreed price (Cichy, 2010, p. 141). Interbank deposits can be either unsecured or secured against, in most cases, foreign currency and short-term securities. This distinction is vital for any bank that entrusts its funds to another bank. In case the other bank suffers financial distress, the underlying collateral, whether currency or securities, may be sold in the financial market to recover the deposited funds.

Interbank deposits allow banks to raise large amounts of finance, for different periods, both short-term (up to one month) and long-term (from two to twelve months), with the largest share of the market held by overnight (O/N), tomorrow next (T/N) and spot next (S/N) deposit facilities. The supply side of the interbank deposit market is dominated by large banks with extensive branch networks, while demand is fueled by small banks with a modest volume of deposits from the non-financial sector.

An alternative method of fund raising by a bank is to issue debt securities, i.e. bank securities issued under the provisions of Banking Law (Article 89) and debentures issued in compliance with the Bonds Act (*Ustawa z dnia 29 czerwca 1995 o obligacjach*, 2001). Such securities are designed to raise stable financing in terms of time period for which the money is held.

Bank securities issue is designated as a banking operation sensu stricto (under Art. 5 (1) (5) of the Banking Law), and its terms are subject to public disclosure, where the issuing bank is obliged to notify the Polish Financial Supervision Authority of the intended issue at least 30 days prior to the projected issue date, reporting the terms of issue and the amount issued. Securities can be basically issued by banks in the form of deposit notes or certificates of deposit.

Deposit notes are usually issued as bearer securities and dedicated to retail customers. Their basic advantage over regular deposits is that they can be sold by an investor before maturity without losing the interest. Certificates of deposit are defined as a negotiable, non-public money market instrument, which a bank can use in collecting funds to finance its daily business, primarily to be able to continue lending (*Rynek pieniężny i kapitałowy*, 2003, p. 97). Certificates typically have large denominations and short maturity dates (no longer than 12 months). Among its features, banks most appreciate the flexibility it permits in organizing issues, in terms of size and timing, to suit the bank's requirements. Since certificates cannot be redeemed before maturity, banks are not obliged to keep liquid reserves in the event an investor wishes to withdraw from the investment prematurely. Certificates are usually issued by banks with high credit ratings, but so far have not been employed much in raising capital.

When a banks needs stable long-term funding, it may also choose to issue debentures, whose issuer acknowledges indebtedness toward its holder and undertakes to repay the debt on specified terms. Although the Bonds Act does not specifically name banks among potential bond issuers, they actually, being legal entities and conducting business activity, fall within the category of corporates. The Bonds Act (Art. 9) entitles banks to issue bonds through public sale to a minimum of 100 persons or to unspecified recipients, while the bonds may be or may not be publicly tradable, or through a private issue addressed to no more than 99 investors.

Obviously enough, bonds are supposed to generate cash flow required to finance long-maturity assets or, possibly, to modify the liabilities structure. However, under Art. 127 (3) of the Banking Law, funds raised through a bond issue may be, on certain conditions stipulated by the Law and on the KNF's (Polish Financial Supervision Authority) permission, treated as part of a bank's supplementary funds.

This right is increasingly often exercised by cooperative banks which, upon the adoption of relevant amendments to the Act on the Operations of Cooperative Banks and Their Affiliation (*Ustawa z dnia 1 lipca 2009 r. o zmianie ustawy o funkcjonowaniu banków spółdzielczych*, 2009), and on Affiliating Banks, were authorized to issue bank securities (Art. 7), on the respective affiliating bank's consent, and to incur liabilities linked to securities issues (Art. 8).

Therefore, a bond issue can help raise liquid funds as well as increase own capital, which makes banks more capable of expansion and ensures safety pursuant to regulatory requirements.

Banks can raise capital not only by incurring liabilities, but also through changes in their asset structures. Art. 92a of the Banking Law empowers banks to transfer some types of assets to a securitization fund under a receivables transfer agreement or a participation agreement, or to a capital company with a view to an asset-backed securities issue by that company (i.e. issue of securities backed with securitized receivables). This financing method allows banks to remove specific types of loans off their balance sheets and raise additional funds. At the same time, besides their financing function, such operations make it possible for banks to shift away the credit risk inherent in the assets, which helps improve a bank's prudential ratios, primarily the capital adequacy ratio and the total capital (ratio) requirement.

In choosing among financing options and, even more importantly, determining their respective proportions in the bank's liabilities, managers have to be guided by their perceptions of acceptable costs and risk exposures. On the other hand, banks are financial institutions that thrive on high levels of trust from their customers, which is why, on depositors' presumed consent, the cost to acquire available funds only slightly exceeds the rate of inflation. The position of banks in their business environment makes them capable of easily raising capital from a variety of sources, including refinancing loans from the central bank; however, these loans are relatively expensive and are taken as a last resort, in dire need to improve financial liquidity rather than to boost business.

2. Liquidity as a Precondition for Sustainable Banking Operations

Regardless of where they come from, capitals are used to finance a bank's assets, whose maturity dates usually differ from those of the funds borrowed. As a consequence of the differences in maturity, as well as between the amount of capital employed by the bank and the amount of capital raised (i.e. between loans and deposits), a financing gap emerges*, which can assume a negative or

* Financing gap is defined as a factor relating the difference between non-financial sector loans and deposits to that sector's deposits.

a positive value depending on the difference between loans and deposits. A short-term* (up to 1 month) negative gap (where loans/assets are smaller than deposits/liabilities) is particularly dangerous, since it may lead to excessive liquidity risk and have an adverse effect on the bank's ability to meet liabilities related to deposits received or loans granted.

Liquidity is a fundamental statutory precondition for the performance of banking activities, accounting for the credibility and solvency of a bank, as well as its safety, sufficient profitability, and funding self-reliance, for a bank that maintains balance between loans and deposits does not need to seek refinancing facilities in the interbank market.

Banking practitioners differentiate between three notions of liquidity:

- financial liquidity, which corresponds to the ability to timely execute payments orders from customers and to continue lending without interruptions,
- payment liquidity, understood to mean the bank's ability to perform customers' orders; pursuant to Art. 8 of the Banking Law, payment liquidity must be suited to the size of the bank and to the type of activity it pursues,
- structural liquidity, construed of as an equilibrium between raising and using capital, which has to meet certain requirements concerning its volume, structure and maturity (Capiga, 2010, p. 83-84).

Considering the importance of liquidity for every bank's operating activities and the need to ensure operating safety, banks have to comply with the liquidity standards established by Resolution No. 386/2008 of the Polish Financial Supervision Authority (*uchwała nr 386/2008 Komisji Nadzoru Finansowego*…, 2008) as well as with the rules for financial liquidity monitoring prescribed in the so called Recommendation P (*Rekomendacja P*…, 2002).

Applicable liquidity measures vary with the size of the bank as expressed by its balance-sheet total, the boundary value being set at PLN [Polish zloty] 200m (see Table 2).

Table 2

Supervisory liquidity measures

Liquidity measure	Content/Explanation	Minimum value required
Banks* with balance-sheet total above PLN 200m		
Short-term liquidity gap (M1)	The sum of primary (assets receivable within 7 days) and supplementary (assets receivable in 7 to 30 days) liquidity reserves less the value of unstable external funds	0.00

* In this instance, a one-month liquidity gap is defined as the difference between the value of assets with a maturity of up to 1 month and the value of liabilities due within 1 month.

Table 2 cont.

Short-term liquidity ratio (M2)	The ratio between liquidity reserves, both primary and supplementary, and the total of unstable external funds	1.00
Non-liquid assets to own funds coverage ratio (M3)	Non-liquid assets are identified with assets not arising from banking operations listed in Art. 5 of the Banking Law	1.00
Non-liquid and limited liquidity assets to own funds and stable external funds ratio (M4)	Limited liquidity assets comprise assets arising from banking operations conducted outside the wholesale financial market alongside assets in inconvertible currencies deemed as insignificant by the bank. Stable external funds encompass the deposit base, the bank's own securities not included as part of its own funds, and other liabilities with maturities of above 12 months which the bank intends to keep and which have not been included in its own funds	1.00
Banks with balance-sheet total up to PLN 200m		
Ratio of primary and supplementary liquidity reserves to total assets (M1)		0.20
Non-liquid assets to own funds coverage ratio (M3)		1.00

* Banks must apply all of the requirements, while branches of credit institutions are only obliged to observe short-term liquidity measures M1 and M2.

Source: *Uchwała nr 386/2008 Komisji Nadzoru Finansowego*…, 2008; *Raport o stabilności systemu finansowego*…, 2009, p. 53-55.

As at the end of 2010, only 4 cooperative banks and 1 branch of a credit institution failed to meet all of the relevant liquidity standards. Assets held by these institutions represented a negligible 0.1% of total assets in the banking sector (*Raport o sytuacji banków w Polsce w 2010 r.*, 2011, p. 44), which means that their default would have no impact whatsoever on the stability of Poland's banking sector. The applicable liquidity measures are influenced not only by a bank's liabilities structure, but also by the values and types of assets in its portfolio, which suggests that decision makers should be concerned with how funds are used just as much as with how and where they are raised.

The liquidity of specific banks too hinges on the development of the financial market as well as on how much mutual trust there is on the market. Distrust among actors in a particular financial market, coupled with uncertainty about macroeconomic developments, has a detrimental effect on the market actors' willingness to enter into transactions with long maturity dates.

The 2007-2009 crisis clearly demonstrated that mutual trust in the interbank market can be very fragile. Some banks, deprived of access to financing in the market, were forced to "go to battle" for deposits, increasing interest rates to 10% per annum or more. What banks should learn form that lesson is that they need to always aim at improving the stability of their financing sources.

3. Assessment of the Use of Funds and of the Criteria for the Selection of Financing Sources

Insofar as the ability to raise funds from the financial sector furthers diversification of financing sources by banks, they should never become solely dependent on this sector, as being too active in their acquisition of financing in the interbank market increases a bank's vulnerability to the volatilities of the domestic and global financial market. There are, nevertheless, banks that are already highly dependent on funding from the domestic or global financial market. Most of these are small banks or branches of credit institutions with a limited area of operation and – by design – reliant on funding from their parent companies, or banks with an aggressive lending/credit policy but an underdeveloped deposit base, or, last but not least, banks suffering from a short supply of deposits that do not suffice to offset the demand for loans.

Financing policies that rely on funds obtained from foreign parent institutions are usually long-term, which is a factor reducing the financing risk, which is particularly understandable if one realizes that most foreign shareholders declare support for their daughter companies' liquidity and for their expansion plans (*Raport o sytuacji banków w 2009 roku*, 2010, p. 3). Yet, the ongoing crisis has shown that support is only given if the parent company itself is in good financial health. Otherwise, daughter banks will sooner or later suffer the same financial difficulties as their shareholders, while their financing will wholly depend on the liquidity of the national financial market and the confidence of the non-financial sector.

The confidence of the non-financial sector constitutes an essential contingent factor for a bank's ability to acquire stable sources of financing in the form of deposits. A the same time, the deposit growth dynamics is also conditional on a number of factors that have been discussed earlier in this paper. In addition, what matters critically for a bank is the maturity structure of deposits, since the longer their maturity dates, the greater the stability of financing. This, however, potentially involves higher costs of financing, even though some banks actually offer lower interests rates for deposits with a long maturity. It could especially be the case if a bank expects a downward trend in market interest rates.

Since customers will normally appreciate it when funds deposited with banks retain a degree of liquidity, a large proportion of these is seen in current accounts. Although the cost of such capital is affordable, funds deposited in current accounts are subject to too much fluctuation, which generates financing risk. In an effort to reduce the risk and increase the stability of deposits, banks offer savings accounts that yield a higher interest but at the same time mitigate the risk of fluctuations in the account balance by introducing charges on e.g. subsequent withdrawals and/or payment orders.

In the context of a large proportion of foreign currency loans in banks' balance sheets, the problem of currency mismatches in the sources of financing, construed as the difference between foreign currency liabilities and foreign currency assets, emerges as vitally important. As at the end of 2010, the currency mismatch for the entire banking sector totaled PLN 67.9 bn and involved mostly the Swiss franc, which was the preferred currency for loans. On the other hand, mismatches did not occur to a similar extent on the liabilities side of the balance sheet (see Table 3).

Table 3 shows that the Swiss franc (CHF) mismatch was higher than the total currency mismatch, exposing banks to excessive currency risk that could easily materialize e.g. in case a significant drop in the Swiss franc exchange rate took place. In an effort to reduce the mismatch, banks should, on the one hand, attempt to acquire more of the same currency which finances their lending activity (unless the currency is in short supply in the financial market) and, on the other, to reduce the growth rate of loans denominated in foreign currencies, mostly housing loans – which actually happened as an upshot of the recent economic crisis. Of course, when the loan currency goes up, the bank will be exposed to increased credit risk, since the borrower will have to repay higher installments; however, as long as the credit risk remains stable, the bank reaps higher profits from exchange rate fluctuations.

Table 3

Currency structure of the balance sheet including currency mismatch between assets and financing sources (PLN bn)

	Dec 2008	Dec 2009	Dec 2010
Currency assets including: CHF	294.1 156.4	271.0 151.5	313.8 164.5
Currency liabilities including: CHF	214.7 68.7	206.2 73.9	245.8 89.1
Assets unmatched to mismatched with financing sources Currency mismatch including: CHF	(79.4) (87.7)	(64.8) (77.6)	(67.9) (75.3)

Source: *Raport o sytuacji banków w Polsce w 2010 r*. (2011, p. 33).

In the context of financing, it should be noted that, notwithstanding the advantages of debt financing, banks barely utilize debt securities, which is reflected in the very modest proportion of liabilities relating to such instruments in the banking sector's balance-sheet total. This may indicate that banks are not fully exploiting other potential sources of financing.

One more alternative to the financing methods and sources that have so far been discussed in this paper is an equity issue. Yet, banks cannot really be expected to use this type of financing on a regular basis as long as the market does not pressure them to do so and the cost involved is substantial (dividend). Besides merely raising funds, a share issue also enlarges the capital base, thus improving the bank's stability, increasing its ability to sustain potential losses, and providing sound foundations for safe expansion and the pursuit of active policies. After all, no bank will be able to expand its business unless financing sources, whether in the financial or non-financial sector, are available.

Summary

Operating in a highly competitive market such as the banking market definitely is, banks have to learn to make optimal decisions on their sources of capital, taking into account the availability of each option, the time period for which funds can be held and used, and its cost. Embracing these factors is crucial for any bank that strives to expand and maximize the efficiency of its operating activities such as, in the first place, lending and investing in securities. Being aware of the competitive pressure from the stock exchange, investment funds, SKOK* or treasury securities, banks are bound to create a system of incentives that would foster an increase in the volume of savings, predominantly long-term savings, thus helping stabilize financing derived from the non-financial sector. Another priority would be to keep monitoring macroeconomic variables and the situation in financial markets with regard to unfavorable developments that could have an impact on the availability of capital, the conditions and methods of capital raising, the risk involved in the process, and its costs. An ideal match, in terms of both value and maturity, between assets and their sources of funding provides for a bank's liquidity, which is a critical success factor, alongside acceptable risk, and at the same time satisfies all requirements laid out by supervisory bodies.

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* SKOK (Spółdzielcza Kasa Oszczędnościowo-Kredytowa) – a cooperative savings and credit union.

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RYZYKO FINANSOWANIA DZIAŁALNOŚCI BANKU OPERACYJNEGO

Streszczenie

Działalność operacyjna to podstawowy rodzaj działalności banku, której celem jest wygenerowanie zysku. Głównym centrum zysku są operacje aktywne, a ich realizowanie jest uwarunkowane posiadaniem kapitału w odpowiedniej wielkości. Wymusza to na bankach podejmowanie decyzji dotyczących finansowania ich działalności, biorąc pod uwagę koszty oraz ryzyko, które jest uzależnione od indywidualnych decyzji deponentów, a także niekorzystnych zmian makroekonomicznych mających wpływ na zachowanie rynków finansowych.

Ryzyko finansowania wpływa na płynność banku, której odpowiedni poziom jest koniecznym, wymaganym przez KNF, warunkiem bezpiecznego jego funkcjonowania. Dlatego też bank powinien zarządzać nie tylko posiadanymi aktywami, ale także dostępnymi kapitałami w taki sposób, aby optymalizować ich strukturę pod względem wartości, rodzajów i terminów wymagalności.

Artykuł ma na celu analizę źródeł finansowania banku z punktu widzenia ekonomicznych uwarunkowań ich wyboru, w kontekście minimalizacji ryzyka występującego przy jego finansowaniu.

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CATASTROPHIC RISK FROM PUBLIC FINANCE PERSPECTIVE

Introduction

Catastrophic risk becomes serious threat to national economies of almost all countries. Public sector, as one of main actors creating economic processes, participates in catastrophic risk management process. The aim of this article is to present the problem of catastrophic risk management from public finance perspective. This demands both: identifying domains of public sector responsibility for catastrophic risk management as well as demonstrating main problems of public sector engagement in catastrophic risk financing, which is crucial issue of this risk management.

1. Catastrophic risk impact on public sector

Catastrophic risk, from among other categories of risk, is distinguished by the character of its' consequences. Consequences of catastrophic risk realization are large and multiple losses, both: personal and material, cumulated in time and space. A cause of a catastrophe can be sudden (hurricanes, earthquake, nuclear reactor explosion) as well as relatively lingering or – using other words – taking a longer time (drought, war, economic crisis). Such understood catastrophic risk is a particular challenge for projecting economic processes, which – basing on limited resources – aim at filling unlimited needs of a mankind. This challenge is particular, because as a result of catastrophic risk realization multiple resources suffer, what in turn has following consequences:

- impossible is exploiting damaged resources and filling the everyday needs (i.e. water supply, food supply, transport),
- resources, that were not injured by a catastrophe, have to be engaged in process of restituting damaged resources, what limits possibilities of filling the everyday needs not related to catastrophic risk realization.

Catastrophic risk realization impact on public sector (and thus public finance) is characterized by a wider and – to a certain extant – specific only for a public sector, range of consequences. Those consequences appear as:

- losses in public property (especially infrastructure), which constrain filling social needs*,
- necessity of engaging public resources (including public monetary means)** in process of restituting damaged public property, which also constrains filling social needs,
- emergence of a social need for providing safety and everything what is necessary to fill basic needs of people hurt by the catastrophe, what requires engaging public resources (including public monetary means),
- tax incomes lowering as a result of lowering tax bases of diverse taxes being a part of tax system, especially such bases as: people's incomes, corporate incomes, magnitude of domestic markets turnover and the real estate floor space.

First two of mentioned types of losses can be described as direct losses suffered by public sector due to catastrophe occurrence. Other two types can be described by indirect losses, because public sector experiences such losses due to this sector environment modification caused by a catastrophe occurrence.

Public sector engagement (and thus public finance engagement) in catastrophic risk management is thereof an indispensable condition of rational management within this sector. However such engagement is not demanded only due to negative consequences of catastrophe occurrence for public sector. The state – taking a responsibility for protecting their citizens right to live (*Konstytucja Rzeczpospolitej Polski z dnia 2 kwietnia 1997 r.*, 1997, art. 38) – is especially responsible for counteracting personal losses, and so – responsible for counteracting catastrophes. Thus it can be stated, that states engagement in catastrophic risk management is motivated not only by necessity for public resources protection, but also by the necessity for citizens and their property protection. This can be briefly expressed as the necessity for the national economy protection (or country protection).

2. Domains of states responsibility for catastrophic risk management

National economy exposition to catastrophic risk can by modified in order to lowering such exposition. Entirety of actions taken in order to lowering exposition to catastrophic risk, in procesual aspect, is called catastrophic risk mana-

* Social needs can be defined as needs noticeable by members of society as a result of belonging to a certain society.

** Public resources are understood as resources allocated in public sector (machines, labour, money etc.).

gement. Assuming that management is realized with the help of informative – decisive functions (Bieniok, 2006, p. 17), it should be stated, that in the process of catastrophic risk management it is necessary to gather appropriate information on this risk (what is called risk assessment and proceeds in certain phases) and then, basing on gathered information, taking actions oriented towards lowering countries exposition to catastrophic risk (what is called risk control)*.

Catastrophic risk assessment includes gathering information of this risk sources (what is called risk identification) and information on this risk severity (risk measurement). Catastrophic risk severity depends on both: risk realization frequency and the magnitude of losses being catastrophe occurrence consequences (Williams, Smith, Young,…, p. 94-96).

Information on catastrophic risk should be gathered systematically, which means it should be sectioned according to risk categories, and gathered continuously (Tchankova, 2002). Catastrophic risk categories are types of this risk settled basing on properly selected risk features. The main criterion of catastrophic risk classification exploited in systematization of catastrophic risk identification is the criterion of risk sources. Basing on this criterion two categories of catastrophic risk are distinguished: natural catastrophes and man-made disasters (these categories can be further analyzed with at will particularity). Subdivision of catastrophic risk based on risk sources criterion allows identifying methods appropriate for risk control (i.e. risk prevention, which aims at counteracting catastrophe occurrence, is impossible to apply for earthquake risk control, however this method it very useful in terroristic attacks risk control).

Estimating catastrophe occurrence frequency and the magnitude of losses caused by such occurrence is called risk measurement. Risk measurement results also should be apprehended in scheme that facilitates risk control methods and tools selection. Such scheme is proposed by the World Bank (Figure 1).

Category	Probability of Event or Return Period	Damage as proportion of GDP
Group 1	5% or up to 20 years	Up to 3%
Group 2	3,33% or up to 20-30 years	Up to 5%
Group 3	1% or up to 30-100 years	Above 5%
Group 4	0,5% or up to 100-200 years	Above 5%
Group 5	Below 0,5% or above 200 years	Above 5%

Fig. 1. Types of catastrophes

Source: Poundrik (?, p. 2).

* Mentioned phases of risk management process are presented by P. Young and S. Tippins (P. Young, S. Tippins, Managing Business Risk. An Organization-wide Approach to Risk Management, American Management Association, Nowy York 2001, p. 60 i 123).

Scheme presented in Figure 1 can be exploited in projecting both: so called "physical risk control", which includes: risk avoidance (not taking actions bounded with risk), risk prevention (counteracting risk realization) and risk repression (limiting magnitude of losses caused by catastrophe occurrence) and financial risk control, which consists in selecting sources of financing losses caused catastrophe occurrence.

Presentation of catastrophic risk management from public finance perspective requires first of all identifying domains of public sector responsibility for catastrophic risk management as well as factors that determine those domains. Deliberated responsibility should not be understood in a legal sense, but as a responsibility that derives from public and private sector entities interests. Schematic division of responsibility for catastrophic risk management between private sector and public sector is presented in Figure 2.

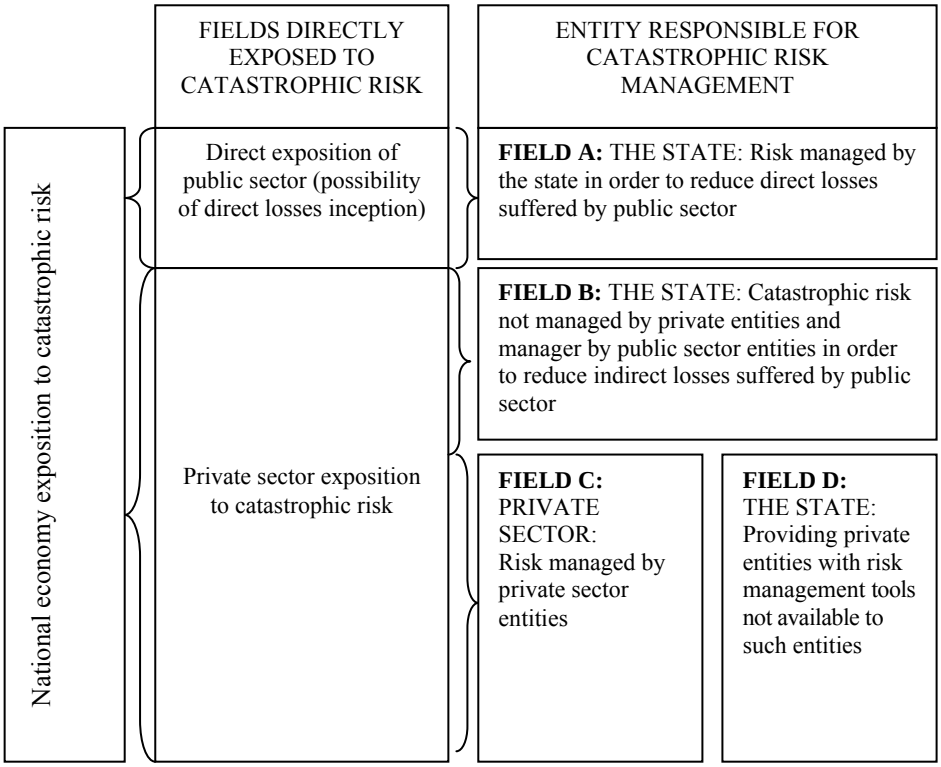

Fig. 2. Division of domains of responsibility for catastrophic risk management

Presented pictorially division of responsibility for catastrophic risk management domains requires deepen explanation. First of all it is clear that the division of responsibility for catastrophic risk management is determined by national economy structure. The more resources are allocated in public sector the greater is the threat of this sector by direct losses, and thereof the greater is the responsibility of the state for catastrophic risk management (Field A).

At once with stating that catastrophic risk threatens national economy it should be noticed, that each entity, that such economy consists in, can manage risk to which it is exposed. The effects of this management determine the scale of public sector threat by indirect losses (the scale of threat by direct losses does not depend on any actions taken by entities other than public). For that reason another factor determining division of responsibility for catastrophic risk management is effectiveness of catastrophic risk management performed by private sector entities. Private sector entities approach towards their risk management may be deliberated and programmed or not deliberated and chaotic. The less effective are actions taken by private sector entities in order to reduce their exposition to catastrophic risk the greater is exposition of public sector to in-

direct losses and greater the demand for public sector engagement in catastrophic risk management (Field B)[*].

It should be stressed that the state is able to stimulate private sector entities to manage their risk in effective way, what includes especially stimulating savings by exploiting tax incentives[**] or imposing compulsory insurance.

Savings are one of appropriate ways of households coping with catastrophe's consequences: by lowering consumption in time of relatively high income (when lowering consumption does not reduce significantly utility of this consumption) households are able to increase consumption in time of risen needs caused by catastrophe occurrence (what, considering low level of income due to catastrophe occurrence, results in significant augmentation of consumption utility)[***]. Usually equalizing consumption utility in times of different income levels can be reached by utilization of loans or other financial commitments. However their availability in case of catastrophe occurrence is limited.

Insurance is a tool which in even better way than savings makes risk financing possible. The reason for this is that insured has a confidence of gaining compensation appropriate to suffered loss. Such confidence is possible because insurance companies possess knowledge on risk and because insurance system includes guarantees of system security (which means guarantees of insurance companies paying capacity).

In case of savings it can't be stated if they are sufficient to finance suffered losses. One entity may build up reserves that exceed suffered losses and experience alternative costs due to keeping its' monetary means out of day-to-day usage. Another entity may save much too little relating to needs caused by catastrophe occurrence. When entities are insured, insurance company is responsible to settle needed amount of money and setting this amount is much easier, because possible random irregularity of losses is not dangerous, when losses are financed from aggregated fund (not divided into individual accounts).

Remarkable notice is that the ability of private sector entities to manage their catastrophic risk effectively is determined by (among others) catastrophic risk management tools availability (considering distinguished phases of risk management process such tools can be classified as risk assessment tools and

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[*] For instance: if inhabitants of territories threaten by flood react to communicate about coming inundation and leave their residences the state is not forced to engage in their evacuation. But if these inhabitants do not react to communication about coming inundation the state has to take care of theme. Parallel problem is related to risk financing. If private sector entities are insured to i.e. hurricanes, hurricane occurrence does not require disposing public sources, but if they are not insured, catastrophe occurrence results in claims to the state for compensation.

[**] Exploiting fiscal stimulus should be preceded by examining for how much costs of the stimulus result in lowering public sector exposition to indirect losses and if, in consequence, such stimulus is effective.

[***] More about the theory of households savings in: (2003, p. 754-758).

risk control tools: risk prevention tools, risk repression tools and risk financing tools). Risk management tools availability is usually limited, what results in demand for public sector engagement in supporting managing catastrophic risk that threatens private sector entities (Field D).

Catastrophic risk management tools availability can be limited for following reasons:

- catastrophic risk management tools may be, so called – public goods,
- catastrophic risk management tools may be too expensive, considering financial conditions of private entities exposed to such risk,
- costs of applying certain catastrophic risk management tools may, in case of particular entities, exceed benefits related to applying these tools (thereof applying these tools becomes – form particular entity perspective – economically not justified).

Mentioned reasons should be analyzed more deeply.

Certain good may be recognized as public good, when is characterized by specific features. These features are especially: lack of competing in access to such good (nonrival goods), impossibility of anybody exclusion from such good consumption (non-excludable goods) and marginal costs of providing such good to additional consumer is equal to zero (Stiglitz, 2004, p. 150).

Mentioned attributes of public good make supplying of such goods by the market impossible (or not sufficient) (Stiglitz, 2004, p. 94-95). Providing such goods requires engagement of public resources. Some of catastrophic risk control tools are characterized by enumerated attributes (riverside barriers, retention reservoirs systems, fireguard, anti-terrorist units, projecting and performing supervision over financial institutions etc.). Thus providing of such catastrophic risk management tools depends on the state.

Following two of mentioned reasons for limited availability of catastrophic risk management tools to private sector entities are: such tools are too expensive and costs of applying such tools exceed benefits related to such application considered individually. Good examples are: gathering, registering and analyzing information on catastrophic risk (weather phenomena, earthquakes, terroristic attacks) or building bunkers. Costs of such activities in majority exceed financial capacity of households and enterprises and if a particular household or an enterprise can afford making such expenses, benefits of this activities, that such household or an enterprise may experience, are below costs. It should be noticed, that considered catastrophic risk management tools are not characterized by pure public good features. Thereof the state supplies such tools only if such supply derives from the country's socio-economic doctrine (adopting certain doctrine is determined by the result of public choice). Such tools belong to the group of so-called social goods*. It should be underlined, that including catastrophic risk management tools in catalogue of social goods is advantageous, because benefits

* Wider deliberation over pure public goods and social goods in: (1999, p. 24-32).

experienced by the whole national economy, when such tools are provided by the state (and the benefits are truly experienced by the whole national economy, because these tool become available to each entity), exceed costs.

When the state supports catastrophic risk management performed by private sector entities by providing risk management tools, otherwise not available to such entities, the state reduces public sector exposition to indirect losses*.

Simplified graphic presentation of domains of responsibility for catastrophic risk management is a model conceptualization. It should be stressed that in the reality in both systems: public catastrophic risk management system and private catastrophic risk management system, gaps emerge. Such gaps result in uncontrolled exposition to catastrophic risk, which, when realize, takes effect in losses depleting resources indispensable in economic processes.

3. Public monetary means in catastrophic risk financing

Remarkable notice is that physical catastrophic risk control tools may fail and do fail. In many cases they turn out to be simply insufficient. Thereof justifiably such tools are called risk reduction tools, because while reducing risk, physical risk control tools do not eliminate it. As a result it can be stated, that indispensable element in every catastrophic risk control system is risk financing. Thus financing catastrophic risk with utilization of public monetary means** is going to be deliberated more extensively.

Engaging public monetary means in catastrophic risk financing should be deliberated in reference to distinguished domains of responsibility for catastrophic risk management. The state is first of all responsible for financing catastrophic risk that endangers resources allocated in public sector. Than – the state is often forced to pay compensations for losses in resources allocated in private

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* Implementation of catastrophic risk management tools results in augmentation of public expenditures as well as change expenditures structure.

** Public monetary means include:
1) public incomes (taxes, charges and others),
2) monetary means derived by European Union budget and monetary means that are not reimbursed derived from EFTA,
3) monetary means derived from foreign sources other than mentioned in points 1 and 2,
4) public proceeds including:
   a) monetary means derived from public securities issuance,
   b) monetary means derived from states and local authorities' property privatization,
   c) monetary means derived from granted by the state and local authorities borrowings reimbursement,
   d) monetary means derived from granted loans and credits,
   e) monetary means derived from other financial operations.
5) public proceeds derived from activities performed by public sector entities and other sources.

Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych (2009, art. 5, nr 157 poz. 1240).

sector (if entities that exploit such resources do not project sources of losses financing). In the end – financing some categories of catastrophic risk is not available to private sector entities (ie. flood insurance is not included in Dutch insurance companies offer), what creates social need for state intervention. Such need satisfaction may be included in socio-economic doctrine adopted in the country.

In each of mentioned domains of responsibility for catastrophic risk financing the state may apply risk retention and/or risk transfer. Both: risk retention and risk transfer, when performed by the state, are advantageous. That is because public monetary means* come from burdens imposed on each private entity (this results in some kind of social justice in incurring the costs of catastrophic risk financing) and are aggregated funds, what allows financing losses even if these losses are irregular (financing losses from individual account is risky, because losses are irregular**).

Risk retention means financing risk from states own monetary means. Risk transfer is financing risk from monetary means derived from other entities.

Risk retention should be programmed in detail. This means that concrete monetary means should be designated for risk financing. This may include current inflows and/or – created especially for catastrophic risk financing – reserves.

Risk transfer may be presented sectioned according to the moment of choosing and organizing external sources of risk financing as: transfer ex ante and transfer ex post (Borys, 2010). Transfer ex ante requires an agreement of risk transferring to another entity (usually at a settled price). Such agreement is made before catastrophe occurrence. This method of risk financing guarantees granting monetary means necessary for restitution of damaged resources. Tools of transfer ex ante include insurance contracts, hedging contracts and risk transferring to a contractor. Transfer ex post consists in searching for needed monetary means after catastrophe occurrence (like international help). Wide approach to catastrophic risk financing (including deliberating both ex ante and ex post transfer) allows comprehensive identification of possibilities of gaining monetary means for losses repair. Yet among identified possibilities there are some, which do not assure granting means in case of catastrophe occurrence.

Selection of catastrophic risk financing sources is determined by number of factors, from among internal and external factor can be distinguished. Internal factors determining risk financing tools selection are public sector conditions, external factors are located in the public sector environment. Internal factors determining risk financing tools selection are especially: regulation and public

* Risk transfer is also bound with utilization of public monetary means, because these means are needed to finance costs of transfer.

** Risk related to financing catastrophic risk form individual accounts realizes as insufficiency of accumulated money towards losses or in excess of accumulated money over losses resulting in alternative costs.

finance situation (level of public debt, expenditures structure etc.). External factors are especially: availability and cost of contracting a debt, availability and costs of insurance and other risk transfer agreements as well as international situation.

Exploiting public monetary means in order to finance losses related to catastrophe occurrence is these means disposing that has a certain legal status – making public expenditures. Public expenditures can be made for purposes and in extent settled in budgetary act (government expenditures), local budgetary resolution (local authorities expenditures) or financial plan of public sector entities (such entities operate at both national and local level and their financial plans are coherent with budgetary act and budgetary resolutions) (*Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych*, art. 44). This means that public expenditures have to be made according to certain plan. This is a kind of restriction of exploiting public monetary means in catastrophic risk financing, because level of needed engagement can't be planned precisely. Thus it can be stated that law, which regulates public expenditures, blockades catastrophic risk retention consisting in financing losses from current inflows. What can be planned is a reserve created in order to finance possible losses. Public Finance Act regulates principles of creation and disposal of so called general reserve and purposeful reserves. Mentioned reserves are the only public expenditures which do not have planned purpose. They can be disposed during budgetary year according to conditions which become known during the budgetary year. General reserve can't exceed 0,2% of public expenditures and sum of purposeful reserves can't exceed 5% of public expenditures (*Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych*, art. 140).

Reserves can be designated in order to counteract natural disasters and such disasters effects elimination. Taking into consideration, that such reserves have number of other destinations it should be noticed that law, which regulates public expenditures, determines the scale of catastrophic risk retention by exploitation of reserves. This has negative consequences, for instance: in 2010 current expenditures from purposeful reserve designated to natural disasters counteraction and their consequences elimination reached only 450 mln of polish zloty and accounted for 0,15% of all states budget expenditures. Simultaneously catastrophic losses caused only by flood in 2010 (not taking into consideration other catastrophes, like: industrial emergencies, transport catastrophes etc.) reached 2,9 mld euro and exceeded 0,6% of polish GDP in 2009 (*KE ostatecznie potwierdziła pomoc dla Polski*, 2010). (this equals to 12 mld polish zloty, using in calculation average euro to zloty course given by Polish National Bank on July 2010). This means that reserves planned by the state inter alia for catastrophic risk financing last out to finance less than 3,8% of losses[*]. Although there are

[*] Another indicator of the scale of public reserves adequacy towards losses may be sum of losses suffered by an individual enterprises: in Karpacka Spółka Gazownictwa, owned by PGNiG S.A., sum of losses reached 20 mln polish zloty (2010).

not detailed data on the level of the state's engagement in losses financing doubts raise if sum of mentioned purposeful reserve was enough to finance at last direct losses in resources allocated in public sector (like damages in infrastructure). Thus it should be examined if the state may exploit other than reserves tools of catastrophic risk financing.

From among factors that determine exploitation of public monetary means in catastrophic risk financing also the budget structure should be analyzed. Public expenditures are often analyzed sectioned according to possibility of unconstrained projecting their designation. This allows distinguishing flexible public expenditures and fixed public expenditures. Flexible public expenditures are shaped according to government policy in the phase of budget planning (like investment). In the phase of budget prosecuting permissible shifts can be made only within flexible expenditure. Fixed public expenditures are strictly defined by law and the government can't change their level and designation in both phases: budget planning and budget prosecuting. If the budget structure is toughen (this means that fixed expenditures account for a large part of the budget), catastrophic risk financing may be performed only via reducing flexible expenditures, which are usually pro-development expenditures (investment, research, education). Unfortunately in Poland flexible expenditures account for a relatively small part of the state's budget and assuring dynamic economic growth requires augmenting pro-development expenditures (Kasperowicz-Stępień, 2009, p. 155). Thereof it can be stated that compilation of public finance condition and serious need for exploiting monetary means that can be freely shaped by the government in assuring economic growth limits possibilities of utilizing that means in creating reserves for catastrophic risk financing and possibilities of making admissible shifts during the budgetary year.

Exploitation of external monetary means in order to finance losses caused by catastrophe occurrence is a risk transfer that can take diverse forms. Relatively most simple issue is pointing appropriate way for financing direct losses. Such losses are consequences in damages in resources allocated in public sector. The state, being their owner, may insure resources. At Polish insurance market there are many insurance products created for protection of diverse resources (real estate, movable property) against following catastrophic risk categories: floods, earthquakes, hurricanes, heavy rain or even tsunami. However coverage often does not include nuclear damages, droughts, wars and terrorists attacks. This means that extent of available coverage is a factor that determines possibility of insurance application in catastrophic risk financing.

Much more problematic is the issue of engaging public monetary means in financing losses emerging in private sector due to catastrophe occurrence. There is possibility of exploiting reserves created by the state in order to manage cata-

strophic risk, but – as it has been demonstrated above – the amount of reserves is definitely insufficient in relation to possible needs. If risk retention is limited, risk transfer should be deliberated. In case of financing losses in resources allocated in private sector the state, which takes on responsibility for financing such losses, may transfer this risk exploiting international help or by contracting an debt. Scale of available international help is difficult to assess[*], especially when international situation has lost its' stability (Greek crisis). It is usually granted when the catastrophe is large and when lack of possibility of managing situation by affected country is presumed (earthquake in Haiti). In turn contracting a debt is determined by number of factors and has a few important negative consequences. First of all determinants of contracting a debt by the state should be deliberated.

Public Finance Act states that contracting a debt at both, national and local level, should be planned (*Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych*, 2009, art. 76, 77, 89). This means that incurring a debt is admissible only when it serves to finance activities planned at the stage of budget planning (before budgetary year starts). Additional needs caused by catastrophe appearance during budgetary year can't be planned, thereof incurring a debt in order to finance losses suffered by private sector may result in authorities problems at the stage of budget control (vote of acceptance granting). Thus the weaker is the government (or local government), the less stabile politic situation, the greater the anxiety against incurring unplanned debts.

Contracting a new debt augments the existing debt. Sum of debt upper limit (at both levels: national and local) is settled by law (*Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych* (2009, art. 861, 243). This means that another determinant of financing losses in private sector from public monetary means is existing indebtedness. In Poland the level of indebtedness at governmental level is dangerously near to settled limit. Among local governments significant diversity of indebtedness is observed. As a result it can be stated, that incurring a debt by the government in order to finance losses in private sector caused by catastrophe occurrence can't be recommended. In case of local authorities recommendation is dependent on particular authority situation. Anyway the authority, which decides to incur a debt in order to finance catastrophic losses must take into account debt's negative consequences. These are mainly:

- intergeneration equity disturbance,
- significant costs of debt,
- toughening of budget structure,
- indebtedness trap.

[*] I.E. Inter-American Development Bank (basing on 40 years experience) estimated, that a country can expect international assistance to cover only about 8% of direct disaster losses (*Closing the Financial Gap*, 2011, p. 7).

The more serious are mentioned problems in particular country the less is authority prone to undertake activities that intensify these problems. Poland experiences noticeable intergeneration equity disturbance and toughening of budget structure. Thus it can be stated that there are some consequences of public debt incurring that constrain augmenting this debt when catastrophe occurrence creates needs for financing losses in private sector from public monetary means.

Deliberation over international aid and contracting a debt, as catastrophic risk financing tools (transfer ex post), allows stating that pre-financing (assuring sources of financing consequences of catastrophe occurrence before such occurrence) is much more valuable in catastrophic risk management that transfer ex post.

Pre-financing tools are especially: reserves and insurance. Yet it should be noticed, that more advanced ways of using public monetary means in catastrophic risk financing are being developed. Observing ways in which some countries project their catastrophic risk financing* leads to the conclusion that reserves may be exploited as some kind of trampoline to the capital markets, what augments available sources needed for repairing losses. Forms of such exploitation are:

- creating SPV company (possibly with private partner), which issues catastrophic derivatives bought by private investors,
- creating captive or company insurance company that gives access to reinsurance markets.

Presented distinction is draft, considering very low number of concluded contracts, and serves only better acknowledgement of possibilities that such contracts create. Each of few such contract is tailor-made and significantly differs from others.

Considering that there are new possibilities of using reserves, that augment financial resources available in case of an event, allows stating that this form of catastrophic risk financing is particularly valuable.

Conclusions

Public sector responsibility for managing catastrophic losses should be deliberated sectioned according to distinguished domains. This allows highlighting factors determining states responsibility level and risk control tools application. The most interesting issue – when it comes to catastrophic risk control – is risk financing. The most appropriate tool of catastrophic risk financing is exploiting reserves build up form public monetary means. That is because insurance may be applied only in financing indirect losses and incurring a debt is constrained by political situation and public finance situation in Poland and results in objectio-

* Pioneering solutions are presented in document *Closing the Financial Gap* (2011).

nable intensifying intergenerational equity disturbance and budget structure toughening. However the sum of reserve, that can be utilized in catastrophic risk, is in Poland definitely too low. Thereof augmenting and shaping this reserve should be taken into consideration, especially because economic sense of reserves – creating savings – is coherent with appropriate way of equalizing consumption in time (when level of consumption is disturbed by catastrophe occurrence). Considering that the state is able to gain appropriate knowledge on catastrophic risk it can be presumed that the state is able to calculate adequate level of needed reserves. Such reserves can give the state access to the capital markets. Augmenting reserves may demand imposing additional charge n private sector entities (taxes, charges). The form of cumulated reserves may presume depending particular entity burdens on this entity approach towards catastrophic risk (risk reducing or excessive risk exposition), what in turn promotes limiting moral hazard. Shortly described reserves for financing catastrophic risk are similar to social insurance. This resemblance is not coincidental, because social risk, which led to creating social insurance, is in fact catastrophic risk. Issue of magnitude and form of reserves created by the state in order to finance losses suffered by private sector due to catastrophe occurrence requires wide-ranging research.

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RYZYKO KATASTROFICZNE Z PERSPEKTYWY FINANSÓW PUBLICZNYCH

Streszczenie

Państwo jest odpowiedzialne za zarządzanie ryzykiem katastroficznym, które zagraża zasobom alokowanym zarówno w sektorze prywatnym, jak i w publicznym. Zarządzanie ryzykiem katastroficznym wymaga podjęcia kroków w kierunku rozpoznania tego ryzyka, zapobiegania jego realizacji, minimalizowania konsekwencji i organizowania funduszy koniecznych dla restytucji utraconych zasobów, co jest szczególnie istotne w kontroli ryzyka katastroficznego. Rozważenie źródeł finansowania ryzyka katastroficznego dostępnych dla państwa ukazuje, że wartościowym rozwiązaniem są rezerwy. Rezerwy zapewniają potrzebne środki, można je zorganizować w sposób, który zminimalizuje hazard moralny, i wykorzystywać jako swoistą „trampolinę" w kierunku rynków kapitałowych, a tym samym stwarzać dostęp do dodatkowych środków.

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TRANSFER PRICING AS A PROBLEM OF MULTINATIONAL CORPORATION

Introduction

With growing specialization in production of components in different locations across the globe, intra-firm transactions account for a growing share of world trade. Accounting manipulations allow for a transfer of tax bases even if physical capital (real activity) remains intact, as multinational enterprises (MNEs) attempt to exploit differences in marginal statutory tax rates across countries, either actual or de facto (if there exist differing laxities with which tax administration is carried out). In most situations, this involves maintaining a judicious setting of the imputed values on the internal transfer of goods and services between operations in different countries. Such tax-shifting manipulations in which intra-firm sales are invoiced (i.e. "transfer pricing") is often arbitrary, since no formal sales occur, and firms can play strategic games in an effort to lower their tax liabilities. The customary notion of "arm's length transaction" is not always easy to apply in practice. As the globalization process unfolds further, it may be increasingly difficult to sustain the current methods of taxing MNEs operating in different tax jurisdictions. Instead of taking each jurisdiction as a separate entity as is currently done, consideration may need to be given to the adoption of the unitary or worldwide tax base for the corporate income tax, with an internationally agreed system of tax credits or allocation procedures to prevent double taxation and to maintain international competitiveness.

1. Taxation Trends in the Global Economy – the aspect of tax competition

Globalization is bringing revolutionary changes. The essence of the internationalization process is aptly described by U. Beck, who thinks that globalization means that national boundaries are becoming less relevant to in the areas of social life, subject to this process. Distances are removed and people take the transnational lifestyle. Under such conditions, nation-states less control of the processes occurring on their territory and part of social and economic life is transferred to the post-sovereign space (Rosenau, 1996, p. 251).

The process of globalization is exposing a deep line between group who have the skills and mobility to flourish in global markets and those who either don't have these advantages or perceive the expansion of unregulated markets as inimical to social stability and deeply held norms. The result is several tension between the market and social groups such as workers, pensioners, with governments stuck in the middle. Another consequence of globalization is increased tax competition.

According to Stewart and Webb tax competition is a phenomenon that reflects the interaction of policy instruments and behavioral responses by taxpayers. In terms of policy instruments, tax competition typically is expected to take the form of government decisions to lower tax rates or make tax incentives more generous, thereby presumably improving the attractiveness of investments within their jurisdictions. However, even if tax policy does not change, behavioral responses by taxpayers to either a lowering of barriers to cross-border investments or a lowering of tax rates in other countries could cause tax revenues to fall in countries that had not introduced any changes in policy. This could occur as a result of either income-shifting – when corporations shift profits to affiliates located in low-tax jurisdictions by manipulating transfer prices or inter-affiliate loans and interest payments – or the shift of direct investments to the lower-tax jurisdictions (Stewart, Webb, 2006, p. 156-157).

In a globalized environment there are many governments have responded to globalization* with tax cuts designed to improve competitiveness and spur growth. Individual income tax rates have plunged in recent decades, and more that two dozen nations have replaced their complex income taxes with simple flat tax. At the same time, nearly every country has slashed its corporate tax rate, recognizing that business investment and profits have become highly mobile in today's economy. For the private sector this fiscal aspect could be considered as a positive consequence of globalization. But the bad news is that some governments (e.g. Germany or France) and international organizations are trying to restrict tax competition. A battle is unfolding between those policymakers wanting to maximize taxation and those understanding that competition is leading to beneficial tax reforms.

Since 1980, assuming the dynamics of technological development has significantly changed the economic landscape, which potentially had a particular

* Many countries increasingly compete to become the legal or financial homes for corporations. Low-tax countries, such as Bermuda and Ireland, have become compelling legal homes for firms from many countries. National stock exchanges actively compete for listings of foreign firms and many firms today are listed on a stock exchange outside their home country or on more than one stock exchange. And various countries, such as Dubai and Singapore, compete actively to be regional or global homes for managerial talent (Desai, 2008, p. 8).

impact on "architecture" of tax systems. V. Tanzi believes that it was dictated by the following factors (Tanzi, 1996, p. 6):

1. Openness of the economies in the internationalization of trade – growth in world trade was twice higher than the GDP growth which resulted in the fact that the current global economy has reached the highest level of integration which any observed.
2. Dynamic growth in trade was accompanied by equally dynamic growth in the free movement of capital, which was the consequence of reducing barriers to capital mobility resulting primarily from technological progress.
3. Increase the role of multinational enterprises in the financing of direct investment and the allocation of its activities in various parts of the world which has created new problems for tax authorities to escape in the form of profits to tax haven.
4. Trend is growing for the free movement of labor, while reducing the transport costs and efforts to obtain more and higher incomes meant that the sources of income of individuals were very often located in other countries than the place of residence of those persons, therefore, in the absence of adequate regulations were placed in tax revenues to budgets of other countries. The problem also has a second face namely the fiscal drain on government revenue which resulted also from the fact that part of the earned outside the country of residence, income was spent in another country, and so was the loss of taxes on both the direct and indirect.

These implications of forced adaptation to the new tax systems, economic and social realities to be fixed by taking the momentum of globalization. It should be emphasized that globalization is not primarily limited to financial matters, although the financial aspects are assigned a special space. The essence of a new quality of social life associated with globalization processes is determined differently. First, it points to a comprehensive process of global interpenetration, national and individual aspects of social life (Piertaś, 2002, p. 7). Secondly, this phenomenon is associated with an increase in various types of connections, interconnectedness, impacts in all areas of life. Thirdly, is introduced to distinguish the phenomenon of globalization, which manifests itself in the network of interdependence for multi-continental scale and the processes of globalization, which is a dynamic process of growth the level of globalism (Nye, Donahue, 2000, p. 2).

Just since the mid-1990, the average corporate tax rate in the 30-nation Organization for Economic Cooperation and Development has fallen from 38 percent to 27 percent*. During the same period, the average rate in the European

* It should be emphasized that statutory corporate income tax rates have been widely used as a simple, highly visible measure of the intent of policy makers. If governments were under serious international competitive pressure to reduce the tax burden facing internationally mobile investors, one might expect to see statutory tax rates decline through a process of competitive tax cutting. In fact, statutory corporate tax rates have fallen substantially over the past 20 years, and this is often cited in popular critiques of globalization (Stewart ,Webb, 2006, p. 158).

Union plunged from 38 percent to 24 percent (KPMG International). But corporate tax cuts have spread beyond the OECD countries. This decade, there have been cuts in far-flung places such as Albania (20 to 10 percent), Egypt (40 to 20 percent), Mauritius (25 to 15 percent), and Russia (35 to 24 percent).

Since 2000, corporate tax rate have included Austria (34 to 25 percent), Canada (45 to 34 percent), Germany (52 to 30 percent), Greece (40 to 25 percent), Iceland (30 to 18 percent), Italy (41 to 31 percent), The Netherlands (35 to 26 percent), and Portugal (35 to 25 percent).

Most countries have also cut tax rates on dividends and capital gains. Many countries have cut or eliminated taxes on estates and inheritances, and many have abolished annual taxes on wealth, which used to be popular in Europe. Futher, witholding taxes on cross-border investments have been cut sharply around the world. Finally individual income tax rate have also been cut sharply. The average top rate in the OECD has plummeted 26 percentage points since 1980 (Edwards, Mitchell, 2008, p. 3). The trend is global, with the average top rate falling by a similarly large in Africa, Asia, Europe, Latin America, and North America. In addition, 25 nations have scrapped their multi-rate income taxes and installed flat taxes. The average individual tax rate in this "flat tax club" is just 17 percent (Table 1).

Flat tax countries have made the choice to scrap multi-rate, or "progressive", income tax systems in favor of single-rate systems that have fewer deductions, exemptions, and credits. As is contrary to the interests of most politicians because it prevents them from micromanaging the economy through the tax code. Under a flat tax, politicians would not be in the business of offering narrow tax benefits to certain interests. Another hurdle to reform has been that some experts and international organizations have argued that flat taxes are not practical in the real world. Some critics continued to dismiss the spread of the taxes as if it were a temporary fad. An International Monetary Fund (IMF) study in 2006 stated boldly, "Looking forward, the question is not so much whether more counties will adopt a flat tax as whether that have will move away from it" (Keen, Kim, Varsono, 2006). Yet a more nations have joined the flat tax club since the IMF assessment, including the first mature and high-income economy, Iceland.

Table 1

The Flat Tax Rate: Income Tax Rate, 2008

Jurisdiction	Year Individual Flat Tax Adopted	Individual Flat Tax Rate	Corporate Tax Rate
Jersey	1940	20.0%	20.0%
Hong Kong	1947	15.0%	16.5%
Guernsey	1960	20.0%	20.0%

Table 1 cont.

Jamaica	1986	25.0%	33.3%
Estonia	1994	21.0%	21.0%
Lithuania	1994	24.0%	15.0%
Latvia	1995	25.0%	15.0%
Russia	2001	13.0%	24.0%
Slovakia	2004	19.0%	19.0%
Ukraine	2004	15.0%	25.0%
Iraq	2004	15.0%	15.0%
Romania	2005	16.0%	16.0%
Georgia	2005	12.0%	15.0%
Kyrgyzstan	2006	10.0%	10.0%
Pridnestrovie	2006	10.0%	10.0%
Trinidad	2006	25.0%	25.0%
Iceland	2007	35.7%	18.0%
Kazakhstan	2007	10.0%	30.0%
Mongolia	2007	10.0%	25.0%
Macedonia	2007	10.0%	10.0%
Montenegro	2007	15.0%	9.0%
Albania	2007	10.0%	10.0%

Source: Edwards, Mitchell (2008, p. 61).

Governments started the ball rolling for tax competition when they began to remove controls on capital movements in the 1970s. The deregulation of capital gave investors more freedom to diversify their portfolios and they ultimately purchased trillions of dollars of foreign securities. Meanwhile, corporations expanded their networks of affiliates worldwide*. The result is that investors and corporations now look globally to maximize their returns and minimize their taxes.

While tax reforms have generally reduced corporate tax rates globally, continued international tax differentials are an enduring feature of the global fiscal

* There are many examples of firms with homes outside their country of origin. Forty percent of Chinese red chip companies listed in Hong Kong are legally domiciled in the Caribbean. New firms, too, no longer routinely establish themselves in their founders' country of birth. When Accenture, the global consulting division of Arthur Andersen, became an independent firm in 2000, it incorporated in Bermuda and listed its shares in New York. The founder of the start-up business Pixamo, a photo sharing website based in Cambridge, Massachusetts, considered Delaware, Switzerland and the Ukraine as corporate domiciles prior to the firm's first round financing (...). Many firms with global activities have created regional headquarters. The natural next step has been to relocate traditional headquarters activities to the regional headquarters best suited for the purpose. For example, an American multinational firm headquartered in Chicago might find itself with a European regional headquarters in Brussels and an Asian regional headquarters in Singapore. Shortly thereafter, the global treasury and financing function might usefully migrate to Brussels and the global information technology function might usefully migrate to Singapore (Desai, 2008, p. 4).

environment. In this context, multinational firms can reduce their worldwide tax payments by shifting income from highly taxed jurisdictions to more lightly taxed locations. While income shifting can be accomplished through the reallocation of real activities, it can also be attained by shifting reported income, as occurs when firms manipulate their transfer prices on international transactions (Swenson, 2000, p. 7).

Globalization has become a strategic practice especially for multinational enterprise (MNE), both in terms of manufactured goods that have been produced offshore for more than two decades and the recent growth in offshore business services and intangibles.

At the level of the source it has to be accepted that any firm currently operating in a geographical and political territory will use supplies both from inside and outside that territory and will offer services to customers inside and outside that territory. This is not only an economic fact but also a legal option under WTO rules and – even more effectively but with different intensity – under regional frameworks such as the European Union, NAFTA, and similar areas of free trade. Free movement of financial capital in "real time" hardly meets any legal or technological limits around the globe. E-commerce renders longstanding assumptions about economic presence more or less meaningless. Moreover, the activities of a single firm might quite often stretch across geographical and political boundaries, thus making it more and more difficult to recognize and evaluate the respective contributions of different (legal or factual) units of the firm to the final outcome. This is most prominently reflected in the eternal debate on the reliability of transfer pricing methods, where the traditional instruments (comparable uncontrolled prices, cost-plus or profit minus methods) are more and more supplemented by "modern" but increasingly arbitrary tools (transactional net margin method and profit split method) (Schön, 2009, p. 68).

Large enterprises account for a major share of international investment, and there is a trend toward large-scale international mergers. At the same time, foreign investment by small- and medium-sized enterprises has also increased and these enterprises now play a significant role on the international scene. Multinational enterprises, like their domestic counterparts, have evolved to encompass a broader range of business arrangements and organizational forms. Strategic alliances and closer relations with suppliers and contractors tend to blur the boundaries of the enterprise (OECD, 2008, p. 9).

In the globalized economy, raising tax revenues on multinational firms has become increasingly difficult for governments, for at least two reasons. First, competition to attract mobile firms creates a downward pressure on profit taxation. Second, multinational firms may take advantage of tax differentials by manipulating profits across jurisdictions (Peralta, Wauthy, Tanguy van Ypersele, 2005, p. 24-25).

2. Transfer pricing – the key point for international taxation

Multinational firms have several tools to shift profits out of high into low tax regions. These include the option to finance an affiliate with debt or equity, the organizational form (e.g., to own the affiliate or to engage in a joint-venture with a local firm), or the payment of management fees or royalties between the parent company and its affiliates.

Designing transfer pricing systems is a central instrument for management control because transfer prices can be set to accomplish certain objectives (Figure 1). These objectives are likely to be conflicting, which makes it hard for the companies to construct an optimal model for transfer pricing. Some objectives will encourage the managers to charge a higher price, while others will promote a lower price. This forces managers to make trade-offs since no single transfer pricing method serves all purposes (Hjertberg, Pettersson, 2010, p. 17).

As a result, more than one-third of world trade in goods, services and intangible assets occurs between firms that are related to one another, for example, between two subsidiaries of a multinational firms. Trade between related firms is called intrafirm trade. The price of an intrafirm transaction, called a transfer price, affects the allocation of profits between the buyer and seller firms; a high transfer price shifts profits to the seller, a low price to the buyer.

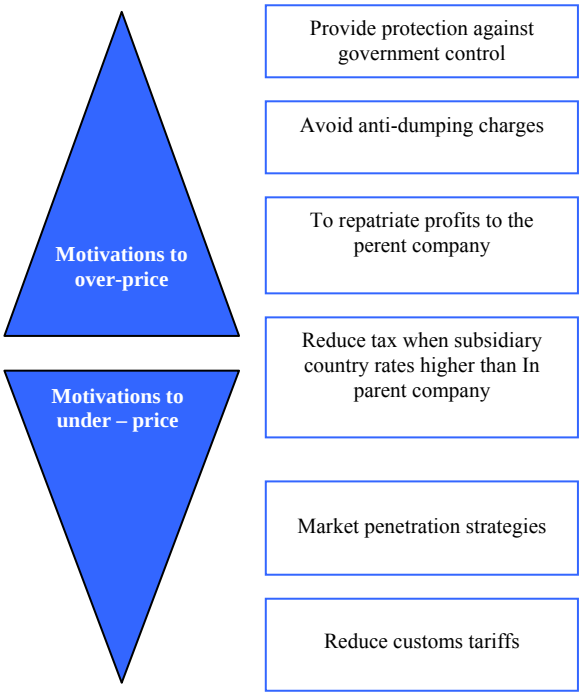

Fig. 1. Strategic Transfer Pricing

Source: Anthony, Govindarajan (2007, p. 8) in: Hjertberg, Pettersson (2010, p. 18).

Domestic transfer pricing is mainly about economic allocations of resources, it is about finding the optimum trade-off between costs and revenues and the performance evaluation between divisions is very important. Hence the aim is to increase the overall profit for the firm as a whole (Hjertberg, Pettersson, 2010, p. 21).

When intrafirm trade crosses national borders, it is called international transfer pricing, or simply transfer pricing. The manipulation of transfer is another widely used instrument. International transfer prices make the already complex situation even more complex since more dimensions are added to the price-making decision. One complex and highly discussed issue is when an internal cross-border transaction occurs, activities are undertaken in different tax jurisdictions which can have large effects on the pricing (Hjertberg, Pettersson, 2010, p. 21).

The economic rules suggest that the highest transfer price would be market price and the lowest transfer price would be differential cost. Depending on the options available to the buyer and seller, some other transfer price might be chosen between these two extremes. Economic rules work best in a domestic business environment where both buyer and seller divisions are taxed at the same corporate rate, because the tax rates do not affect the outcome.

While the economic principles work well for domestic transfer prices, they differ substantially from international rules. Each country legislates and enforces its own transfer pricing laws. A multinational enterprises with foreign divisions must then comply with tax laws for each country in which one of its divisions is domiciled. Every transaction between company sub-units is subject to audit by two sets of tax authorities. Tax compliance places a heavy burden on MNEs and takes precedence over economic rules (Drtina, Reimers, 2009).

Transfer pricing refers to the terms and conditions surrounding transactions within a multi-national company. It concerns the prices charged between associated enterprises established in different countries for their inter-company transactions, i.e. transfer of goods and services. Since the prices are set by non independent associates within the multi-national, it may be the prices do not reflect an independent market price. This is a major concern for tax authorities who worry that multi-national entities may set transfer prices on cross-border transactions to reduce taxable profits in their jurisdiction. This has led to the rise of transfer pricing regulations and enforcement, making transfer pricing a major tax compliance issue**.**

But a MNE has to manage its overseas transactions in a world characterized by different international tax rates, foreign exchange rates, governmental regulations, currency manipulation, and other economical and social problems. One of the most important things is to reduce the global income tax liability for the

MNE and problem focus on double taxation. According to analyses made by Hjertbeg and Petterson situation is as follows (Hjertberg, Pettersson, 2010, p. 23-26).

An economic double taxation situation arises when the same income are taxed twice. For MNEs this occurs when there is a conflict of interest between the tax authorities in the countries involved in the transaction. The tax authority in each country wants to protect their tax base and gain as large income as possible. They can have laws and regulations that differ and raise claims at the same income. For example there can be differences in definitions on the requirements for unlimited tax obligations or in the definition of associated enterprises, what is considered to be the permanent place for the operation or different rules of what is considered to be incorrect pricing or transfer loss (Nguyen, 2009).

Assume that there is a difference in definition of associated enterprises. Country A requires at least 50% holding to consider companies associated while country B requires 30%. In country A, the income tax is 25% while in country B 35%. Then assume that company B in country B buys goods from company A in country A in which they hold 31% of the shares. The cost of goods sold is 50 and the price is set to 100 (Figure 2).

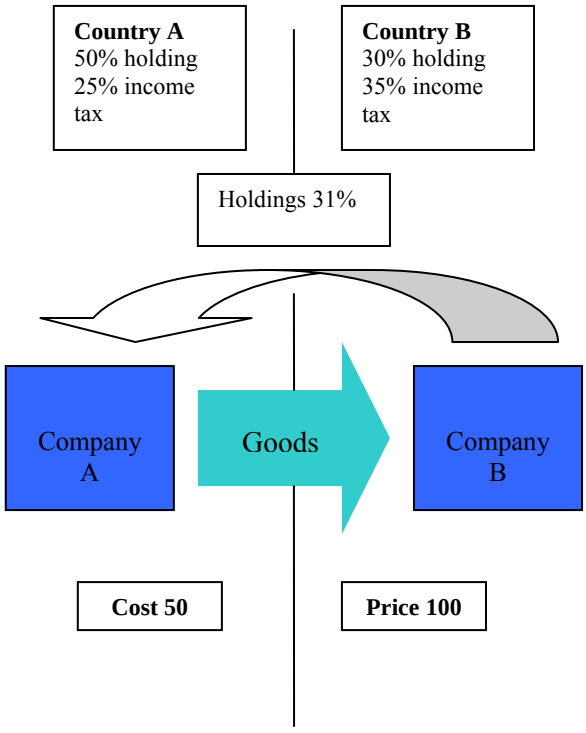

Fig. 2. Cross-border Transactions

Source: Hjertberg , Pettersson (2010, p. 24).

In country A no transfer pricing adjustments is required since the transaction does not meet the requirements for the definition of associated companies. They produce it for 50 and sell it for 100. If we then assume that Company B buys the goods for 100 and then resells it for 80, i.e. they make a loss at the transaction and income are shifted from Country B to Country A which has a lower income tax. If both countries didn't consider this as a transaction between associated companies the income tax would have been 12.5 payable for company A (50 x 0.25) and 7 receivable for company B (-20 x 0.35). This means a global income tax at 5.5 for the group since they transfer goods to a high price from a country with lower income tax to a country with higher.

But since the transaction lives up to the requirements for associated companies in country B, the tax authority will probably assert incorrect pricing and instead adjust the price at the purchased goods from 100 to let us say 60, i.e. Company B (in a tax point of view) suddenly make a profit at 20 on the transaction instead of a loss at 20, which would lead to a payable income tax at 7 (20 x 0.35). So the total global tax would be 19.5 since a part of the profit is rated in two countries. This incorrect pricing will not be advantageous for the associated companies due to the transfer pricing regulations since it leads to double taxation.

Scenario 1: No associated interest between the companies
A: 12.5 payable income taxation B: -7 receivable
Total global taxation 5.5

Scenario 2: Associated interests between the companies with incorrect pricing
A: 12.5 payable income taxation B: 7 payable
Total global taxation 19.5

Scenario 3: Associated interests between the companies with correct pricing
A: 2.5 payable Income taxation B: 7 payable
Total global taxation 9.5

If the group sets a correct price, according to the arm's length principle, they can avoid these extra costs. Assume that an added margin at 20% of cost of goods sold is a result of the arm's length principle between the companies. Then Company A would sell for 60 to Company B and pay 2.5 in tax (10 x 0.25), while company B buys for 60 and sells for 80 which means a payable income tax at 7, this gives us a global income tax at 9.5. Not as good as 5.5 but way better than 19.5. This is just one example over when a double taxation can occur. Another easier example at double taxation is when a profit in a subsidiary in country A is taxed and then transferred to the parent company in country B where it is taxed again.

Double taxation is a barrier that discourages investors from conducting business and investments in foreign countries. It is not beneficial for anyone and therefore tax authorities have developed double tax relief measures to reduce or eliminate international double taxation. (Nguyen, 2009). It seems important to mention the statement (as a kind of summary) "The golden rule is that tax treaties can never extent a country's taxing right, only reduce it" (Hjertberg, Pettersson, 2010, p. 26).

3. OECD Recommendation for the transfer pricing

According to international standards individual group members of a multinational enterprise must be taxed on the basis that they act at arm's length in their dealings with each other. This arm's length principle is found in article 9* of the OECD Model Tax Convention** and maintained and developed in the 1995 OECD Transfer Pricing Guidelines (OECD, 2010):

"[When] conditions are made or imposed between (...) two [associated] enterprises in their commercial or financial relations which differ from those which would be made between independent enterprises, then any profits which would, but for those conditions, have accrued to one of the enterprises, but, by reason of those conditions, have not so accrued, may be included in the profits of that enterprise and taxed accordingly".

OECD member countries continue to endorse "*the arm's length*" principle as embodied in the OECD Model Tax Convention (and in the bilateral conventions that legally bind treaty partners in this respect) and in the 1979 Report. These Guidelines focus on the application of the arm's length principle to evaluate the transfer pricing of associated enterprises. The Guidelines are intended to help tax administrations (of both OECD member countries and non-member countries) and MNEs by indicating ways to find mutually satisfactory solutions to transfer pricing cases, thereby minimizing conflict among tax administrations and between tax administrations and MNEs and avoiding costly litigation. The Guidelines analyses the methods for evaluating whether the conditions of commercial and financial relations within an MNE satisfy the arm's length principle and discuss the practical application of those methods. They also include a discussion of global formulary apportionment (OECD, 2010, p. 20).

In the OECD Report there are several reasons why OECD member countries and other countries have adopted "the arm's length" principle, (see OECD, 2010, p. 34-35).

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* For permanent establishments the principle is established in Article 7 of the OECD Model Tax Convention.

** OECD Model Tax Convention on Income and Capital, first published in 1963 and periodically updated since then.

The universally accepted approach for setting a transfer price is referred to as the "arms-length standard". Deloitte Tax LLP (2007), an international consulting firm, defines this as "the price at which two unrelated parties agree to execute a transaction". Despite the fact that countries worldwide use the arms-length standard to set transfer prices, they enact rules that can lead to different interpretations of what the price should be. Companies are stuck with compliance burdens on each side of the transaction. Meeting the rules of one country does not guarantee that the other's requirements will be met (Drtina, Reimers, 2009).

It seems that in principle, 'transfer pricing' based on "the arm's length principle" represents a coherent and sound concept for establishing the correct attribution of company profits between countries. But not quite, the setting of intra-group transfer prices in accordance with the separate entity approach and the arm's length principle does not necessarily correspond to the prices set for business reasons (effectiveness, performance measurement etc.). This has always been the case. However, business representatives maintain that the very concept of "the arm's length principle" will in the future lose its underlying commercial rationale. This is because large companies, in view of their EU-wide corporate restructuring, adopt so called Euro-pricing (European Commission, 2001, p. 292).

An alternative to the "arm's length principle" can be "global formulary apportionment". Global formulary apportionment would allocate the global profits of an MNE group on a consolidated basis among the associated enterprises in different countries on the basis of a predetermined and mechanistic formula. There would be three essential components to applying global formulary apportionment: determining the unit to be taxed, i.e. which of the subsidiaries and branches of an MNEs group should comprise the global taxable entity; accurately determining the global profits; and establishing the formula to be used to allocate the global profits of the unit.

The formula would most likely be based on some combination of costs, assets, payroll, and sales. But OECD member countries do not accept these propositions and do not consider global formulary apportionment a realistic alternative to the arm's length principle, for the reasons discussed below.

4. European Union Recommendation for the transfer pricing

The European Union role in taxes is mainly limited to indirect taxation and tax state-aid**.** Articles 90 to 93 EC specifically deals with tax provisions. However, the scope of these articles is limited as they only allow the European Commission to work on "(…) provisions for the harmonization of legislation concerning turnover taxes, excise duties and other forms of indirect taxation to the extent that such harmonization is necessary to ensure the establishment and

the functioning of the internal market within the time-limit laid down in article 14". Article 87 EC on State aid provides another rationale for intervening when a tax distorts competition by favoring certain undertakings or the production of certain goods and affects trade between Member States. Despite its strict formulation, this article has been widely used by the European Commission to remove harmful tax measures.

However in The Company Tax Study, the Commission identified the increasing importance of transfer pricing tax problems as an Internal Market issue: although all Member States apply and recognize the merits of the OECD "Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations", the different interpretations given to these Guidelines often give rise to cross border disputes which are detrimental to the smooth functioning of the Internal Market and which create additional costs both for business and national tax administrations (European Commission, 2001, p. 9).

Member States' legislation generally also obliges domestic intra-group transactions to take place at arm's length. However, in practice, transfer pricing is mainly a cross border issue which creates specific compliance costs and contains a risk of double taxation. Multinational enterprises with cross-border transactions find themselves confronted with a number of difficulties that are explored in detail below (European Commission, 2001, p. 259-260):

– documentation requirements (sometimes heavy),
– the risk of penalties and economic double taxation,
– the costs of temporarily having to finance the same tax burden
– twice,
– increased auditing by the tax authorities.

A general problem in this context for multinational enterprises is the one of uncertainty. It is claimed by business that there is a risk of suddenly having a business structure which has perhaps been in place for a number of years undermined by the tax authorities who will – for transfer pricing reasons – no longer accept it from a tax point of view. Moreover, according to the business representatives in the panel it is not uncommon that a certain structure and/or transfer price (or the application of a specific method) might be acceptable to one Member State but not to another.

Transfer pricing thus represents an additional burden for a company in one Member State to set-up and/or conduct business with an affiliated company in another Member State, and instead favors domestic investments/transactions. Furthermore, as independent enterprises are not subject to transfer pricing regulations on cross border transactions they will be in a better position than multinational enterprises. Transfer pricing can also affect the location of cross border investments. All other things being equal, a company would be less likely to set-

up a subsidiary or branch in another Member State with a stricter transfer pricing policy than in another Member State with more lenient rules.

The report (European Commission, 2001) stresses the increasing differences between the transfer prices calculated for tax purpose and the underlying commercial rationale. It also pointed to the high compliance costs imposed by the Member States in the form of documentation requirements, the differences and uncertainty of the treatment of those operations by national tax authorities, the lack of use of the arbitration convention (90/436/EEC) and the subsequent double taxation.

The report estimates that "(…) medium sized multinational enterprises spend approximately EUR 1 to EUR 2 million a year on complying with transfer pricing rules" and that "(…) large multinational enterprises incur compliance costs related to transfer pricing of approximately EUR 4 up to EUR 5.5 million a year. These figures do not include the costs and risks of double taxation due to transfer pricing disputes" (European Commission, 2001, p. 343). To overcome these difficulties, the European Commission has proposed to establish a Code of Conduct to standardize the documentation that companies must provide to tax authorities on their pricing of cross-border intra-group transactions (European Commission, 2004).

Schön assumes that corporate law influences business decisions on transfer pricing in two respects: On the one hand, corporate law rules on the protection of minority shareholders and creditors provide a framework for intra-group transactions which the management is not allowed to transgress. Within this framework, the management is bound by law to pursue the goal of profit maximization, meaning on the one hand to increase to overall profit of the corporate group and on the other hand to reduce the overall tax burden of the corporate group. Insofar, the interaction of tax and business transfer pricing is governed by corporate law requirements. Managers will seek a balance between tax benefits and "tunneling" of profits to large shareholders (Schön, 2011, p. 4).

There is another aspect. Four of today's biggest and fastest growing economies; Brazil, Russia, India and China, also known as the BRIC-countries, are for example non members of the OECD. Together they stand for one fifth of the world's Gross Domestic Product (GDP) and almost half of the world population (Svenska Dagbladet, 2009). Even if the OECD standard has been really successful in contributing to a uniform global standard, there are a number of domestic considerations and peculiarities to be aware of. These considerations and peculiarities are of course more superior when dealing with non member countries. There are also other factors, besides laws and regulations, which can affect the transfer pricing strategies. The business environment differs among countries and there are cultural aspects and principles that can affect their transfer pricing strategies (Hjertberg, Pettersson, 2010, p. 12).

At this point raises the statement that there is no simple recipe for international tax coordination. There is no natural order of things in the international tax world. "Perhaps the most fundamental rule of international taxation" – as Bird and Wilkie have put it – "that there are no rules of international taxation" (Bird, Wilkie, p. 91).

5. Corporate tax coordination and the transfer pricing

Policy-makers often view transfer prices as being manipulated by multinationals to minimize taxes. Transfer pricing rules in many countries assume that the correct price to assess for non-marketed transactions is a comparable price of a similar arm's length transaction adjusted for quality and other differential attributes such as business risk (see Bernard ,Weiner, 1990; Eden, 1985).

As emphasized in the accounting literature transfer prices are essentially based on sales or costs of production (with an adjustment for an assumed profit rate), fails to recognize the role of transfer prices in influencing the behavior of subsidiaries that are controlled by the parent the transfer price may be used as part of an incentive scheme to induce divisions to improve their efficiency. If control is an issue, the transfer price need not be equal to the marginal cost of production since it influences the agency costs faced by the parent when controlling subsidiaries. Therefore, transfer pricing by multinationals may be used not only to minimize taxes but also to improve the efficiency of worldwide operations.

Business research focuses on the use of transfer prices to provide incentives for efficient resource allocation within a multidivisional firm; taxation rules strive to control transfer prices between head office, subsidiaries and permanent establishments within a multinational enterprise in order to allocate profits and ensuing tax revenue among the countries where the firm operates; corporate law uses a panoply of strategies to monitor related party transactions between corporate entities and their dominant shareholders as these might result in the diversion of the company's assets to the detriment of minority shareholders or company creditors (Schön, 2011, p. 3).

It is widely accepted that companies seek to maximize profits. A multinational enterprises (MNEs) can help achieve this goal by shifting profits from high-tax to low-tax jurisdictions. For example, take Hungary, with a corporate tax rate of 16%, and France, with a tax rate of 35%. An MNC with divisions in these two locales will benefit by shifting more profit toward Hungary and less to France. Each division is controlled by corporate headquarters, which can set a transfer price to benefit the entity as a whole. The cases below illustrates how this works (Drtina, Reimers, 2009).

In Case 1, the Hungary division transfers goods to the France division and charges a sales price of $1,000. (1) Hungary division's revenue becomes France

division's cost of goods sold. Using the respective country tax rates, net income for the Hungary division is $420 and for the France division is $260.

Case 2 shows how these results differ if the Hungary division sells the same goods to the France division for $600 instead of $1,000. Now the France division's cost of goods sold is only $600. As a result, the Hungary division's net income falls to $84 and the France division's net income increases to $520. Total company net income falls from $680 to $604-solely due to the change in transfer price and its impact on division taxes.

Case 3 shows the effects when tax authorities unilaterally impose a transfer price adjustment. Assume the Hungary division first used a $600 transfer price, as in Case 2. Now Hungary's tax authorities disallow the $600 price, claiming it does not represent arm's length. The Hungary division is forced to use a $1,000 transfer price. Further, assume that the France division is unable to adjust the $600 purchase price it first reported. Without adherence to any convention between the two countries, the result is double taxation because the government on the other end of the transaction does not provide a correlative adjustment. Total company net income falls from $604 (Case 2) to $540 (Case 3).

Blouin, Robinson and Seidman pointed to the hypothesis: whether corporate coordination of the firm's tax function or governmental coordination of tax enforcement affect the transfer pricing behavior of firms that face competing tax minimization incentives. According to them more centralized organizations have a higher likelihood of jointly considering both tariffs and income taxes when making transfer pricing decisions. Said another way, better coordinated firms are more likely to coordinate tariff and income tax minimization in their tax planning function (Blouin, Robinson, Seidman, 2011, p. 16).

Based on the survey Blouin, Robinson and Seidman find that when tariff minimization and income tax minimization cannot be achieved by using a single transfer price, the negative relation between income tax rates and reported pretax income is weaker. Specifically, a subsample of firms with significant conflicts between their tariff-minimizing and income tax-minimizing transfer pricing incentives (importing affiliates located in high tax countries and exporting affiliates located in low tax countries) exhibit a positive negative relation between income tax rates and reported pre-tax income. This suggests that transfer pricing decisions are made to minimize tariff payments rather than income taxes and is consistent with non-creditable taxes playing a more significant role in tax minimization strategies.

Ernst & Young (2008) reports that only 3 percent of tax directors of multinational firms view customs duties as the most important tax issue they face, while 39 percent stated transfer pricing for income tax purposes as the most important issue they face. Additionally, fewer than half (48 percent) of firms said

the person responsible for transfer pricing for income taxes has input over setting prices for customs purposes. Thus, there appears to be a wide range of overlap in oversight of tariffs and income taxes within an organization when setting transfer prices, and income tax minimization seems to play a primary role.

MNEs use different methods to achieve different results. Both internal and external goals can be determining the transfer prices. Common goals are performance evaluation of subsidiaries, motivating managers, tax reduction and strengthening of foreign subsidiaries. Transfer pricing can also be used to reduce foreign exchange risk, increase market shares, profit maximization and tax burden minimization.

A survey by Kim and Miller indicated that in the past, MNEs considered reducing income taxes as the most important corporate goal in designing their transfer pricing systems. Now, tax reduction is only a minor factor among many others, and the company's overall goal rather than income tax liability should be a major concern (Kim, Miller, 1979, p. 71). Another survey, by Jamie Elliott, found that an important factor that places constraints on a group's freedom to minimize direct taxes by fixing artificial transfer prices is the possible knock-on effect that this could have on indirect taxes (Elliott, 1998, p. 48-50).

The evidence of tax-motivated transfer pricing comes in several forms. Though it is possible that high tax rates are correlated with other location attributes that depress the profitability of foreign investment, competitive conditions typically imply that after-tax rates of return should be equal in the absence of tax-motivated income shifting fact that before-tax profitability is negatively correlated with local tax rates is strongly suggestive of active tax avoidance (Hines, 1999, p. 311).

According to Abdallah along with the reduction of global income tax liability, a major problem is how to coordinate the tax effect of transferred goods among different foreign countries to come up with the optimal transfer price. To set the appropriate transfer price for tax reduction, it is very important to determine the tax effects of different ways of taxing imports and exports by imposing duties and customs on them, and different tax rate structures and the methods of taxing MNEs' profits used by foreign countries.

It is not an easy task to determine the results of these effects on MNEs' global profits because there are frequent and rapid changes by host- and home-country governments to achieve some economic, political social objectives for their own countries

On the other hand the whole problem of maximizing profits at the lowest cost of tax is primarily focused around the transfer pricing to shift profits. However, in the literature, we find the view that there are other channels for shifting profits besides transfer pricing. One prominent channel is the extensive use of debt contracts between related parties in different countries (Bartelsman, Beetsman, 2000, p. 11).

Conclusions

International transfer pricing policies are generally set to maximize the after-tax profitability of worldwide business transactions. The minimization of income tax liabilities for an MNEs has been considered as the most significant factor or objective in designing transfer pricing policies in the foreign country, and consequently, if a transfer prices shifts profits from a country with high tax rates to a country with low tax rates, the global profits will be maximized. However, tax authorities are concerned that MNEs could use these transfer prices to shift profits between related parties through cost of goods.

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CENY TYRANSFEROWE – PROBLEM FIRM MIĘDZYNARODOWYCH

Streszczenie

Globalizacja i internacjonalizacja wymiany handlowej oraz stosunków miedzynarodowych nadały szczególnego wymiaru problemowi cen transferowych, co w szczególności objęło międzynarodowe korporacje. Na arenie międzynarodowej pojawiły się wytyczne umożliwiające wdrażanie rowiązań w zakresie cen transferowych do narodowych systemów podatkowych, tworząc w ten sposób w miarę możliwości spójne otoczenie fiskalne dla tego typu transakcji, chroniąc tym samym dochody podatkowe przed ich odpływem do państw o bardziej liberalnych rozwiązaniach fiskalnych.