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Introduction

One of the fastest growing areas in the economic sciences is broadly defined area of finance, with particular emphasis on the financial markets, financial institutions and risk management. Real world challenges stimulate the development of new theories and methods. A large part of the theoretical research concerns the analysis of the risk of not only economic entities, but also households.

The first Wrocław Conference in Finance WROFIN was held in Wrocław between 22nd and 24th of September 2015. The participants of the conference were the leading representatives of academia, practitioners at corporate finance, financial and insurance markets. The conference is a continuation of the two long-standing conferences: INVEST (Financial Investments and Insurance) and ZAFIN (Financial Management – Theory and Practice).

The Conference constitutes a vibrant forum for presenting scientific ideas and results of new research in the areas of investment theory, financial markets, banking, corporate finance, insurance and risk management. Much emphasis is put on practical issues within the fields of finance and insurance. The conference was organized by Finance Management Institute of the Wrocław University of Economics. Scientific Committee of the conference consisted of prof. Diarmuid Bradley, prof. dr hab. Jan Czekaj, prof. dr hab. Andrzej Gospodarowicz, prof. dr hab. Krzysztof Jajuga, prof. dr hab. Adam Kopiński, prof. dr. Hermann Locarek-Junge, prof. dr hab. Monika Marcinkowska, prof. dr hab. Paweł Miłobędzki, prof. dr hab. Jan Monkiewicz, prof. dr Lucjan T. Orłowski, prof. dr hab. Stanisław Owsiak, prof. dr hab. Wanda Ronka-Chmielowiec, prof. dr hab. Jerzy Różański, prof. dr hab. Andrzej Sławiński, dr hab. Tomasz Słoński, prof. Karsten Staehr, prof. dr hab. Jerzy Węcławski, prof. dr hab. Małgorzata Zaleska and prof. dr hab. Dariusz Zarzecki. The Committee on Financial Sciences of Polish Academy of Sciences held the patronage of content and the Rector of the University of Economics in Wroclaw, Prof. Andrzej Gospodarowicz, held the honorary patronage.

The conference was attended by about 120 persons representing the academic, financial and insurance sector, including several people from abroad. During the conference 45 papers on finance and insurance, all in English, were presented. There were also 26 posters.

This publication contains 27 articles. They are listed in alphabetical order. The editors of the book on behalf of the authors and themselves express their deep gratitude to the reviewers of articles – Professors: Jacek Batóg, Joanna Bruzda, Katarzyna Byrka-Kita, Jerzy Dzieża, Teresa Famulska, Piotr Fiszeder, Jerzy Gajdka, Marek Gruszczyński, Magdalena Jerzemowska, Jarosław Kubiak, Tadeusz Kufel, Jacek Li-

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Wanda Ronka-Chmielowiec, Krzysztof Jajuga

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RISK MANAGEMENT MODEL BALANCING FINANCIAL PRIORITIES OF THE BANK WITH SAFETY OF THE ENTERPRISE

MODEL ZARZĄDZANIA RYZYKIEM RÓWNOWAŻĄCY CELE FINANSOWE BANKU Z BEZPIECZEŃSTWEM PRZEDSIĘBIORSTWA

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Abstract: Banks are focused mainly on their own financial goals rather than the safety of the customers. We think that balancing both financial results of the bank with stability of the enterprise delivers higher efficiency of the bank in the long term. This approach demands change in the bank's risk management approach. We hypothesize that the asymmetry of information, between the bank and enterprise, due to the different models used for risk assessment of the same object (project), contributes to the risk-shifting from bank to the enterprise. This results in no balance between bank's profits and enterprise safety. To reduce this deficit, we developed the Inter-Organizational Risk Management Model (IRMM) based on the agency relationship between the bank and enterprise. Finally, we present the assumptions, mainframe, structure and theoretical base for the construction of the IRMM model.

Keywords: risk-shifting, Inter-Organizational Risk Management Model, Credit Risk Models, safety of the enterprise.

Streszczenie: Banki interesują się bardziej swoim zyskiem niż bezpieczeństwem przedsiębiorstwa. Wydaje się, że równoważnie korzyści finansowych banku ze stabilnością kredytobiorcy zwiększa, w długim okresie, efektywność działalności kredytowej banku. Takie podejście wymaga zmiany modelu zarządzania ryzykiem banku. Można postawić hipotezę, że asymetria informacyjna pomiędzy bankiem i przedsiębiorstwem spowodowana stosowaniem istotnie różnych modeli oceny ryzyka przez każdą stronę przyczynia się do przerzucania ryzyka z banku na kredytobiorcę. Wynikiem przerzucania ryzyka jest brak równowagi pomiędzy korzyściami finansowymi i ryzykiem stron transakcji. Celem zredukowania występującego deficytu w wymienionym obszarze zaproponowano międzyorganizacyjny model zarządzania ryzykiem (IRMM), który jest oparty o relację agencyjną a nie transakcyjną. W artykule zaprezentowano założenia, ramy, strukturę i fundamenty teoretyczne konstrukcji IRMM.

Słowa kluczowe: przerzucanie ryzyka, międzyorganizacyjny model zarządzania ryzykiem (IRMM), modele ryzyka kredytowego, bezpieczeństwo przedsiębiorstwa.

1. Introduction

The turbulent economic environment, the pressure towards declining interest rates, which in some cases became negative, the increase of the systemic fragility [Minsky 1977], all contribute to the risk-shifting between economic sectors, asymmetry of information and loss of equilibrium between the risk and financial yields of the business partners. Additionally, Basel III and the competitive environment in financial sector demands banks to be focused on long term perspective and determines the reconsideration of the paradigms in the risk management area [Satchkov 2011, Krysiak 2012b]. In such circumstances, the risk management models may be altered to different concept than ones used in the past. The core business of the banks, in the long term, lays on the originating of the loans, therefore banks should implement more sophisticated risk management organization and tools to keep financial stability and economic condition of the customers along all the periods within the financial and economic cycles.

Nowadays, short term strategy of the bank in the loan origination seems to be not efficient, because this results in the high fluctuation in the number of customers, and then high fluctuations of incomes, which finally implies high risk for the bank. Hence, if the bank cares about the safety and stability of the enterprises, then this can contribute to establishing the long term relationships with the customers. These should then result in fixing the long term cash flow for the bank from the loan installments and decline the risk. The risk-shifting, from bank to the enterprise, effects the loss of equilibrium, between the financial outcomes and the safety triggered for both parties by the common project.

In part 2, we discuss shortly the risk-shifting phenomenon, its theoretical basis and indicate some evidence discovered by the author during the research studies in Poland and USA. Part 3 presents the concept of inter-organizational risk management model, its components, foundations, pillars, and its sources in the theory. In part 4 we discuss the assumptions of the IRMM, the hypothesis on which it is build and we discuss the theoretical base for this model, which is strongly related to the theories developed in finance and the organization science in the past. Part 5 presents the conclusions and directions of IRMM development.

2. Theoretical base and evidence of risk-shifting

Projects in the real economy sectors are developed by engagement of the producer (customer-enterprise) and funder (bank). In such a case, the bank "buys" the share in proceedings from the project expressed in price which comprises the cost of funding, risk premium and principle amount. The enterprise, against the funding sources, "sells" the share in cash flow from the project to the bank and, as a matter of fact, obtains the share in proceedings from the same project. The enterprise incurs the manufacturing costs of the project, including risk of the production and the bank contributes the funding sources comprising its risk.

Based on the mutual agreement the project generates the cash flow which is shared accordingly between these two parties. The proportion of the cash shared between two parties is determined by one-sided perception of the risk and return on the equity. The split of the cash flow in such a relationship is biased by superior position of the bank, who is not suffering the lack of investment opportunities. Because the enterprise demands more funds against the lesser supply from the banks, therefore enterprise is forced to pay higher price in form of the upper share of cash flow offered to bank from the project. The larger price paid by the enterprise is reflected subsequently as the lower share in the cash flow from the project against the acquired risk, therefore the lower cash flow obtained by the enterprise from the project lowers the value of an enterprise proportionally.

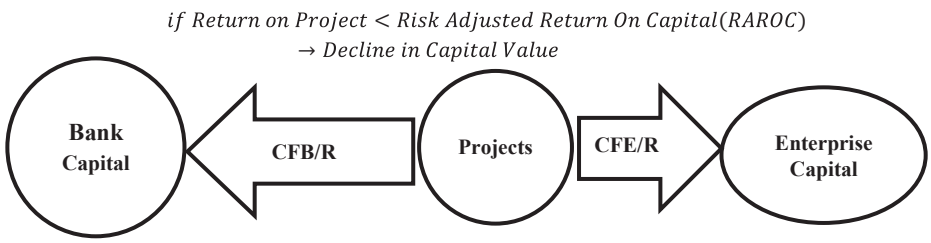

Figure 1. Distribution of the cash flow between the bank and enterprise and its impact on capital

Source: Author's own study.

The change in the magnitude and in the direction of the enterprise value depends on the relationship between the rate of return on the project and the cost of capital adjusted by risk. In Figure 1 we display general scheme of risk-shifting process between the bank and its customer as a result of unequal share of cash flow and risk generated by project. The unequal yields can be expressed as:

$$\frac{CFB}{R} \gg \frac{CFE}{R}$$

where: *CFB* – cashflow to the bank; *CFE* – cashflow to the enterprise; *R* – risk of the project.

There are some studies [Krysiak, Seaman 2012; Krysiak 2010], which show significant impact of the risk-shifting on the financials of the enterprises.

3. Concept of Inter-Organizational Risk Management Model

The transactional form of the relationship between the bank and the company, linked to a strong asymmetry of information and the information deficit causes that estimated results, by bank and enterprise, are more optimistic compared to the results

obtained during the operation of the project. We think that the change to the agency relationship, assuming some institutional form of such agency, could improve the efficiency of the business for both entities in relation to the results obtained in the framework of the pre-existing forms of transactional relationships.

The studies in the field of risk management models indicate the deficit of a holistic approach in the system of two business partners. Some signals from studies in the literature point to the need of shaping the institutional arrangements that support the risk management system of the two organizations [Williamson 1979; Satchkov 2011]. Risk management models, described in the literature and applied in practice, relate to the treatment of risks within a single organization or organizational unit of the company. The issue of risk management model for the bank and enterprise in the context of balancing their mutual interests is an important gap in the literature and research studies.

In the study of finance literature, the institutional approach dominates, where individual types of entities are assigned specific functions [Jajuga 2010]. The practice is different, because in recent years there has been integration of various financial functions in different entities, which implies the necessity for considerations in respect of functions performed by the various institutions, regardless of what the formal placement of the institution is [Jajuga 2010].

The bank's risk management practice is moving towards integration of the three, yet different financial processes in one functional risk management process – the integration of the risk rating process (the risk premium, the probability of default by the borrower) with the processes of allocating risk capital (economic capital) and the valuation of assets (value of the loan, the bank value). The integration of risk assessment processes in the bank only partly takes into account the entire risk assessment process carried out by the company, and this conclusion was obtained based on the interviews with many experts from the banking sector. This deficit does not allow for an assessment of the risk profile of the enterprise, which significantly distorts the assessment of credit risk by the bank.

Credit risk assessment of the project funded by the bank is only a part of the overall risk profile of the company. From a practical point of view, taken by the bank into account, the overall risk of the company would often allow for a significant reduction in the value of collateral, which in many cases would contribute to the improvement of the competitive position of the bank and increase its value. The risk assessment by the bank on the basis of the risk profile of the company and its verification by the enterprise, carried out based on the bilateral exchanged data, may be achievable by the "merger" of the bank's risk assessment processes with enterprise's one within an inter-organizational functional process of risk monitoring and assessment.

Tools of theoretical finance will become increasingly focused on specific features of financial processes, regardless of where they take place, which means that practical issues will stimulate the development of the science of finance [Jajuga 2010]. In the

considered concept, the center of gravity of the risk assessment function of each of the business partners is moved in the direction of inter-organizational "institution" taking the form of agency relationship. The discussed concept is confronting the risk assessment from the perspective of both sides of the bank-enterprise relationship, in order to estimate its objectification, as well as determining the equilibrium point at which comes to maximizing the benefits of both parties.

We believe, that establishing an Inter-Organizational Risk Management Model (*IRMM*), as opposed to the risk management model used only from the perspective of one organization, would carry out the different risk management functions leading to increased efficiency of both entities and balancing their interests. One important function of the IRMM involves the diagnosis of uncertainties, and by modeling, makes them measurable, which creates the basis for rational decision making. This approach corresponds to the idea expressed by F. Knight, who believes that minimizing uncertainty can be obtained by assigning measures to uncertainty. Implementation of this objective requires the creation of some institutional mechanisms with the forms, functions, processes and tools that were agreed on by both parties of the business relationship and could be used for risk management from the perspective of the common goals, while important for both organizations. Application of IRMM needs to ensure that the following items are in place:

- assessing the effectiveness of the enterprise risk management system [Krysiak, Pijanowski 2015],
- implementing the methods of capital budgeting at risk for the enterprise [Krysiak 2012a],
- modification of bank's models for credit risk assessment [Krysiak 2006; Krysiak 2011],
- estimating the extent of the risk-shifting from banks to enterprises [Krysiak, Seaman 2012].

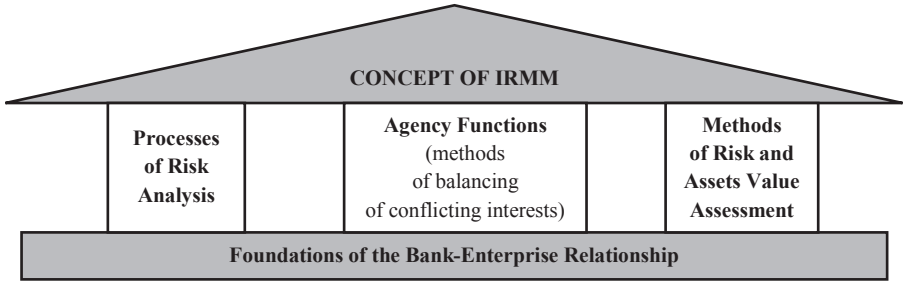

Figure 2. Foundations and pillars of the IRMM concept

Source: Author's own study.

In Figure 2, we present the idea of IRMM, which is based on three pillars. The concept is composed of the following main elements:

- foundations of the organization-stakeholder relationship,
- processes of risk analysis,
- agency functions (methods of balancing conflicting interests),
- methods of risk and assets value assessment.

4. Assumptions and Theoretical Base of IRMM

In the process of creating the mainframe of the Inter-Organizational Risk Management Model in the system of bank-enterprise, the following main hypothesis and auxiliary hypotheses were stated. The **main hypothesis** is as follows:

Inter-Organizational Risk Management Model (IRMM), based on the relationship of agency bank- enterprise, constitutes a strong institutional foundation and a more efficient solution in balancing the financial benefits of the bank's enterprise security than in the case of a transactional relationship.

Symbols used in the hypotheses are as follows:

ΔM equals the difference between the bank's expected margin loan (RMB) and the risk premium (RME) taken into consideration by the company in the discount rate on the project;

ΔR equals the difference between the probability of loan default (PDB) estimated by the bank and the probability of insolvency (PDE) as assessed by the company;

ΔC equals the difference between sum of the amount of risk capital allocated by the bank on company risk (CRB) and expected by the bank collateral (PAB) and the sum of risk capital allocated by the company (CRE) and estimated by the company to provide security to the bank (PAE).

The first auxiliary hypothesis states: Through the exchange of data in the agency relationship bank-enterprise system increases the efficiency of reducing asymmetric information, narrowing the area of uncertainty and leads to a reduction of the difference between:

- margin for risk (RMB) of the bank and the risk premium (RME) incorporated in the cost of capital of an enterprise [$\Delta M = RMB - RME$],
- credit risk (PDB) estimated by the bank and the risk of insolvency (PDE) calculated by the company [$\Delta R = PDB - PDE$],
- sum of capital at risk (CRB) allocated by the bank for the implementation of the company's risk and expected by the bank collateral (PAB) and the sum of capital (CRE) allocated by the company for the implementation of projects financed by the bank and estimated by the company to provide security to the bank (PAE) [$\Delta C = (CRB + PAB) - (CRE + PAE)$].

The second auxiliary hypothesis states: Achieving an overall balance between the bank's financial benefits and enterprise security in inter-organizational risk management model is carried out in three dimensions, by minimizing the difference in risk margin (**ΔM**), minimizing the difference in the credit risk (**ΔR**) and minimizing the difference in the sum of the risk capital and the estimated value

of security (Δ**C**). **The formal record of the conditions in the auxiliary hypothesis can be represented** as follows:

$$\Delta\mathbf{M} = RMB - RME,$$
$$\Delta\mathbf{R} = PDB - PDE,$$
$$\Delta\mathbf{C} = (CRB + PAB) - (CRE + PAE).$$

Let's consider, what may happen in the absence of information available by each business party on loan margin at the asymmetry of information. Such asymmetry will widen Δ**M,** but declining the asymmetry will minimize the Δ**M,** what is the main goal of IRMM. If the bank undervalues the risk premium in relation to the assumed risk, then the reduction in cash receipts will decline the value of the bank. This situation translates into an increase of cumulative risk, on which capital is not allocated, which finally leads to an increased risk of bank's marginal default. The enterprise miss-perception of such a case will lead to the wrong conclusions. The lower risk premium, charged by the bank, relative to its real level will cause an increase in value of the enterprise. The enterprise will treat this situation as a decline in risk, which will provoke the enterprise to reduce the capital in respect to its total risk, leading to an increase of the insolvency risk of the company. As a result, bank-enterprise system will allocate proportionally lesser capital than is needed to the assumed cumulated risk.

If the bank demands a higher risk premium than is apparent from its actual level, then the interest costs, higher than the cost of capital assumed by the company, is worsening its cash flows, leading to an increased insolvency risk. In the case of high asymmetry of information, on the one hand underestimated capital risk, and on the other hand, increased load of cash flows of the company, will intensify the increase of the insolvency risk of an enterprise. The asymmetry of information can be removed by utilizing the information available by the enterprise. The analysis heading to minimize other measures, like ΔR and ΔC, will lead to similar conclusions.

These analysis shows that there is a point of equilibrium leading to maximizing the value of both organizations in relation to risk. The determination of the equilibrium is difficult or impossible until the differences in ΔM, ΔR and ΔC may be estimated on the basis of information obtained from both partners. Estimating such differences using the method of "trial and error" is only possible, when there is an exchange of information on measures ΔM, ΔR and ΔC. Such opportunity becomes possible, when the bank-enterprise transactional relationship is transformed into an agency one, where institutional mechanisms and procedures may arise in the field of inter-organizational risk management system.

Inter-Organizational Model of Risk Management (IRMM) is schematically shown in diagram in Figure 3. Inverted cone diagram symbolically shows that the implementation of individual element of IRMM will lead to the reduction of uncertainty equivalent in respect of the chance of survival of the project, financed by bank and implemented by enterprise, over its live cycle to its successful completion.

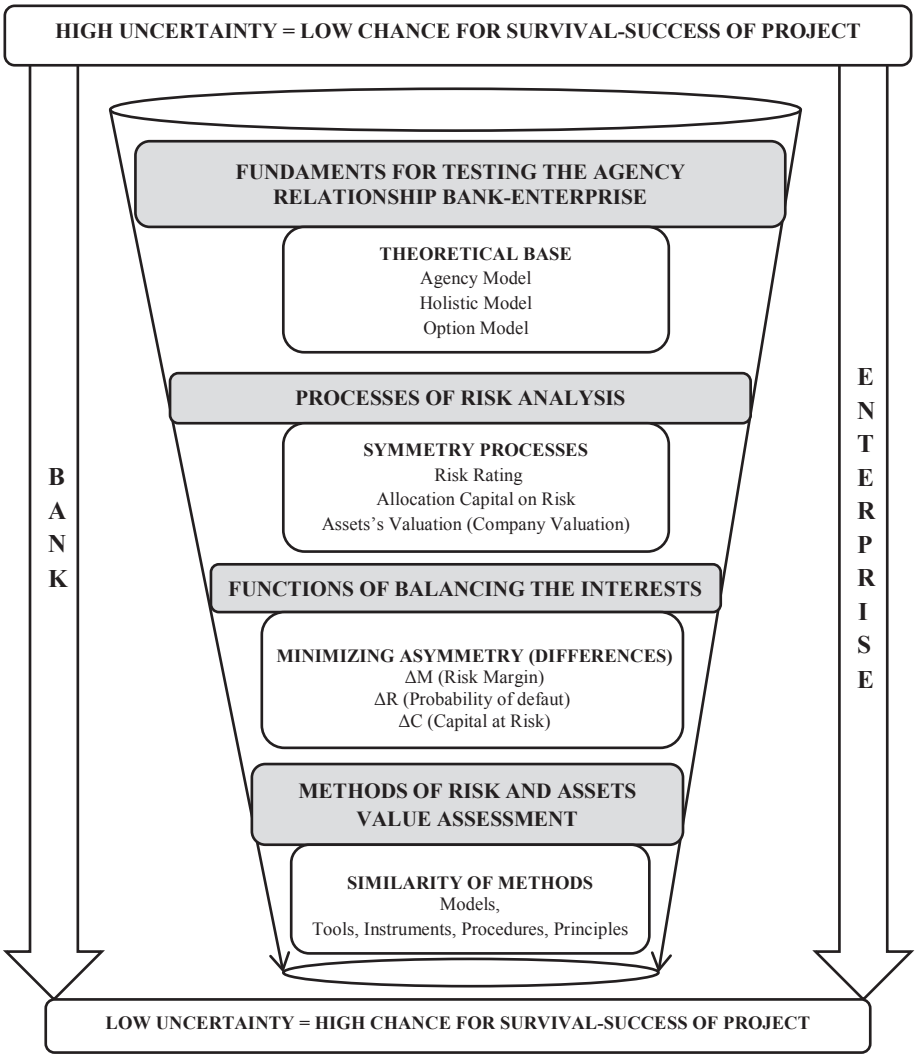

Figure 3. Inter-Organization Model of Risk Management (IRMM)

Source: Author's own study.

The implementation of the elements shown in the diagram should allow for creation of a continuous process by minimizing the functions expressed by three main parameters characterizing the balance of benefits for the bank and enterprise. There are four assumptions adopted in the model, as following:

- the bank-enterprise system is an agency relationship,
- risk assessment processes are symmetric in both entities,

- there is no systematic accumulation of risk as a result of its migration between bank and enterprise,
- there is high degree of similarity and universality of methods to measure the risk and value of the assets used by the bank and enterprise.

After one creates type of IRMM model, it should undergo the verification of its assumptions, to conclude if model is capable to balance financial priorities of the bank with safety of the enterprise. Positive verification of the assumptions, needed to be followed by IRMM, will put forward the thesis that the IRMM model allows to achieve the goal of balancing the interests of the bank and the company. In the process of verification of the assumptions fulfillment by IRMM, we may also identify gaps that are filled in part, which can be useful in pointing to the directions for the adjustment of the model.

We derive the construction of the presented theoretical concept of IRMM model from the theory of the enterprise particularly the theory of finance. Therefore, we refer to the detailed theories of business and finance, such as:

- theory of minimizing the uncertainty and minimizing the costs of uncertainty by risk management [Knight 1921],
- agency theory, where the relationship "supervisor-agent" (principle-agent) is the head of the bank, and the specific agent is a company [Jensen, Meckling 1976],
- theory of capital structure and financing activities of the company linked to the problem of the cost of capital [Modigliani, Miller 1958],
- ecological theory, in which the key issue is to maximize the chances of survival for economic entities [Hannan, Freeman 1989],
- theory of incomplete contracts is devoted to finding justification for creating the institutions needed to control the execution of contracts and to respond to situations not included in the contracts [Hart 1995],
- transaction cost theory of specific assets, such as loans to companies engaging in minimizing their cost, combines theory with agency theory and transaction costs theory of incomplete contracts [Williamson 1979],
- theory of real options is to minimize the cost of assurance of return on equity [Trigeorgis 1996].

The granting of credit by a bank to finance the company's project is a transaction of specific asset, at which the basis for the existence of certain compounds of interest between the bank and the company is formed. The specificity of the service, which is a loan, involves a long-term relationship between the parties, and the effects of funding are a function of many variables that are distributed over time. Therefore, it can be argued that the financing, by the bank, of projects conducted by the company contains a lot of uncertainty, especially when each party does not know a number of important risk factors and the methods of risks assessment that are taken into account by the business partner. But if there were exchange of information, then to making corrections to the estimates of risk at the beginning of the lending process and during the project execution could be bilateral.

The relationship of long-term interest between the bank and the company may be treated as a relationship of the agency "supervisor-agent" (principle-agent), where the bank takes the "principle" role, and the company plays an agent role [Jensen, Meckling 1976]. Subsequently, this relationship is combined with the theory of incomplete contracts, which seeks justification for the creation of institutions needed to control the contract. With regard to the conceptualization of risk, there would be controlled balance between the benefits of both parties, which would lead to taking appropriate corrective actions in order to maximize the benefit of the entire system. The theory of transaction costs of specific assets includes the agency theory, the theory of incomplete contracts and the theory of transaction costs. From the perspective of this theory, the balancing of the benefits of the bank and the company in the context of cross-organizational 'institution' risk management, should ultimately lead to the minimization of all costs within the two organizations.

Agency relationship between the organizations has to do with the theory of capital structure financing activities of the company and the theory of the cost of capital [Modigliani, Miller 1958]. In this context, the bank, as the owner of the means of financing the project, being superior, determines the structure of the financing of the company, which is associated with the risk of migration between the bank and the company. The capital structure of the company affects the cost of capital and the value of the company. From this perspective, the relation of the agency will be able to be used to minimize the cost of capital and maximize the value of the company.

Option models of risk measurement belong to the group of structural models, which are based on the financing structure of the company, and thus refer to the theory of capital structure and cost of capital. This context refers to the theory of real options, dealing with the minimization of costs assurance of return on equity [Trigeorgis 1996]. The relationship of these theories comes down to a very important function, which I think is inherent to IRMM, and that is maximizing the chances of survival of businesses through allocation of capital at risk, which is the basis for the ecological theory [Hannan, Freeman 1989].

5. Conclusions

We think that the concept of the IRMM model creates an interesting perspective in-line with the evolution of paradigms in finance regarding the new risk management approaches both for banks and enterprises. But, we are aware that there are many areas to be more deeply researched to obtain many detailed answers which will be helpful for practical applications of such models. IRMM model can be assumed as a kind of mainframe, which based on several investigations may deliver several diversified forms of that type of model, which may fit to the context and the specificity of the businesses. We identified number of issues to be researched towards the development of the IRMM concept. Some of them may be as follows: types of econometric models to measure the risk and the value of the company; information capacity of models

used for risk assessment; consistency of banking models and enterprise models used for assessment of the risk; modeling the survival ability of the enterprise; modeling the capital at risk of the enterprise.

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