

Varazdin Development and Entrepreneurship Agency and University North
in cooperation with
Faculty of Management University of Warsaw
Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat
Polytechnic of Medimurje in Cakovec
Association of Economic Universities of South and Eastern Europe and the Black Sea Region



Economic and Social Development

53rd International Scientific Conference on Economic and Social Development Development

Book of Proceedings

Editors:

Igor Klopotan, Katalin Czako, Victor Beker



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RISK MANAGEMENT CONCEPTS IN PROJECT FINANCE: THEORETICAL FRAMEWORK

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ABSTRACT

Global experience in financing and implementing real investment projects indicates that such activities have a high level of risk compared to other types of entrepreneurial activity. This is due to the long life cycle of real investment projects and uncertainty about future results. Modern infrastructure projects become increasingly complex, which leads to difficulties with their implementation. These difficulties are associated with a delay in the implementation of projects, cost overruns, the use of unsuccessful methods of procurement of necessary materials, lack of funding and a project risk management system. The study showed that the main mission in the implementation of the base components of project finance should occur through banks, although investment funds and financial institutions related to cash flows may be involved in this process. The structure and allocation of project finance risks has been determined, including risk identification, impact and probability assessment, risk mitigation, risk re-classification and risk prioritization. Researches have shown that banks are the main players in the project finance market. Project finance is associated with the risk of its implementation, since there is a need to attract significant amounts of financial resources that project participants receive both by obtaining bank loans and by issuing various types of securities. To minimize the risks of project finance it is possible to use such strategies as: risk management strategy, supply chain strategy and search strategy. The main risk management instruments in project financing include: measures of ensuring the fulfillment of contractual obligations, financial market instruments, special funds and reserves.

Keywords: *Cash flow, Financial instrument, Project finance, Risk*

1. INTRODUCTION

In conditions of transformational conversions of economic processes in the state, real investment is obtaining a great importance, without which it is impossible to refresh, develop and innovatively increase the production potential real sector of the economy's subjects. Large infrastructure projects, such as the construction of highways, airports, power stations and ports, are used as essential instruments for directly or indirectly increasing wealth and ensuring stability by stimulating economic development. According to C. Calderon, E. Moral-Benito and L. Servén (Calderon et al., 2011) – World Bank experts, an increase in the number of structural projects by ten percent leads to an increase in GDP by one percent. Modern infrastructure projects are becoming much more complicated, which leads to difficulties with the implementation. These issues are associated with a delay in the realization of projects, cost overruns, the use of unsuccessful methods of purchasing necessary materials, lack of funds and a project risk management system. Due to the high technical, legal and regulatory complexity, long-term investment projects with a high cost of infrastructure generally take the form of project finance, which one is the most effective form of fundraising private capitals for investments in infrastructure development. The main factor in the mismatch between the need of investment in infrastructure and the attraction of private investment is the fact that such investments entail complicated and expensive legal, financial and technical expertise. Private investors are prepared to bear significant financial costs for such projects only if there is an adequate banking support (Bank for International Settlements, 2014). Considering the above, relevant is the issue of profile accounting and risk management associated with project finance.

2. PROJECT FINANCE IN GLOBAL SCOPE

The definition of project finance can be found in almost any book on finance and market analysis. According to the generally accepted approach, project finance is the investment of a legally independent company (SPV – special purpose vehicle) in a specific project without (or with limited) right of recourse. Investments usually last for an initially defined period (Calderon et al., 2011; Yescombe, 2013; Hoffman, 2007; Tinsley, 2014). Scientific papers also study the structural characteristics of project finance related to risk and its management, based on a contract structure, the cash-flow-oriented approach and the establishment of higher debt ratios and longer repayment period compared to conventional corporate lending (Fletcher et al., 2014; Gatti et al., 2007). F. Blanc-Brude and D. Makovsek (Blanc-Brude et al., 2013) had notice that the risk of construction in financing infrastructure projects is quite manageable and expected cost overruns should be zero. It was also noted that the construction risk, which a private investor falls into when financing infrastructure projects, is different unlike the risk that a public sector investor falls in with traditional investments in infrastructure development. Researches are also paying attention to the need of considering the credit risk in project finance. In accordance with the principle of risk management “you cannot manage what you cannot measure”, project investors try to find out what their debt loss is in scale (Dong et al., 2014). The main issues connected with the risk management system of project investments, determination characteristic risk factors for project finance are considered in the scientific papers of P. Nevitt and F. Fabozzi (Nevitt et al., 2013), G. Walter (Walter, 2017), M. Malloy (Malloy, 2004). The global experience in the preparation, financing and implementation of real investment projects indicates that such activities have a high level of risk compared to other types of entrepreneurship. This is usually interpreted as a long life cycle of real investment projects and uncertainty about results. Under such circumstances, particular attention is paid to methods of financing projects, among which project finance plays an important role. Therefore, particular attention is required for studying methods of financing and risk assessment in investment projects, among which the problem of project finance is especially important. The relevance of researching this issue is enhanced by the rapid process of digitalization all over the

world. Based on the foregoing, project finance should be understood as the type of bank financing using various sources and financial instruments, provided that the sources of debt repayment are project cash flows, and the debt is secured by the assets of finance participants to apply risk minimization methods and instruments related to with this process, ensuring the viability of the project itself and obtaining projected returns in a certain period, which is determined by criterion – the long-term placement of cash flows, which is accompanied by inflationary risk. The dynamics of the project finance's global market for are presented in tab. 1.

Table 1: The dynamics of the project finance's global market in 2011–2019

Indicators	2013	2014	2015	2016	2017	2018	2019*
International institutions and organizations loans, \$B	56,19	59,53	37,59	30,47	28,33	37,57	8,81
Rate of increase, %	0,12	5,93	-36,85	-18,93	-7,0	32,6	-53,1
Bank loans, \$B	154,50	165,11	178,76	150,57	138,90	199,37	64,59
Rate of increase, %	19,37	6,87	8,26	-15,77	-7,7	43,5	-35,7
Project bonds, \$B	28,02	26,90	27,97	29,00	46,15	35,80	14,30
Rate of increase, %	62,42	-4,00	3,96	3,68	59,1	-22,4	-7,2
Corporate rights, \$B	46,18	556,95	45,71	43,09	42,74	31,60	15,28
Rate of increase, %	-15,56	20,61	-17,92	-5,75	-0,8	-26,1	11,9
Total, \$B	284,89	307,24	290,03	253,04	256,12	304,34	102,99
Rate of increase, %	10,64	7,84	-5,60	-12,73	1,2	18,8	-30,6
Amount of deals	640	805	892	667	926	1030	364
Rate of increase, %	-4,62	25,78	10,81	-25,22	38,8	11,2	-24,9

* *Ist half of 2019 compared to the indicator for the Ist half of 2018*

(Source: Calculated by the authors based on IJ Global, 2020)

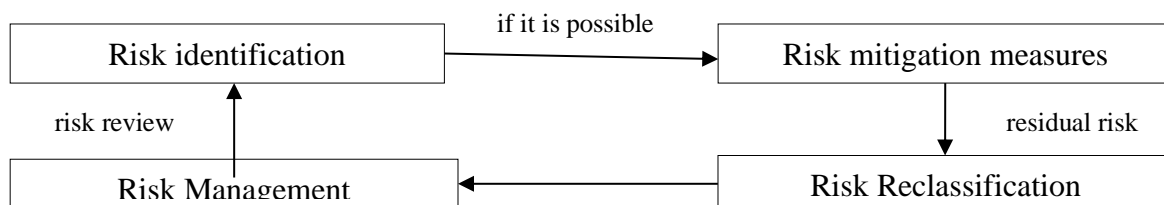
In 2011, according to “IJ Global”, bank project finance was not carried out at all, since, after the financial crisis of 2008, banking institutions still avoided such assets. The leaders then were loans from international financial institutions and regional development banks (53%), the large part also had financing from the sale of corporate rights (36%). Yet in 2016, the situation changed dramatically, and commercial banks (50%) became the market leader. Since then, the share of loans from international financial institutions began to decline, amounting to 12% in 2016-2017. Fluctuations in the share of corporate rights as part of project finance instruments in the global market have been relatively stable, varying between 16-17% over the past 5 years. The share of project bonds until 2017 also did not show significant volatility, but in 2017 reached 18%. In 2019, the results of data analysis only in the first quarter do not allow to state that trends regarding the structure of the project finance market will continue until the end of the year, but now we are seeing a significant reduction in the share of loans from international financial institutions and regional development banks to 53.1%, and also the growth in the share of project bonds up to 7,2 %. Project finance is also a type of special credit exposure established by the Basel Directives. Considering this, risks of project finance should be assessed separately from risks of ordinary corporate loans in banks that use the internal rating methodology. The directives protect several groups, two of which – resources' financing and (partially) objects – are not included in the general definition of project finance. At the same time, project finance and real estate financing look like separate categories, although banking practice does not distinguish between them (EBA, 2016). Project finance originated in the 13th century, when the Florentine Merchant Bank financed exploration of the Devonian silver mines using compensations from mining (EBA, 2016). Until the 1990s, this type of lending was used for long-term capital-intensive projects with high cost, as a rule, in excess of several million US dollars, but by the end of the 20th century, project finance was also provided to projects of

lower cost (Finnerty, 2007). Since then, the practice and concept have improved in terms of instruments, faced with governments' fiscal restrictions around the world.

3. ISSUES OF RISKS IN PROJECT FINANCE.

The necessity of project finance is mainly caused the fact that, firstly, large infrastructure projects are necessary and useful for economic development, and secondly, for the implementation of these projects, risks must be evenly distributed or transferred to those parties that are better able to bear them. This moment, together with the huge size of projects – both in time and in money terms – demonstrates that risk management is one of the most important aspects of successful project finance. Since the implementation of the project is determined by significant time, and not at all stages risks are the same, it is important to maintain a continuous cycle of risk identification, mitigation and management. Fig. 1 shows this cycle. Each party involved must implement autonomous risk management, based on its own point of view.

Figure 1: Risk identification cycle in project finance



Source: Compiled by the authors based on Gatti, Stefano, 2007; Nevitt, Petter, 2000; Yescombe, Edward, 2013; Ravis, Jhon G. 2013

The fact that the parties involved in the project finance process can transfer risk from one company to another means that the risks are different for each of the parties, that is, that what is a “mitigation” for one side, may be a “new risk” for the other. For example, SPV faces the risk of late completion of the construction phase (this will not only delay revenue, but also create a situation where SPV is already responsible for repaying some loans by the actual completion of the project). SPV can reduce this risk by adding caution about late delivery to contracts with engineering companies. Thus, SPV is protected from risk, while engineering companies take it upon themselves. Such a distribution of risk seems reasonable, since it is the engineering company that will perform the work and should be able to assess the time required to complete the work, and this is the only party that can act, for example, adding more workers to ensure the timely completion of work. Thus, each side has its own opinion on what risk is and how to manage it. Each involved company should form its own vision of the relevant risks, to mitigate and constantly monitor the main risks, if possible, so that they remain minimal. For example, it is not enough to determine the risk that the construction phase may end late – only daily observations and process accelerations can minimize losses. Therefore, each side must constantly carry out the basic cycle of risk management, including the following aspects:

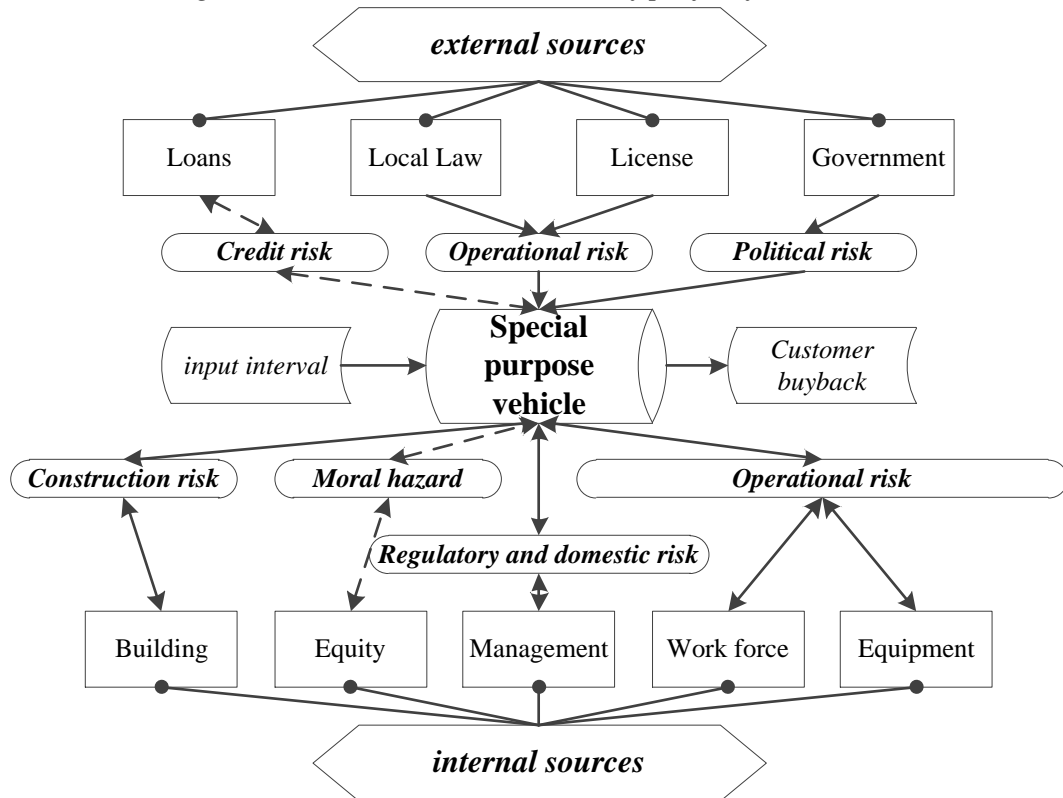
1. Risk identification. Main risks can be determined by following checklists, but they need to be checked regularly. Some risks may be inactive or may not be identified to an unexpected event. Such new risks should be added to the list at the same time that measures are taken to reduce them in order to control the consequences;
2. Impact and probability assessment. When assessing risk, it is not enough to consider only probability or only influence, it is absolutely necessary to monitor both aspects. Also, the probability and impact will change over the life of the project (for example, when the project is implemented, the risk of construction delays drops to zero). Since it is often impossible to accurately quantify these parameters, they usually resort to the use of a qualitative scale: for example, very low, low, medium, high and very high;

3. Risk mitigation. Where it is possible, risks should be minimized. For example, if there is a risk that the construction phase of the project will be delayed, then the SPV may include a “deferred delivery clause” in the contract and provide a clause on compensation for losses. The engineering company, in turn, reduces this risk by ensuring that the deadlines are realistic, that – with the involvement of subcontractors – their contracts include this item, and – for their own employees – this will ensure effective management of the workforce in places;
4. Risk re-classification. The residual impact of risks will change with effective management. If the risk is correctly identified as critical, and appropriate measures are taken, the corresponding risks should be reassessed;
5. Risk prioritization. Based on the two above-mentioned aspects, it is possible to make a one-dimensional classification of all risks based on MCDA (multi-criteria decision analysis), usually something related to WPM (weighted product method), which is the most suitable. This prioritization can be presented as a “risk matrix”.

The risk analysis in project financing should contain three stages that are similar to the process of general corporate risk management, namely: identification and assessment of risks; risk sharing and transfer; analysis, management and reduction of unallocated risks (Ravis, Jhon G., 2013). The first step is to identify relevant characteristics and assess the degree of importance for each factor on the profitability of the project. At this stage, both the probability of the onset of risk and the expected effect should be evaluated simultaneously. This concept is similar to the equality $EL = PD \times LaD$ is often used and applied by quantifying credit risks: expected losses (EL) are equal to the product's probability of default (PD) and expected losses from default of the project (LaD) (Gatti, Stefano et al., 2007). The distribution of risks for this project occurs at the second stage. The most effective methods of distribution that are commonly used in project finance is the contractual framework. More risks should be transferred to partners in the framework of the contract system so that lenders will be able to finance the project. By slightly changing the classical logic of considering this issue, we can slightly modify the classical representation of the structure of project finance (Fig. 2) to illustrate the definition and distribution of risks. Based on Fig. 2, it is advisable to highlight two points. One of them concerns the differentiation of risks, refers to the stage of project implementation. The second one relates to postoperative structures i.e. business models. At its essence, the risk of implementation remains until the start of the project and the start of useful operation. The launch of a project substantially depends on measures to minimize business and strategic risks, which are complemented by certain elements of operational risk. When identifying risks associated with project finance, attention should be paid to their classification. Some of the alternatives include: construction period and operational risks in accordance with the phases of project finance; construction risks include technological risks, and operational risks include market risks; risks associated with free cash flow and cash flow financing; project risks, financial risks and political risks (Yescombe, Edward, 2013); sixteen risks in project finance (Tinsley, Richard, 2014); S&P – six risks; risks are identified by export credit agencies.

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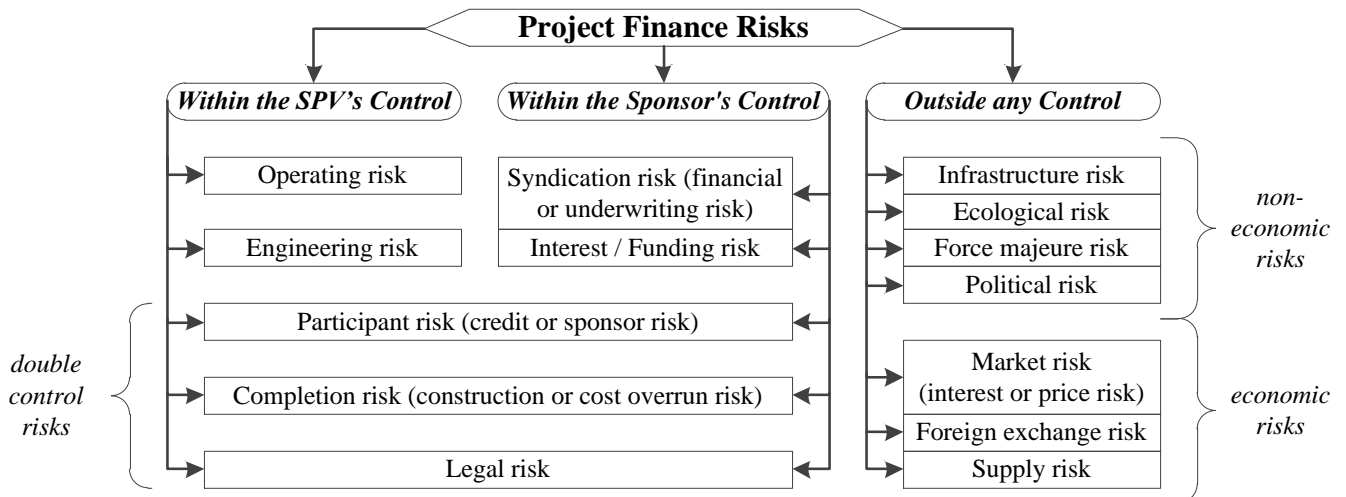
Figure 2: Structure and allocation of project finance risks



Source: Compiled by the authors considering Walter, Gustav, 2017

Risks associated with project finance contain economic risk, risks associated with construction, operational, technological risk, legal, political, regulatory impact risk (Fig. 3).

Figure 3: Classification of project finance risks, compiled by the authors considering



Source: Tinsley, Richard, 2014

4. STANDARDS FOR RISK-MANAGEMENT IN PROJECT FINANCE

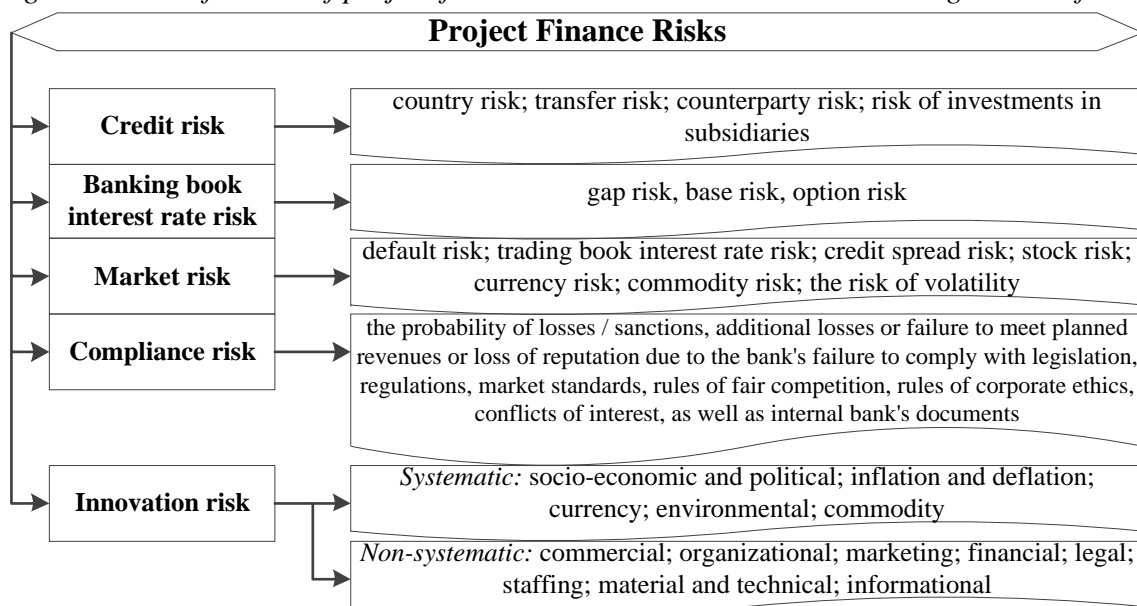
Nowadays, main approaches to risk management in the world are formed by such organizations and standards:

- FERMA (Federation of European Risk Management Association) – in its documents a model for identifying events is proposed;

- ERM COSO (Enterprise Risk Management – Integrated Framework Committee of Sponsoring Organizations of the Treadway Commission) – risk management principles developed by the Committee of Sponsoring Organizations of the Treadway Commission together with PriceWaterhouse Coopers;
- ISO / IEC Guide 73 is a standard developed by the International Organization of Standardization, which describes a systematic approach to risk assessment and management;
- PMBoK (Project Management Body of Knowledge) is a project management standard established by the American Project Management Institute (PMI). Describes all stages of the project life cycle, including elements of project risk management;
- Basel II & Basel III – methodological approaches to identifying and predicting risks that may arise in the organization, risk classification, determining its level and rating.

In the context of considering the Ukrainian experience in identifying risks associated with project finance, participants of which are banks, the Regulation “On the Organization of a Risk Management System in Banks of Ukraine and Banking Groups” adopted by the Board of the National Bank of Ukraine dated June 11, 2018, no. 64, was taken as the basis (Fig. 4).

Figure 4: Classification of project finance risks in accordance with the Regulation of NBU



Source: Compiled by the authors based on National Bank of Ukraine, 2018

The main instruments for managing project finance risk include:

- Instruments for enforcing contractual obligations: state guarantees (government guarantees); guarantees of international financial institutions; bank guarantees; sureties; implied warranties (long-term and fixed-price contracts);
- Financial market instruments: letters of credit (reserve and irrevocable); bill instruments; credit notes;
- Special funds and reserves: reserve funds; deposits in special accounts; special mode bank accounts (escrow accounts); tender participants' depositing funds and competitive procedures and procurements (Naumenkova Svetlana et al., 2013).

The second aspect, which is rarely mentioned in professional scientific literature, is sponsor risk. High leverage projects provide a lower coefficient of financial investment of owners.

Additional contributions are usually provided by companies that they have debts, thereby reducing existing contributions. When discussing moral hazard in the scientific literature, the main factors that can be solved by financing the project are quite profitable. Significant risks, meant to be accounted, do exist. On the one hand, an investor is less interested in supporting the continued functioning of the project than a lender. The reasons are such factors as a small share size, limited liability, and the inability to exercise the right of recourse. Despite the fact that it is precisely these positions are indicated as advantages, they do not create the necessary conditions for motivating an owner to make a profit out of the main contract. These phenomena affect significantly moral hazard, creating additional difficulties for banks and other lenders in the applied aspect. However, professional literature rarely addresses this issue (Triole, Jean, 2006). The third stage includes the management of unallocated risks. Professional literature emphasizes the role of modeling, as well as the creation and detailed analysis of business plans based on cash flows (Ravis, Jhon G., 2013). Since financial modeling is not used to make accurate predictions, but, for a greater extent, to identify probable threats, to improve interpretation of project's logic and structure, to run more complex analytical procedures with basic documents and contractual relationships, to supervise projects and calculate criteria for early warning (Anastasios, Katsikas, 2015), the goals of models in project finance indeed are specific. It should be noted that an important role in providing minimization and full coverage of undistributed risks is played by the share of the sponsor's property, liquidity and value of financial instruments (securities and reserve assets), and last, but not least, profile transactions related to optimizing cash flow coverage (in particular, scope agreements).

5. DISCUSSION ON RISK ISSUES IN PROJECT FINANCE

Following the above concept “risk identification – risk allocation – residual risk management”, it can be found rationale for the significant leverage and debt burden in project finance. A simplified calculation of threats is explained mainly by the unification of activities' directions. The allocation of most risks between the counterparties involved is possible through the use of a contract system. Unallocated risks are usually fairly optimally covered by securities and derivatives – however, the quality and liquidity of such assets play a decisive role. In case of urgent needs, additional contributions to the authorized capital can perform a similar function. The fundamental task for banks and other lenders in the last decade is the analysis and estimation of credit risks when dealing with projects, because project finance, as a sub-division, is characterized by high levels of loan debt and significant credit indices. Particularly noteworthy are approaches to the quantitative assessment of threats in this form of lending, although the analysis and calculation of qualitative characteristics of riskiness also require increased efforts. Since the methodology and standard indicators of quantitative measurement in project finance are still the subject of fundamental, rather than applied aspect, usage of corporate crediting assessment instruments (ratings based on the balance sheet, statement of comprehensive income, other forms of reporting and statistics) is inappropriate. This status is explained by the long-term and structured character of loans, the uniqueness and quality of each new project, the lack of credit history, poor adaptation to standard approaches and corporate rating lists. All this explains the objective need for analysis within the framework of this study main risk assessment banks' models for project finance. Considering this, the relevance of EBA guidelines (2016) is rising, which determine the following aspects of the evaluation criteria: financial stability, political and legal environment, contractual parameters, shares of owners and sponsors, as well as a securities portfolio. At the same time, there were no fundamental differences in the stages and methodology compared to the internal guidelines of rating agencies. The result of applying this approach is an estimation dot on a five-point scale, where the highest mark (5) means default, and the minimum (1) means fundamental stability. The definition of risk models in project finance assumes their structural nature, which allows to use

the probability of default as an indicator of the value of a company's property, insufficient to compensate for loans and other third-party obligations. Besides structured models, a group of statistical approaches known as reduced models is also used in practice. According to the ideology of its construction, the onset of default is always unexpected and does not have a discrete connection with any group of assets. Thus, the root-causes of default are considered as external variables that cannot be calibrated for market indicators' errors. Nevertheless, the development of these models was not reflected in the scientific literature, remaining the prerogative of corporate risk management systems. Standard definitions of default apply to project finance in the same way as regular corporate loans. As mentioned earlier, the professional literature also uses a structured approach or, more precisely, "first-pass" models to evaluate a project's default. The highest probability of default for a project exists during the maturity of the raised funds, since it is during this period a threat of insufficient cash flow is relevant. Based on this, it is important to ensure that the cost of cash flows exceeds the maximum level of solvency. This approach accurately reflects banking practice in such situations and therefore is acceptable. The project may default if the cash flow falls below the level necessary to service a debt, considering further deterioration of such situation. Modeling based on these postulates makes it possible to clearly define limit values of indicators and include clauses in the contract to protect lenders from an unfavorable scenario. Such indicators are usually coverage ratios, such as LLCR, DSCR, FSCR and similar.

6. CONCLUSION

The main players in the project finance market are banking institutions. Project finance is associated with the risk of its implementation, since there is a need to attract significant amounts of financial resources that project participants receive both by obtaining bank loans and issuing various types of securities. To minimize the risks of project finance, it is possible to use such strategies. Risk management strategy (criteria, leverage, diversification, hedging, execution). Supply chain strategy: modification through changes in technology and through production outsourcing; geographical diversification to reduce danger risk and price risk; diversification of political pressure to reduce political risk and tax risk; hedging currency risk, matching incoming and outgoing capacity and flexibility of supply chains; coordination of supply chain capacities with marketing opportunities; restructuring the value chain, alternative supply chain interactions, supply chains designed to reduce cycle times and inventory, simplifying supply chains to reduce the risk of project finance complexity. Search strategy: consolidation of costs to improve flexibility; diversification of suppliers to reduce supply risk, price and quality risk, danger risk; hedges of currency risk; components selected from a single source to reduce complexity; expanding the exchange of information with major suppliers. Main risk management instruments in project finance include measures of ensuring the fulfillment of contractual obligations, financial market instruments, special funds and reserves.

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