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## THE DEVELOPMENT OF STRATEGIC BANK LENDING INDUSTRIES IN THE CONTEXT OF GLOBALIZATION<sup>1</sup>

*It is shown that, in the context of globalization, improved credit support for strategic sectors of the economy (for example, shipbuilding) can be achieved through the creation of a banking consortium based around leasing. A dialectical method of resolution of system tasks is selected as the methodological approach. Methods used include: comparative cost analysis of the strategic lending industry supporting the formation and development of a banking consortium; integrated method at the condition modeling of making and implementation of a lease agreement, which allowed to accommodate the interests for both parties of such agreement; optimization method to select the conditions of a lease agreement; classification and analytical method to clarify the classification of lease. The study proved and developed a plan of creation a banking consortium, including options of interaction of such consortium with potential customers based on a lease agreement. The process of functioning of the lease agreement in order to optimize it for both a bank consortium-lessor and a lessee is modeled. The significant advantages of leasing compared to the traditional lending for both parties of leasing, especially when ensuring long-term projects are summarized. The results of the research can be applied in the strategic lending industries development and can reduce the level of banking risks. Applying the results of the research in the social aspect can maintain and increase the number of jobs including the banking sector. The value of the work lies in the fact that the author has developed a new approach to achieve the credit support for strategic sectors of the economy through the creation of the banking consortium based around leasing, which allows to protect the interests of both parties.*

**Keywords:** bank lending, bank consortium, globalization, leasing agreements, strategic industries

### Statement of the problem

Modern banking, banking systems are doomed to be flexible and respond quickly to the need for changes in accordance with their customers' needs. At the same time, banks, individually, are not always can quickly make the necessary changes, in particular, to provide the monetary resources to the needs of strategic sectors of the economy, which is associated, first of all, with their insufficient capitalization. That is why there is a proposal to establish a bank merger in the form of the banking consortium. In practical terms, the development of such union could solve business problems of resource-intensive economic sectors, which is especially important in the modern, globalized society.

### Analysis of recent research and publications

Recently, the Ukrainian as well as the Russian scientists, and also scientist from other countries place a high emphasis on the specified problem, namely: O. Vovchak [1], S. Logachev [4].

L. Ryabinina [7], A. Todoseychuk [8], T. Havrilesky [13] and other researchers.

### Unresolved parts of the problem

The performed analysis of the publications relating to the issue revealed that the issues of creation of a banking consortium based around leasing, as a credit support for strategic sectors of the economy, have not yet received an appropriate attention. The purpose of the research is to improve the credit support for strategic industries through the creation and modification of a banking consortium for these industries based on leasing.

### The main results of the research

The need to develop the strategic industries of the economy highlights the need for ensuring their cash resources and, therefore, the organization of their quality banking services. Thus, the potential demand of the Ukrainian shipbuilding companies for additional interim financial resources (in early 2012) was satisfied by Ukrainian banks only for 1/5 [3, p. 229–231]. Shipbuilders worldwide concern about the attraction of additional capital [11]. On this basis, and considering the low capitalization of the banking system

<sup>1</sup> © Kramarenko O. M. Text. 2015.

Table 1

## Stages of the projected increase of bank lending to shipbuilding enterprises, for the beginning of the year, mln UAH\*

| Stages                                       | 2012   | 2015   | 2016    | 2017    | 2018    | 2019    | 2020    | 2021    |
|--|--------|--------|---------|---------|---------|---------|---------|---------|
| Sum of actually issued loans                 | 1097.8 | —      | —       | —       | —       | —       | —       | —       |
| Sum of planned lending and leasing contracts | 5042.7 | 8133.4 | 10329.4 | 13118.3 | 16660.3 | 21158.5 | 26871.3 | 34126.6 |
| Growth rate, %                               | —      | 27     |         |         |         |         |         |         |

\* Growth rate to meet the demand equals the average rate of growth in demand for borrowed resources for the period from 2004 to 2012 [3, p. 75].

of Ukraine, the author believes that it makes sense to create a consortium of banks for lending and servicing the business entities of strategic sectors of the economy. Apparently, the banking association serving the strategic industries of the economy must be supranational, although, of course, there is a political component in their development [14]. Banks already have a considerable experience of strategic partnership, which should be used in the future. Therefore, it would be appropriate to involve into consortium, simultaneously, banks that have already effectively cooperated with the industry and, therefore, have the experience of its lending and, at the same time, other large banks, including Russian. This will allow Ukraine and Russia to plan joint solutions to the problems of development and modernization of strategic sectors of the economy. The development of the relationship between the banking association (consortium) and enterprises of strategic sectors of the economy (in particular, shipbuilders and shipyards) requires further study and detailed elaboration. At the same time, the author believes that the most realistic is to increase gradually the volume of bank lending for enterprises of strategic industries (Table 1).

Table 1 shows that for 01.01.12, the full (potential) demand of Ukrainian shipbuilders for temporarily attracted funds was about 5.0427 billion UAH, but, in fact, the banks issued only 1097.8 billion UAH. From the point of view of the author, through the creation of the banking consortium in 2015, it will be possible to create conditions for attracting additional financial resources in shipbuilding based on the average increase in their demand — 27 % per year.<sup>1</sup> The composition and structure of the consortium, which are assumed to be created, based on the experience of relations between a group of banks and shipbuilding enterprises of Ukraine, are represented in Table 2.

Table 2 shows that the author has proposed the creation of the consortium of 16 banks, to exploit better the potential of banking system and to op-

imize lending of shipbuilding industry. Some of them are banking institutions, which in early 2012 have already been serving loans for shipbuilding companies, other banks — those that have done it sometimes, they can be encouraged to gradually develop relationship with the industry on the basis of mutual benefit. We believe that a bank that will be able to lead such consortium is JSC “Raiffeisen Bank Aval”, as it provides loans to Ukrainian shipbuilding, almost without interruption, for more than 20 years. At the same time, it uses its own assessment: the financial condition of borrowers-shipbuilders, shipbuilding market, collateral, etc. According to the author, special functions as a Special Chief Inspector of a banking consortium, most effectively will perform JSC “Ukreximbank” as the main state-owned bank (the Cabinet of Ministers of Ukraine is its shareholder). Creation of the consortium should be made in parallel with “technologizing” of shipbuilding companies, for example, within the boundaries of European Commission projects [15].

We believe that it is advisable to plan lending between consortium’s members pro rata portion of capital that banks participating with, while the amount of debt, which is already accounted by creditor banks of shipbuilding will not be cut.<sup>2</sup> The opportunity to receive a partner support from consortium members will allow all banks to fulfill customer orders and participate in the lending of large investment projects. Centre of shipbuilding (from now on Centre) will consider these applications in advance. The consortium will address issues relating to credit resources for strategic sectors of the economy, the main bank will determine who will be responsible for financing the project; the other functions of other participating banks will be limited, except the ensuring of required number of credit resources. At the same time, to attract banks to join the consortium, the author proposes to revise the legislation of Ukraine and provide preferences for mem-

<sup>1</sup> Calculated as the result of the average volume of potential demand for shipbuilding industry 2004–2012 [3, p. 70].

<sup>2</sup> Along with this, it may be changes in the volume of loans that are associated with the need for credit lines and their stretching-out. etc. Features lending by consortia should interest the bank executives who occasionally lent shipbuilding.

The composition and structure of the banking consortium assumed to be created<sup>1\*</sup>

| №  | Member banks                              | Loan debt shipyards as of 01.01.12, mln UAH | The share of banks in lending to shipbuilding, to 01.01.12, % <sup>2*</sup> | Plan debt shipyards as of 01.01.15, mln UAH | Equity capital of banks as of 01.01.14, mln UAH | Part of the capital of banks in equity of consortium, % | Possible share of banks participating in the lending shipbuilding as of 01.01.15, % |
|----|---|---|---|---|---|---|---|
| 1  | PJSC "Bank" Finance and Credit"           | 421.6                                       | 38.0  | 421.6                                       | 2108.6  | 3.2   | 6.6   |
| 2  | JSC "Raiffeisen Bank Aval"                | 417.2                                       | 38.4  | 704.1                                       | 7236.7  | 11.0  | 11.0  |
| 3  | PJSC "OTP Bank"                           | 90.8  | 8.3   | 326.8                                       | 3359.4  | 5.1   | 5.1   |
| 4  | PSC "Prominvestbank"                      | 55.5  | 5.1   | 523.8                                       | 5384.2  | 8.2   | 8.2   |
| 5  | PJSC "Unex Bank"                          | 47.6  | 0.1   | 47.6  | 343.9   | 0.5   | 0.7   |
| 6  | PJSC "Ukrsotsbank" <sup>3*</sup>          | 39.5  | 3.6   | 843.3                                       | 8667.7  | 13.2  | 13.2  |
| 7  | PJSC "Bank "Kievan Rus"                   | 18.5  | 1.7   | 54.4  | 559.6   | 0.9   | 0.8   |
| 8  | PJSC "International Investment Bank"      | 3.7   | 0.3   | 12.0  | 123.3   | 0.2   | 0.2   |
| 9  | PJSC "Ukrgazprombank"                     | 2.6   | 0.2   | 15.3  | 157.1   | 0.2   | 0.2   |
| 10 | PJSC "UkrSibbank"                         | 1.0   | 4.3   | 257.9                                       | 2650.3  | 4.0   | 4.0   |
| 9  | PJSC "Alfa-Bank"                          |   |   | 215.4                                       | 4198.8  | 6.4   | 3.4   |
| 10 | PJSC "Bank Nadra"                         | —   |   | 206.8                                       | 4032.3  | 6.1   | 3.2   |
| 11 | PJSC "VTB Bank"                           |   |   | 164.5                                       | 3206.9  | 4.9   | 2.6   |
| 12 | PJSC "Pryvatbank"                         |   |   | 1041.9                                      | 20311.6   | 30.9  | 16.3  |
| 13 | JSC "Ukreximbank"                         |   |   | 927.6                                       | 18083.3   | 27.5  | 14.5  |
| 14 | PJSC "First Ukrainian International Bank" |   |   | 238.6                                       | 4652.3  | 7.1   | 3.7   |
| 15 | PJSC "Ukrgazbank"                         |   |   | 232.0                                       | 4522.5  | 6.9   | 3.6   |
| 16 | PJSC "Delta Bank" <sup>4*</sup>           | —   |   | 170.6                                       | 3325.3  | 5.1   | 2.7   |
|    | Total                                     | 1098  | 100   | 6404.2                                      | 65823.3   | 100.0   | 100.0   |

<sup>1\*</sup> Achieved by the author.

<sup>2\*</sup> In accordance with the data [3, p. 226].

<sup>3\*</sup> Displayed only loan debt shipbuilding companies, which PJSC "Ukrsotsbank" into account 01/01/2012.

<sup>4\*</sup> Given that the bank "Delta Bank" has been integrated with PJSC "Kreditprombank" part of the participation of these banks in the consortium are combined together.

ber banks of the consortium, as well as to legislate a control of their performance.<sup>1</sup> The consortium, in our opinion, can flourish only under the strict control over its activities by the Centre and the Special Chief Inspector (JSC "Ukreximbank"). This implies the need to develop and use a system of control and management of the consortium. First of all, it concerns the need for monitoring of the

banking consortium.<sup>2</sup> We believe that similar consortia can be created and ensure the development of other strategic industries (e.g. agricultural enterprises, aircraft, etc.). Monitoring of the use of financial resources by shipbuilders should be carried out at the enterprise level by the units concerned and by representatives of the banking consortium and the state.<sup>3</sup> Large banks have more op-

<sup>1</sup> In particular, it may apply the provisions of the Law of Ukraine "On an economic experiment on state support for the shipbuilding industry" regarding cheapening loans through partial compensation rates on loans of commercial banks to the level of the NBU discount rate prevailing on the date to pay interest for a loan" [6, Art. 3, § 3] — exclusively for members of the consortium banks. In addition, the CMU will need to provide real opportunities to implement these banks concessional lending companies in the industry.

<sup>2</sup> Based on the strategic importance of the industry, there is a need to involve representatives of such control of the Finance Ministry and the State Agency of Ukraine for the management of state corporate rights and property. As expected, the introduction of partial compensation rate of return on the lease and the interest rate on loan operations by the state budget.

<sup>3</sup> Thus, it is envisaged that at the Centre will be established monitoring department, which will solve the problem of control of the industry as a whole, and including control of its use of credit

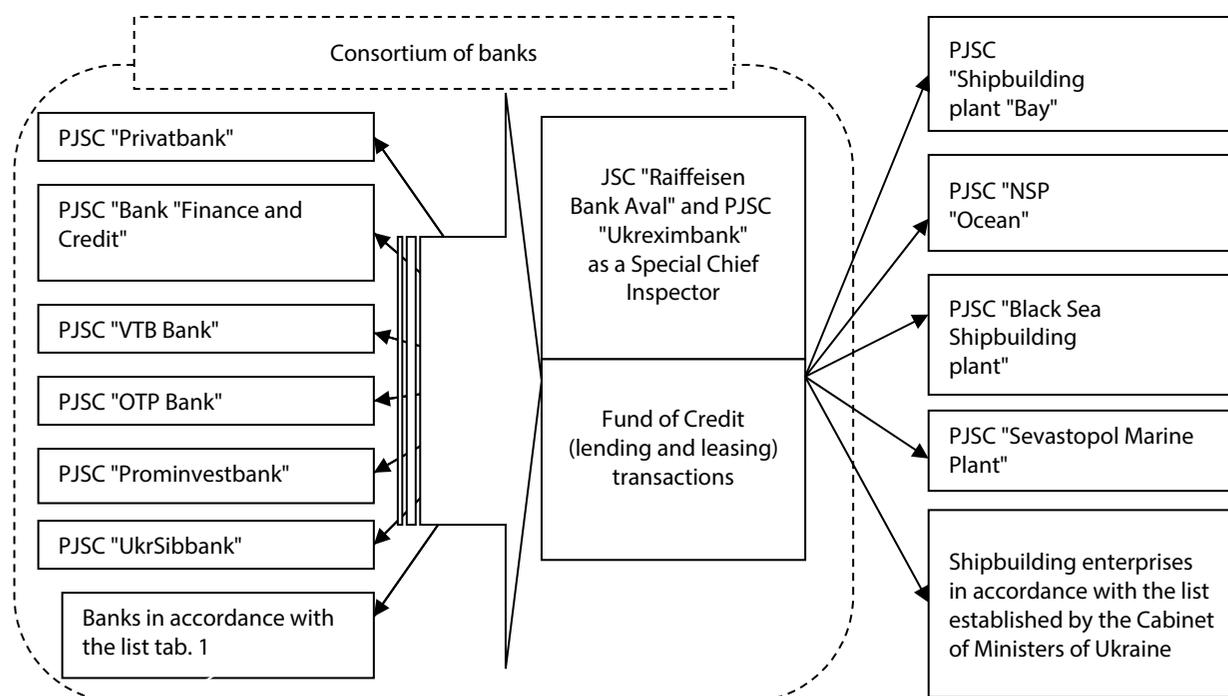


Fig. 1. Fund of Credit (lending and leasing) transactions (Developed by the author)

portunities for such investments, and the parent bank is faced the need to regulate the amount of contributions from particular banks. It is assumed that the main bank has information about the total amount of funds to sign loan agreements. It is, therefore, advisable to establish at the main bank a special fund of credit (lending and leasing) transactions (the Fund) for the timely provision of the necessary means of ship construction (Fig. 1).

Figure 1 shows that each member bank contributes its own money to the General Fund that comes within the terms of a loan agreement, based on the system of correspondent accounts. At the same time, member banks will be required to sign an agreement on how to transfer the money to the fund. They (the banks) will open the appropriate accounts in the main bank. A size of such contributions is assumed to be calculated according to the corresponding part of participation of banks in the capital of the consortium. Major benefits for the participating banks (from the delegation of powers to the main bank): they receive a guaranteed level of income and get rid of or reduce their risks+. This problem is particularly relevant today in a globalized banking community [10]. In addition, there is the possibility of increasing the level

resources. Banking association needs to address: the allocation of responsibilities among the members of the consortium, the input and exclusion from the new members of the consortium, access to quality and adequate security and further excluding collateral and, if necessary, its implementation, etc. We believe that these issues should be addressed in the context of proportional responsibility of participating banks.

of risk because of the worsening of global crises (financial, economic and others) which have outraged the world's economies with different frequency [12, Appendix].

Parent bank seems to be the institution, which can guarantee the organization of work of the consortium at a high professional level and the acceptable risk values for all members of the consortium.<sup>1</sup> At accepting credit agreements, the parent bank is advisable to execute and monitor a hypothecation agreement, because otherwise, problems concerning the adequacy of guarantee and, most importantly, problems with its implementation can occur.<sup>2</sup> Without a doubt, consortium creation,

<sup>1</sup> Parent bank itself will carry out the process of signing credit / leasing contracts with customers on behalf of the consortium, the main bank, will transfer payments (loan / lease) that come from customers in a timely manner (in the future — an hour per hour) on the current account of member banks (in proportion to the amount of their contributions).

<sup>2</sup> All responsibilities for the assessment and monitoring of the mortgaged property is expected to instruct the parent bank, so that it could, if necessary, take steps to implement this property. Fund should be created in such a way that it supports (minimum) amount of money that is calculated as the "standard" when placing an "average" credit. That is, the participating banks will need to keep the money in the Fund. Money will be calculated in advance. It will divert resources from their (banks) of active operations, however, will provide the necessary efficiency, at the signing of the loan agreement or lease agreement; that will allow banks in the future to receive a steady income throughout the crediting period. If the Fund's resources are not used for credit transactions, the parent bank will pay interest to banks participating. Interest rates will be equal to the average

Plan for the phased creation of the banking consortium

| №     | Stage                        | The main content of stage   | Period, months. | Responsible   |
|-------|------------------------------|---|-----------------|---|
| 1     | Preliminary                  | Deciding on the possible creation of the consortium by member banks and the CMU             | 1               | A working group of experts PJSC "Raiffeisen Bank Aval", JSC "Ukreximbank" banks and future members of the consortium, the CMU |
| 2     | Reason                       | Preparation of a decision to establish the consortium with justification of its feasibility | 1               | Responsible persons in the parent bank and the participating banks  |
| 3     | Inculcation                  | Preparation and development of agreements on signing of a preliminary agreement             | 2               | Responsible persons and members of the working groups of the parent bank and the participating banks                          |
| 4     | Testing                      | Discussion and improvement of the future treaty   | 2               | Responsible persons and members of the working groups of the parent bank and the participating banks                          |
| 5     | Pilot project                | Preparation and development of the pilot agreement  | 2               | Responsible persons and members of the working groups of the parent bank and member banks, future direct executors            |
| 6     | Testing of the pilot project | Testing of the pilot project  | 2               |   |
| 7     | Finalization                 | Completion of the pilot project   | 1               |   |
| 8     | Implementation               | Implementation of the project   | 1               |   |
| Total |                              |   | 12              |   |

all possible mechanisms of action of its members have to be registered, for this, the specific instructions and rules have to be created. Such work will require additional costs and should be done gradually, step-by-step, in accordance with the pre-approved plan (Table 3).

Table 3 shows that the creation of the banking consortium occurs in 8 basic steps. Initially, the parent bank and member banks decide to explore the possibility of creating the consortium. This sequence should help banks to make informed decisions and give an opportunity to correct mistakes that often occur in the early stages of the formation of the consortium. Of particular importance, in this case, from the point of view of the author, is the signing a preliminary agreement on the creation of the consortium to develop and test the pilot project. As the successful initial activities of establishing the association can largely guarantee its success. This will pretty much guarantee the success of the consortium. At all stages of the work, it is expedient to involve banks and leading experts to discuss and analyze their suggestions for making changes to improve the project. The additional home burden on the organization and functioning of the consortium should be entrusted to the main bank. Its (main bank) main tasks are shown in Table 4.

Table 4 shows that the activity of the parent bank, as the coordinator of the Fund, provides: continuous monitoring of the size of the Fund.<sup>1</sup> Parent Bank also monitors current payments between clients-borrowers (lessees) and member banks. Home Bank also performs duties (at the signing of the loan agreements): it provides for the assessment and registration of the mortgage, maintenance, and monitoring, and if necessary — the realization of collateral. This requires highly qualified professionals with experience, good relations with management, Justice, State Tax Service, the State Executive Service, local authorities and self-government in Ukraine. The treaty itself (consortia agreement) can be both permanent and temporary. The main purpose of such treaty can serve to the strategic revival industry (shipbuilding, aircraft, machinery, agriculture, etc.), based on the mutual benefit of participating banks.

As the number of members of the consortium is significant (16, and the number is projected to increase), the contract must be clearly stated: the main responsibilities of the bank, as performing the functions of managing and paying agent responsibilities of participating banks with reference to the corresponding list of fares. It is also necessary to prescribe the procedure for adoption

rate for deposits "on demand" and must be confirmed by tariffs, which are attached to the consortium agreement.

<sup>1</sup> This coordination of payment of contributions by member banks; if necessary, adjust the amounts of contributions; execution of payments between member banks, etc.

Table 4

## Key tasks of the main bank consortium for strategic service industry

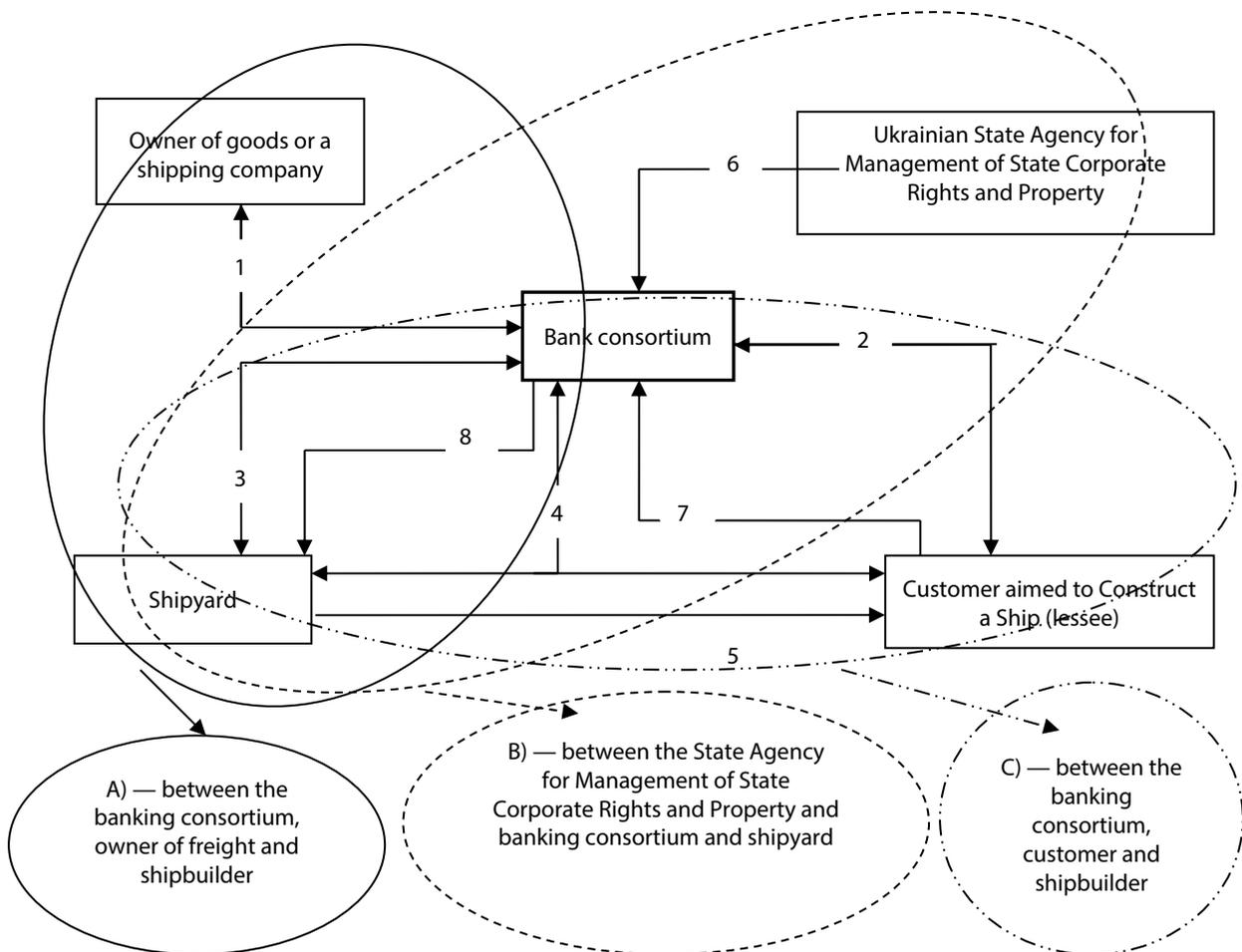
| Task  | Contents   |   |  |
|---|--|---|--|
| Organization of the Fund  | Formation of the Fund  | Coordination of the activities of the Fund, its monitoring              | Search, recruitment and registration of new banks participating in the Fund                                      |
| Organization of settlements between the participating banks           | Performance of current payments between borrowers, lessees and participating banks   | Performance of final accounts at closing of loan and leasing agreements | Receiving payments from participating banks for the services rendered  |
| Credit support of participating banks; formation of personnel reserve | Solution of a question of mutual settlements between banks participating in the event in the case of temporary lack of funds | Signing of the loan agreements with new participating banks             | Matching questions regarding participation of individual parts of the banks participating in the loan agreements |
| Registration of ownership of a leased item                            | Registration of ownership of a leased item, its constant monitoring  | Implementation of all current lease payments                            | Actions to implement a leasing object (if necessary)   |
| Performance of the duties of the mortgagee                            | Evaluation and design of collateral  | Accompanying collateral   | Actions to implement a pledge (if necessary)   |
| Counseling  | Providing qualified consulting support to members of the consortium  | Consulting clients  | Signing cooperation agreements with clients  |
| Legal support   | Legal assistance to banks participating in the consortium  | Settlement of disputes between members of the consortium banks          | Legal counseling clients   |
| Formation of personnel reserve  | Preparation and training of staff on the basis of existing experience  | Formation of personnel reserve  | Monitoring personnel reserve   |

of the new consortium member banks. In this case, it is appropriate to apply the requirements regarding to the size of capital, assets, performance of the basic economic standards, and consider the views of member banks on the future bank member. Participating banks joining the consortium acquire the possibility of organizing cooperation with new groups of clients — representatives of strategic sectors of the economy; a degree of risk due to its distribution is reduced. Thus, the NBU prudential standards will not be violated. So, according to the terms of the lending consortia, the cost of security provided to the mortgagor, when calculating the allowance is shared between members of the consortium banks in proportion to their participation in consortia lending.” [5, R. 2, Chapt. 3, §§ 4.5].

The main bank should form only part of the reserve’s own participation in the loan. This approach to the development of consortia agreements assumes that each member bank is responsible only for its share of provided syndicated loans as that allocates responsibilities and reduces risk. Moreover, the sizes of the reserves generated by the participating banks are stronger for them. Participating banks will save on: transaction costs, costs associated with direct registration of loan/leasing debt, registration of ownership of the leased item, mon-

itoring, evaluation and implementation of expertise, etc. All of these responsibilities are assigned to the main bank, for which it receives a commission from the participating banks. The author believes that it would be useful to offer a preliminary contract between the parent bank and a borrower/lessee, where the basic requirements of the parties are set out, that conforms to the international practice.<sup>1</sup> Feature and advantage of registration of credit (loan or leasing) transactions with the bank consortium for a client are in that fact, that all issues are resolved with only one (main) bank, but, in fact, there are many more creditors. Only one transaction is issued, all analysis procedures: the financial condition of a borrower, the property offered as collateral, most of the investment project, insurance options, etc. are performed by one parent bank, which greatly simplifies the procedure of contract registration for a customer. Control over the activities of the banking consortium should be

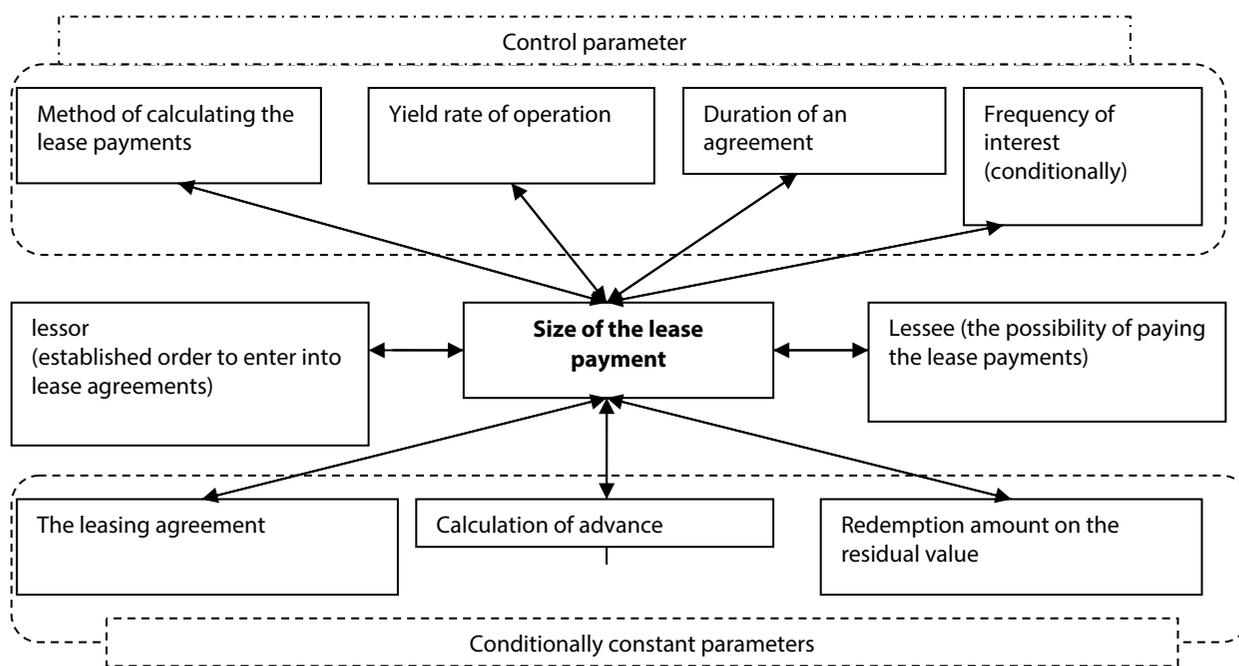
<sup>1</sup> Contracts (Term Sheet) to the terms of a loan or enter into a leasing transaction are preparatory document for designing the final agreement. In these preliminary agreements, the requirements, rights and obligations of the parties are usually prescribed as well as force majeure, afterwards they (contracts) would be finalized. Ukrainian analogue of such contracts are letters of intent, but their vagueness and unreliability indicate that it is necessary to turn to the world practice of signing preliminary contracts.



**Fig. 2.** Variants of interaction of the banking consortium with leasing members (developed on the basis of the data [4, p. 532]): 1 — the signing of the agreement between the shipping company / owner of the cargo and the consortium on the financing of the construction of the vessel (with the conditions of its intended use); 2 — conclusion a lease agreement between the consortium and the customer of the vessel; 3 — conclusion of a contract for mediation between the consortium and the shipyard for the timely transfer of funds to the customer's plant ( financing of the latter); 4 — the conclusion of a tripartite agreement on mutual cooperation between: a consortium shipbuilding enterprise and the customer (lessee); 5 — finally, the shipbuilding contract between the customer and shipbuilding enterprise; 6 — getting a bank consortium state guarantee from the State Agency of Ukraine for the management of state corporate rights and property; 7 — receive the advance and / or lease payments from the customer's bank consortium ship construction; 8 — bank consortium financing to the plant in accordance with the lease agreement

strengthened. The Consortium is controlled by the NBU, verified by the auditor and the Centre. But, from the point of view of the author, considering the special role and importance to the economy of the parent bank consortium, it must also undergo additional inspection by the CMU and JSC "Ukreximbank" as a special master of controller banking consortium. Currently, scientists discussed the sources and instruments of financial security of investment and innovation in the strategic sectors of the economy. [4, pp. 518-532, 9, pp. 11-15]. Among the new tools, a leasing is often-mentioned. In this context, the author also considers that it is necessary to expand the scientific and methodological approaches to the improvement of leasing operations of the banking consortium with the companies of strategic sectors of the economy.

It should be noted that the use of leasing, which is preferred in comparison to traditional lending for banks and leaseholders in various strategic sectors of the economy has significant differences. For example, due to the peculiarities of shipbuilding, in classification of lease, it is essential to take into account such features as "the level of technical complexity" and "degree of investment attractiveness," which today are not included in the classification of lease, even though they are relevant to leasing in shipbuilding. Therefore, the author proposes to amend the existing classification of leasing with listed features. The special attention is required the development of an algorithm of leasing relations, which would allow to take into account the interests of all parties. It is also foreseen that the government represented by the State Agency of Ukraine as the management of state cor-



**Fig. 3.** Scheme of the lessor and lessee interaction in the lease agreement development (developed on the basis of data [2, p. 289-295])

porate rights and property, act as the guarantor of the leasing agreement, and the customer can be both Ukrainian shipping company (or owner of the goods) and a foreign enterprise. As there is a need to develop options for the interaction of the banking consortium with members of leasing relations based on various schemes of such relations.

In the case, when the bank consortium is the lessor, the lessee may be a shipping company or shipyard. In the latter case, a shipyard is also a supplier of the lease. This situation is possible if a plant build a ship for their own use (barge or tug) or has no intention to convey vessels under construction in subleasing to another lessee. However, the most common option is when the lessee is a shipping company; a shipyard is a provider of leasing object. The approximate scheme of the relationship is shown in Figure 2.

Figure 2 shows that the banking consortium is in the center of leasing relations as the lessor. Besides, there may occur 3 main circles of relationships (A, B, C). In this scheme, the bank consortium plays the key role. In this case, both the lessee and the lessor confront the issue of choice: the method of calculating the lease payments, the size of commission, the term of agreement, the schedule for repayment of lease payments, the amount of down payment, which is paid by the lessee to the bank consortium and repurchase price for the residual value of a vessel. To solve these issues, it is proposed to create a model of the lease agreement between the lessee – the shipping company (shipbuilding enterprise) and the lessor

(bank consortium) regarding the construction of a vessel. The model provides the optimization of the basic parameters of the leasing transaction, as its total volume depends on: the type of vessel, its design, etc. and conditionally is a constant value for the selected project. Also as conditionally-constant values can be considered – the initial size of the leasing fee that pays a customer to the banking consortium at the conclusion of the leasing transaction (its amount is determined by the intrabank state on the active/credit transaction) and vessel size foreclosure on the residual value depends on the lease agreement. The model foresees the possibility to find such option of a leasing transaction, which would balance relationship between the lessor and the lessee (Fig. 3).

The diagram (Fig. 3) shows that for a leasing transaction, the main things, i.e. those that significantly affect the size of the lease payments are as follows: the method of calculating the lease payments, the size of a rate of return, the conditional frequency of its accrual term deal. They form the size of lease payments, which must satisfy both parties of the contract. However, from the part of the lessee, its financial resources have the significant impact on the amount of leasing payments, which are limited by level and regularity of income. The level of income of supplier i.e. lessee – shipyard is equally important. That is, depending on the level of the lessee income, its potential for lease payments is formed. In addition, the relationship between the lessor and the lessee also form a leasing transaction, even though their in-

Conditional input data to construct a mathematical model\*

| №  | Parameters   | Legend         | Units of measurement | Restrictions  |
|--|--|----------------|----------------------|---|
| <i>Basic parameters</i>                  |  |                |                      |   |
| 1  | Methods for calculating the lease payments           | [3, с. 88–104] | —                    | Total number of methods — 13  |
| 2  | Yield rate   | $J$            | %                    | $(i_c - 0,01)r \leq j \leq i_c$ , where $i_c$ — average rate on a leasing contracts |
| 3  | Term of contract, $n$                                | $N$            | years                | $5 \leq n \leq 15$  |
| 4  | Conventional frequency of Interest                   | $m$            | Times a year         | $4 \leq m \leq 12$  |
| <i>Conditionally constant parameters</i> |  |                |                      |   |
| 4  | Sum of the lease agreement                           | $K$            | thousand UAH         | 5000  |
| 5  | The initial contribution                             | $A$            | %                    | $15 \leq A \leq 20$   |
| 6  | Foreclosure amount of a vessel at its residual value | $s$            | %                    | 0   |

\* Developed according to [2, p. 289-295]).

fluence, the bank consortium-lessor tries to formalize and neutralize, for the improvement of the work organization efficiency. The initial contribution is usually established by the bank.<sup>1</sup> The issue to improve the leasing agreement provides the choice of such values governing parameters that would ensure, on the one hand, an acceptable level of profitability and profitability of the banking consortium or leasing company, and on the other hand, would satisfy the manufacturer or the ship-owner and would allow it to receive an appropriate profit. The scope of allowable values for control and semi-fixed parameters are given by the limitations presented in Table 5.

Table 5 shows that the input parameters have the following main limitations: the methods of calculating of the lease payments, the size of rate of return<sup>2</sup>, notional interest accrual rate (from 4 to 12 times per year), the term of the agreement for the project (from 5 to 15 years). We offer a mathematical model of the leasing agreement optimization, which will reduce the credit risk of the consortium, improve bank service and meet lessees' demands.

At the modeling of the process of concluding and functioning of the lease agreement, the determining factor for both the lessee and the lessor is leasing payments for the period of the contract, which depends on both the main variables and the semi-fixed parameters. So, the size of the

agreement during the computation is considered constant (although the same can vary depending on the choice of a manufacturer). In this case, the minimizing the lease payment will be optimal for the lessee, while the banking consortium is interested in its reasonable maximization. The choice of repayment schedules also has the essential value. We believe that the methods of evaluating of options for calculating the lease payments characterize the lease agreement qualitatively, and the use of mathematical modeling — quantitatively, which together provides an opportunity to choose the best option of the lease agreement for both parties.

A goal to find the optimal value for the size of the lease payment for the lessee is the determination of such part of his (the lessee) net income, which will give him the opportunity to work without overload, paying lease payments. We should note that only such methods of calculation are considered, which has an initial (advance) payment or increased down payment and redemption on the residual value of a vessel, as in banking, the leasing agreements are not used without the initial payment.

We also believe that the size of the lease payment should be justified and calculated for each lessee individually, based on the volume of its implementation, since amount of revenue determines potential of the lessee for leasing payments.

The calculation of the optimal parameters of the lease agreement, depending on the size of lease payments (in the case where the lessee is a company of strategic industry) for each of them is presented in Table 6.

Table 6 shows that the average volume of net income of companies selling products in 2005-2011 is fluctuated and significantly different among different enterprises.

<sup>1</sup> When leasing ships can vary between 15-20 % of the transaction amount. Sumy foreclosure vessel's at the residual value may also vary, but usually are 0 %, although they may be other values (5-10 % of the transaction).

<sup>2</sup> Rate is set according to the lease agreement, and must be less than the average rate of return on leasing contracts for a given period in order to ensure the competitiveness of the banking consortium.

Table 6

## Average values of net income of Ukrainian shipbuilding enterprises, mln UAH\*

| Shipyards                               | 2005   | 2006   | 2007   | 2008   | 2009    | 2010    | 2011   | Mean value |
|---|--------|--------|--------|--------|---------|---------|--------|------------|
| PJSC "Shipbuilding plant "Bay"          | 106.10 | 55.60  | 164.70 | 240.40 | 280.50  | 420.20  | 266.81 | 219.2      |
| PJSC "NSP "Ocean"                       | 242.20 | 460.70 | 500.70 | 289.20 | 803.90  | 142.80  | 71.35  | 358.7      |
| PJSC "Black Sea Shipbuilding plant"     | 119.20 | 38.10  | 6.50   | 51.90  | 46.30   | 76.90   | 135.88 | 67.8       |
| PJSC "Sevastopol Marine Plant"          | 0.00   | 0.00   | 9.90   | 30.00  | 9.30    | 28.30   | 45.18  | 17.5       |
| PJSC "Plant "Lenin's smithy"            | 77.50  | 72.40  | 51.90  | 76.40  | 191.90  | 30.30   | 19.93  | 74.3       |
| PJSC "Kherson Shipyard"                 | 137.20 | 126.50 | 180.20 | 209.10 | 493.60  | 352.90  | 174.09 | 239.1      |
| JSC "Feodosia shipbuilding company"Sea" | 9.70   | 2.20   | 2.20   | 4.00   | 4.80    | 4.20    | 137.45 | 23.5       |
| JSC "Shipyard "Liman"                   | 5.70   | 11.10  | 4.50   | 13.00  | 61.40   | 18.20   | 38.75  | 21.8       |
| Total                                   | 697.60 | 766.60 | 920.60 | 914.00 | 1891.70 | 1073.80 | 889.45 | 1022.0     |
| Mean value                              | 87.20  | 95.83  | 115.08 | 114.25 | 236.46  | 134.23  | 111.18 | 127.7      |

\* Developed by the author. [3, p. 256–257].

Table 7

## Calculation of the optimum size of lease payments for Ukrainian shipbuilding enterprises, mln UAH\*

| № | Shipyards                                | The average annual net income from sales**, mln UAH | The average monthly income (col. 3/12) | The optimum size of the lease payment (col. 4/100), % |
|---|--|---|--|---|
| 1 | PJSC "Shipbuilding plant "Bay"           | 219.2   | 18.3                                   | 0.183   |
| 2 | PJSC "NSP "Ocean"                        | 358.7   | 29.9                                   | 0.299   |
| 3 | PJSC "Black Sea Shipbuilding plant"      | 67.8  | 5.7                                    | 0.057   |
| 4 | PJSC "Sevastopol Marine Plant"           | 17.5  | 1.5                                    | 0.015   |
| 5 | PJSC "Plant "Lenin's smithy"             | 74.3  | 6.2                                    | 0.062   |
| 6 | PJSC "Kherson Shipyard"                  | 239.1   | 19.9                                   | 0.199   |
| 7 | JSC "Feodosia shipbuilding company "Sea" | 23.5  | 2.0                                    | 0.020   |
| 8 | JSC "Shipyard" Liman                     | 21.8  | 1.8                                    | 0.018   |

\* Developed by the author.

\*\* Calculated according to Table 6.

Maximum sales volumes have PJSC "Shipyard" Bay", PJSC "NSP "Ocean", PJSC "Kherson Shipyard" minimum – PJSC "Sevastopol Marine Plant", PJSC "Shipyard "Liman", JSC "Feodosia shipbuilding company"Sea". Based on data in Table 6, the optimal size of lease payments for individual enterprises is calculated (Table 7).

Table 7 shows that for each enterprise, the optimum size of a lease payment sets on a minimum level – 1 % depending on the average monthly net income.<sup>1</sup> This approach to select the size of payment, in our view, is a time step and is designed for a transition period of a gradually increase the production level of strategic sectors by enterprises; in addition, the rate of interest may vary. Therefore, the sizes of lease payments defined in Table 7 will be optimal for each enterprise. However, it is nec-

essary to link the sizes of lease payments to the main control and conditionally constant parameters of the project. Then mathematical solution of the optimal size of the regular lease payments for the lessee is a system of mathematical equations with constraints as follows:

$$R = \frac{[K(1 - sv^n) - A]}{a_{n;j/m}} = \{183; 299; 57; 15; 62; 199; 20; 18\}, \quad (1)$$

where,  $a_1 = \frac{j/m}{1 - (1 + j/m)^{-mn}}$ ;  $v = (1 + j/m)^{-1}$ .

Restrictions:

- 1)  $j = 0, 1834$ ;
- 2)  $5 \leq n \leq 15$ ;
- 3)  $4 \leq m \leq 12$ ;
- 4)  $m$  – whole / number;
- 5)  $0,15K \leq A \leq 0,20K$ ;
- 6)  $s = 0$ ;
- 7)  $K = 5000$ .

To calculate rents the author uses: postnumerando equation (with advance payments and pay-

<sup>1</sup> In accordance with international practice of lending and leasing, an optimal payments for the borrower / lessee are considered to be up to 10 % of their average income, however, based on the realities of the current state of the strategic sectors of Ukraine and the principles of prudence and discretion, we offer to take the amount of payments at the level of 1 % of the income businesses.

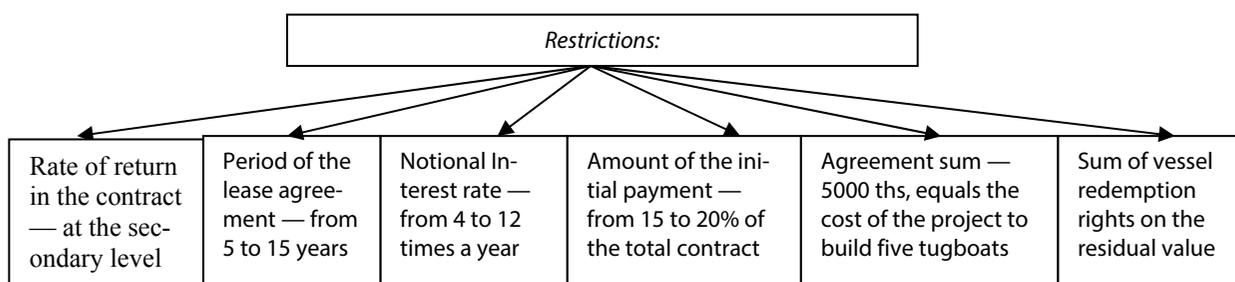


Fig. 4. Additional restrictions for equation 1 (developed by the author)

Table 8

## Calculation of the optimal parameters of the leasing agreements for shipbuilding companies in the construction of a tug\*

| № | Shipyards                                | The optimum size of lease payments, $R$ , ths UAH | Cash-optimal size of lease payments, $R'$ , ths UAH | Yield rate, $j$ , % | Period of the lease agreement, $n$ , years | Conventional frequency calculation, interest, $m$ , times a year | The initial contribution, $A$ , thousand UAH |
|---|--|---|---|---------------------|--|--|--|
| 1 | PJSC "Shipbuilding plant "Bay"           | 183   | 183   | 18.34               | 6.85                                       | 6  | 750.00                                       |
| 2 | PJSC "NSP "Ocean"                        | 299   | 299   | 18.34               | 5.88                                       | 4  | 750.00                                       |
| 3 | PJSC "Black Sea Shipbuilding plant"      | 57  | 65.40   | 18.34               | 15   | 12   | 1000.0                                       |
| 4 | PJSC "Sevastopol Marine Plant"           | 15  | 65.40   | 18.34               | 15   | 12   | 1000.0                                       |
| 5 | PJSC "Plant "Lenin's smithy"             | 62  | 65.40   | 18.34               | 15   | 12   | 1000.0                                       |
| 6 | PJSC "Kherson Shipyard"                  | 199   | 199   | 18.34               | 7.42                                       | 5  | 999.89                                       |
| 7 | JSC "Feodosia shipbuilding company "Sea" | 20.0  | 65.40   | 18.34               | 15   | 12   | 1000.0                                       |
| 8 | JSC "Shipyard" Liman                     | 18  | 65.40   | 18.34               | 15   | 12   | 1000.0                                       |

\* Developed by the author.

ing the cost of a remainder of a ship). As restrictions accept (Fig. 4)

Figure 4 shows that 6 additional restrictions are imposed. In order to solve the above-mentioned system, we use the computer program of "finding solutions" for each company separately, as the optimal size of lease payments for each company are different and depend on the size of their income from sales<sup>1</sup> (Table 8).

Table 8 shows that the optimal size of the lease payments at the application of these limitations does not allow companies to pay part of the lease payments in the amount of 1 % of their income (Table 7, p 3). Thus, it was found that the conditions of leasing contracts for five enterprises are too stiff, because even though the maximum term of the contract is limited to 15 years, a sum of the lease payment exceeds 1 % of the volume of a number of enterprises.<sup>2</sup> It turns out that for these

<sup>1</sup> Sales revenue in the selling prices that are displayed in the F2 page of 35 financial reporting.

<sup>2</sup> PJSC "Black Sea Shipbuilding plant", PJSC "Sevastopol Marine Plant", PJSC "Plant "Lenin's smithy", JSC "Feodosia shipbuilding company "Sea" and PJSC "Shipyard "Liman" do not maintain the set parameters of leasing contracts.

businesses, the softer individual conditions, and hence limitations need to be introduced.

Having assessed the preliminary performed calculations, it can be concluded on the need either to set the lease payment at the level above 1 % of the sales revenue (which may complicate the financial condition of a company) or to reduce the rate of return for the leasing agreement.

There is a proposal to introduce a partial payment as an interest rates on loans and commission on lease agreements for banks participating in the consortium This measure the "sea" states use to maintain its own shipbuilding industry, it has been successfully applied in Ukraine until 2005. This compensation can be carried out on the basis of cheaper loans and leasing contracts exclusively for domestic shipbuilders and shipping companies. Moreover, the introduction of partial compensation from the state will be useful to monitor the current activity of the customer's leasing object to avoid careless use of funds, as it generates a lack of control and can lead to waste of budgetary resources. When implementing a partial compensation for the lease agreements at the level of 50 % of the NBU discount rate, the mathematical

Table 9

## Optimal parameters of leasing contracts for shipyards` with the condition of partial compensation of yield rate`

| № | Shipyards                                | The optimum size of lease payments, R, ths UAH | Cash-optimal size of lease payments, R', ths UAH | Yield rate, j, % | Period of the lease agreement, n, years | Conventional frequency calculation, interest, m, times a year | The initial contribution, A, thousand UAH |
|---|--|--|--|------------------|---|---|---|
| 1 | PJSC "Shipbuilding plant "Bay"           | 183  | 183  | 14.6             | 5.6722                                  | 6   | 797.61                                    |
| 2 | PJSC "NSP "Ocean"                        | 299  | 299  | 14.6             | 5                                       | 4   | 807.59                                    |
| 3 | PJSC "Black Sea Shipbuilding plant"      | 57   | 57   | 14.6             | 15                                      | 12  | 846.37                                    |
| 4 | PJSC "Sevastopol Marine Plant"           | 15   | 54.89  | 14.6             | 15                                      | 12  | 1000.0                                    |
| 5 | PJSC "Plant "Lenin's smithy"             | 62   | 62   | 14.6             | 11.5448                                 | 12  | 858.26                                    |
| 6 | PJSC "Kherson Shipyard"                  | 199  | 199  | 14.6             | 5                                       | 6   | 797.61                                    |
| 7 | JSC "Feodosia shipbuilding company "Sea" | 20.0   | 54.89  | 14.6             | 15                                      | 12  | 1000.0                                    |
| 8 | PJSC "Shipyard" Liman "                  | 18   | 54.89  | 14.6             | 15                                      | 12  | 1000.0                                    |

\* Redemption amount of the residual value for all businesses is 0, the sum of the lease agreement — 5000 thousand UAH.

\*\* Developed by the author.

system that allows one to find the appropriate parameters of leasing contracts is used. At that, the restrictions on the size of the rate of return are changed:

$$R = \frac{[K(1 - sv^n) - A]}{a_{n;j/m}} = \{183; 299; 57; 62; 199; \min\}, \quad (2)$$

where,  $a_1 = \frac{j/m}{1 - (1 + j/m)^{-mn}}$ ;  $v = (1 + j/m)^{-1}$ .

Restrictions:

- 1)  $j = 0,146$ ;
- 2)  $5 \leq n \leq 15$ ;
- 3)  $4 \leq m \leq 12$ ;
- 4)  $m$  — whole / number;
- 5)  $0,15K \leq A \leq 0,20K$ ;
- 6)  $s = 0$ ;
- 7)  $K = 5000$ .

The present system provides for all businesses the decrease of the yield rate for 50 % of the NBU discount rate (to 14.6 %). For some shipbuilding companies, the search for new parameters of the leasing contracts is provided despite the fact that the sizes of the lease payments are set at 1 % of the product sales income. These are companies that "survived" the rate at the average rate.<sup>1</sup>

For other enterprises, which have not the sufficient amount of revenue to ensure appropriate levels of lease payments, the search of minimum lease payments and the corresponding parameters of the lease agreement are provided. Duration of the contract, the conditional frequency of inter-

est, the size of advance lease payment and the lack of redemption of a vessel on the residual value remain unchanged. The results are presented in Table 9.

Table 9 shows that at the application of preferential rates of return, there are three companies for which cash-optimal size of the lease payments are too high, i.e. more than 1 % of their income. It is for these enterprises, the minimal value of size of lease payments — 54.89 ths UAH is found. Wherein, the amount (54.89 ths UAH) is respectively a following percentage of the average monthly income: 2.7 % for JSC "Feodosia shipbuilding company "Sea" and 3.6 % PJSC "Sevastopol Marine Plant". That is, with these companies, the lease agreements may also be signed with appropriate approach to the organization of their production.

It is to create the appropriate conditions for the signing of lease agreements with these companies we offer: to increase the frequency of lease payments (2 times per month) and introduce a condition of vessel redemption at its residual value.

The system of equations is as follows:

$$R = \frac{[K(1 - sv^n) - A]}{a_{n;j/m}} \rightarrow \min, \quad (3)$$

where,  $a_1 = \frac{j/m}{1 - (1 + j/m)^{-mn}}$ ;  $v = (1 + j/m)^{-1}$ .

Restrictions:

- 1)  $j = 0,146$ ;
- 2)  $5 \leq n \leq 15$ ;
- 3)  $4 \leq m \leq 12$ ;
- 4)  $m$  — whole / number;
- 5)  $0,15K \leq A \leq 0,20K$ ;
- 6)  $0 \leq s \leq 0,1$ ;
- 7)  $K = 5000$ .

<sup>1</sup> There are three shipyards: PJSC "Shipbuilding plant "Bay"; PJSC "NSP "Ocean" and PJSC "Kherson Shipyard".

Minimum dimensions of the lease payments for shipyards\*

| № | Shipyards                               | The optimum size of lease payments, R, ths UAH | Cash-optimal size of lease payments, R', ths UAH | Yield rate, j, % | Period of the lease agreement, n, years | Conventional frequency calculation, interest, m, times a year | The initial contribution, A, thousand UAH | Ransom vessel at its residual value, s, ths UAH |
|---|---|--|--|------------------|---|---|---|---|
| 1 | PJSC "Sevastopol Marine Plant"          | 15   | 23.99  | 14.6             | 15                                      | 12  | 1000.0                                    | 500   |
| 2 | JSC "Feodosia shipbuilding company"Sea" | 20.0   | 23.99  | 14.6             | 15                                      | 12  | 1000.0                                    | 500   |
| 3 | PJSC "Shipyard" Liman                   | 18   | 23.99  | 14.6             | 15                                      | 12  | 1000.0                                    | 500   |

\* Developed by the author. Sum of the leasing agreement — 5000 ths UAH. Under the conditions of partial compensation of interest rate yields, increased frequency of its conditional accrual and redemption of the vessel at its residual value.

The calculations were performed using the "search for solutions" program. The results of calculations, taking into account these additional constraints are shown in Table 10.

Table 10 shows that by introducing into the leasing contracts such additions as the lease payments twice a month and vessel redemption according to the residual value (at 10 % of the total sum) — the payment for the optimal size of these payments is 23.99 thousand. This value is close to the optimum size of the lease payment, softens conditions of agreements for shipbuilding enterprises and disciplines the lessees.

Thus, the proposals to raise banks in syndicated bank should strengthen the role of credit in the development of strategic sectors of the domestic economy. The step-by-step creation of the banking consortium is proposed, a list of the main tasks of the main bank of the Banking Association is developed; the establishment of a special fund of credit operations (loans and leasing) in the consortium to provide optimum conditions of

loans for the strategic industries is provided; JSC "Raiffeisen Bank Aval" is invited to be the main bank of the consortium, and to be responsible for the following functions: organizational, estimated, credit, and other on the level of the consortium; JSC "Ukreximbank" may perform the specific duties as the Inspector General of the consortium. The proposals regarding the possible areas for controlling the activities of the consortium and improving credit relations with enterprises of strategic sectors of the economy are developed.

To improve the leasing operations of member banks of the bank consortium, the lease agreement and its functioning are modeled. The main factors that determine the buyout decision on the conclusion of the leasing contract (for both a tenant and a landlord), the sum of the lease payment and the schedule of repayment are considered. This approach to the formation of the leasing contract allows to choose the optimal conditions of the leasing transaction for both parties.

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