The model of forming of innovative financing and credit schemes in housing construction and estimation of their financial stability

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Abstract. The authors propose a new approach to the housing lending system based on the creation of building stakeholders as a group of stakeholders. All possible participants in the process are considered, starting from the facility construction and ending with the final consumers of construction products. A fundamentally new financial and credit mechanism is proposed, which is an alternative to a mortgage and, according to the authors, will serve as a catalyst for solving the problem of housing affordability. As part of the study, a stakeholder capital flow chart is proposed, direct and reverse financial flows are considered, a mechanism for forming a stakeholder fund is presented. The financial structure of the stakeholder proposed by the authors is based on the mechanism of direct and reverse movement of capital of the association. The formation of innovative credit mechanisms raises the question of the stability of the financial system in the face of risks. The authors propose a model for assessing the financial stability of a stakeholder based on the robustness theory, which determines the possible effects of risks and analyzes the effectiveness of process protection options.

Key words: stakeholder holding, financial credit scheme, robustness theory, risks, system stability, reverse capital movement, multi-capital.

1 Introduction
The problems of housing affordability remain one of the most acute and socially significant for many decades. As part of the search for a solution to this topical problem, various options were offered to “revitalize” the construction market. The institution of mortgage lending is actively developing, which certainly plays a positive role in solving the problem. But in this case, the question of the loans availability for the population in need of better housing conditions arises. Unfortunately, the conditions for issuing loans, including high mortgage rates, significantly limit the range of consumers.

The authors propose a new approach to the formation of credit mechanisms in the housing market, allowing the maximum number of participants to be included in the financial system on the basis of common motivation and unity of goal setting in terms of meeting their own commercial and social interests.
1.1 Literature review
Such scientists as R. Freeman, G. Mintzberg, D. Newbould and D. Luffman A. Mendellow, and many others made a great contribution to the development of the concept of stakeholders. For the first time this concept was sounded in the work of R. Freeman “Strategic Management”.

In the works of G. Mintzberg, the task of managers was defined as a system of managerial roles: organization, coordination, planning, supervision and management.

In the works of D. Newbould and D. Luffman (1989), the problem of the development of stakeholder groups is considered at the level of systematization of the persons involved, and their classification is also given. Particularly common model is the model by A. Mendelaw, which makes it possible to prioritize among stakeholders.

The problem of the development of stakeholder relations also involved Russian scientists: Zub A.T. in the works on strategic management. Solodukhin K.S. and Belousov K.Yu. developed the theory of stakeholders within the framework of management theory and considered the degree of sustainability of the company.

The authors propose their own interpretation of the theory of stakeholders, adapted to the construction industry.

2 Materials and methods
To solve the problem of housing affordability, it is proposed to consider the issue of creating building stakeholdings with the aim of developing new forms of financial and credit instruments in the housing market, activating the housing market and developing new credit mechanisms.

The construction industry, unfortunately, does not have experience working with stakeholders structures. This association is fundamentally new for the Russian real estate market.

We define the stakeholding group as a combination of individuals and legal entities motivated by a common business goal and directing their activities towards its achievement with maximum efficiency.

It is assumed that this group of stakeholders will include not only construction enterprises as stakeholders, but also enterprises of related fields of activity, such as repair companies, suppliers of raw and other materials, housing and communal services, ensuring the continued operation of the building, telecommunications companies and etc.

In addition, the stakeholder group may include investors, government agencies, banks and insurance companies. But one of the most significant categories of participants is individuals who are consumers of housing. It is for this category of interested parties that the functional scheme of the construction stakeholder is being developed as a new production and financial instrument that can, to a certain extent, reduce the social tension of the problem of providing citizens with housing.

All member associations have their own interests, the balance of which is the main task of creating such a unified corporate system in the real estate market. It should be noted that the stakeholder may not have the status of a legal entity, which distinguishes it from other organizations. The form of civil relations is a system of contractual relations between the parties. The system of contracts between stakeholders is differentiated. For each participant, the rights and obligations are prescribed depending on his field of activity, monetary participation, his importance and importance of the stakeholder company as an economic partner.

3 Results and discussions
The main thing in the stakeholder structure is a fundamentally new scheme of financial relations, new forms of lending, which enable participants in the process to maintain the balance of interests on mutually beneficial conditions.

We consider the structure of the stakeholder in terms of the composition of its participants and the possible adaptation to the residential real estate market. The main stakeholders can be:

1. investors who invest their capital with a certain share of risk in order to generate income on it;
2. lenders temporarily providing the company with a loan in exchange for some predetermined income, and interested in information, allowing them to determine whether payments on the loan will be made in a timely manner;

3. suppliers interested in the success of the enterprise, allowing them to determine whether the amounts due to them will be paid in time;

4. consumers (customers of the enterprise) interested in its stability, as a result of financial respectability of the enterprise;

5. public and state organizations, since the well-being of the economic infrastructure of the region depends on the successful functioning of the enterprise.

Further, we consider the principle of stakeholding financial structure formation. The authors propose the term “multi-capital of holding” as a generalizing concept of the financial system of a merger. Multi-capital is a set of differentiated components of an integrated financial flow, the movement of which should maximize the commercial effect of stakeholders.

The formation of a stakeholder fund is based on the well-known financial mechanism of Stroysberkass, whose source of resources for targeted housing loans are citizens 'deposits, borrowers' payment for using a housing loan, and also a premium of state. It is paid in accordance with the construction savings contract provided that the depositor is paid during the year he have deposited a certain amount on his account.

The resources of the fund are directed to lending to borrowers and building new housing. For individuals entering into a stakeholding, a condition may be established for making a down payment as a percentage of the cost of housing purchased by them. This contribution can be either one-time or made over a period of time. The scheme of formation and movement of a multi-capital holding is based on the mechanism of reverse movement of the financial flow with some increment (figure 1).

![Scheme of the reverse movement of a multi-capital of the stakeholders.](Image)

Figure 1. Scheme of the reverse movement of a multi-capital of the stakeholders.

There can also be a redistribution of resources within the holding fund. Depending on the occurrence of a financial deficit in any direction, intra-fund capital may be partially redirected as an internal loan to the needs of a particular stakeholder company.
Thus, the active movement of multi-capital participants within the holding structure, speeds up the process of housing construction and sale, improving the quality of public utilities at the operation stage, reduces the risks of process participants, which makes housing more accessible to categories of citizens with low and medium income levels.

Like any system, the structure of the stakeholding with its new forms of capital flow and credit-return schemes is the subject to the influence of the external environment that means it is not free from risks. Any financial system is exposed to risks, especially one that does not have a sufficient history in the market, there is no lengthy approbation of financial schemes in real conditions. Consequently, the next stage of the proof of such structures creating and functioning possibility in the construction market is the assessment of the system sustainability under the influence of various factors, both external and internal.

We consider a functional model of stability, built on the basis of robustness theory. It is known that robustness is the ability of the system to maintain a given margin of stability with variations in its parameters caused by load changes, external influences, calculation errors and an error in the object model. Applying this concept to economic categories, one can define economic robustness as the financial sustainability of a system under the influence of risks, taking into account the response of the system to the impact of risk factors.

The external environment, as a source of negative factors, can significantly reduce the efficiency of the system. At the same time, the system resists risks. Speaking about the real economic subject, it is necessary to remember that the identification, analysis and risk management is an integral part of the management of the company. Consequently, the system will react to the external negative impact with appropriate protective measures. But, as a rule, any anti-crisis measures incur certain costs. It remains to determine how justified the costs of carrying out anti-risk measures are compared to the expected effect of their introduction into the real process.

The basic equation of system performance in an aggressive economic environment is:

\[ W = W_0 - H_w - \varphi + \sum q_i P_i, \]  \hspace{1cm} (1)

where

- \( W_0 \) – the potential value of system functioning efficiency;
- \( H_w \) – payment for own resources;
- \( \varphi \) – force of negative environmental impacts;
- \( \sum q_i P_i \) – effectiveness of system protection against risks;
- \( q_i, P_i \) – number and effectiveness of protective elements.

The normal functioning of the financial system is ensured by the achievement of the potential value of efficiency \( W = W_0 \).

Normal functioning is ensured through the use of risk-averse measures that provide compensation for harmful effects. The compensation condition is described by the equation:

\[ -H_w - \varphi + \sum q_i P_i = 0. \]  \hspace{1cm} (2)

Equations of system efficiency in case of under-compensation of harmful effects:

\[ W = W_0 - \Delta W, \]  \hspace{1cm} (3)

\[ \Delta W = H_w + \varphi - \sum q_i P_i, \]  \hspace{1cm} (4)

where

\( \Delta W \) – deviation from the condition of compensation (under-compensation) of harmful effects. If the compensation condition is met, \( \Delta W = 0 \).

We define the robustness index as the normalized efficiency of the system:

\[ \rho = \frac{W}{W_0} = 1 - \delta W, \]  \hspace{1cm} (5)

where \( \delta W = \Delta W / W_0 \) is the relative deviation from the compensation condition. The normal robustness value corresponding to the potential efficiency value of the system is 1, i.e. \( \rho_0 = 1 \).

The purpose of managing the system in a risk environment is to ensure the potential level of the system’s efficiency. To achieve this goal, a number of tasks have been identified:

- identification of risk factors, determining their impact on the system’s effectiveness;
- definition of managed protection means and their use for compensation of negative influences.
The scheme of reverse movement of multi-capital of the holding (Fig. 1) is based on the mechanism of direct and reverse movement of capital. The financial system should work with maximum efficiency and minimum losses. Direct flow involves the formation of the Fund in the form of contributions from participants of all categories, the reverse movement is the cost of construction, repair, infrastructure, loans, etc.

The equation of the functioning efficiency of the financial model is given in the form:

\[ W = k P_k - l P_l \]

where \( k \) – coefficient and specific efficiency of using direct cash flow \( P_{in} \); \( l \) – coefficient and specific efficiency of using reverse cash flow \( P_{out} \).

All terms of the effectiveness of the financial scheme (6) are described by the equation of risk of loss of potential efficiency due to the negative impact of external factors:

\[ P = R_i - (T + H), \]

where \( R_i \) – is the profitability rate of \( P_{in} \); \( H \) – bid for using \( P_{out} \); \( T \) is the total tax rate.

Efficiency of using the incoming (direct) cash flow is described by the equation of risk of potential efficiency on the part of tax at the rate of \( T \) and payment for the use of capital \( P_{in} \) at the rate of \( H_k \):

\[ P = R_i - (T + H_k). \]

Efficiency of using reverse cash flow \( P_{out} \) is described by the equation of risk of potential efficiency on the part of tax at the rate of \( T \) and payment for the use of capital \( P_{out} \) at the rate of \( H_L \):

\[ P = R_i - (T + H_l). \]

The full equation of financial system efficiency, taking into account the components, will take the form:

\[ W = k R_i - (k + l)T - k H_k - l H_l. \]

The effectiveness of the financial system of the holding is vulnerable to negative external influences of the economic environment, and the activity of the dynamic financial system is manifested in the application of protection means (anti-risk measures) from these influences. The negative impacts, first of all, include taxes, fees for the use of capital, low effective demand, etc. The means of protection against negative impacts include credit resources, the effective use of which allows you to compensate for the decrease in return on capital. In addition, the specificity of the construction industry highlights other types of risks, including solvent demand, the presence of competition, inflation, etc. Risks of stakeholders as the new structures in the construction market have a higher level of uncertainty compared to other types of business activities in the construction industry.

To establish «means of protection» against risks is one of the most important tasks of real business. How effective these measures are can be determined by the proposed model of sustainability assessment.

For a real business that is affected by negative market factors, performance benchmarks are provided by protections to meet compensation conditions.

The compensation equation is as follows:

\[ l(R_i - T - H) - k(T + H_k) = 0. \]

The equation of the efficiency of cash flow at rates of return can be considered as the main form of description, focused on analysis and diagnosis. In this form, total efficiency is defined as the difference between the level of return and the amount of reverse cash flow losses in relative terms. Let's group the terms of the efficiency Eq. (10) by the rates of income generation (\( G_i \)) and deductions from profit (\( T, H_k, H_L \)):

\[ W = (k + l)R_i - (k + l)T - k H_k - l H_l. \]

Considering the bet multipliers as weighting factors, we obtain a 4-component decomposition of the form:

\[ W = \alpha_i R_i - \alpha T - \alpha_k H_k - \alpha_l H_l. \]

The weights are given as functional dependences on the financial coefficients \( \alpha = f(k, l, \lambda) \):

- \( \alpha_i = (k + l)(1 + \lambda) \) – investment efficiency ratio;
- \( \alpha_T = (k + l) \) – tax rate efficiency coefficient;
- $\alpha_a = k$ – is the efficiency factor of the dividend;
- $\alpha_L = l$ – the efficiency rate of the loan.

4 Conclusions
Thus, the model (13) is functionally complete, which provides versatility and adequacy. It allows us to assess the balance of direct and reverse cash flows, the effectiveness of their dynamics in terms of ensuring the interests of stakeholders.

Together, the profit distribution model and reference values form a business valuation method that can be used to analyze and diagnose financial processes, as well as to assess the effectiveness of the financial structure of the construction holding from the point of view of the participants interests.

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