

DEVELOPMENT OF AN INTEGRATED APPROACH TO THE ASSESSMENT OF THE MORTGAGE LENDING SYSTEM FUNCTIONING EFFICIENCY IN THE RUSSIAN FEDERATION

Ekaterina ZINOVIEVA

Nosov Magnitogorsk State Technical University
38 Lenina St., 455038 Magnitogorsk, Russian Federation
zinovyeva-ekaterina@rambler.ru

Margarita KUZNETSOVA

Nosov Magnitogorsk State Technical University
38 Lenina St., 455038 Magnitogorsk, Russian Federation
wj27@mail.ru

Lilia VOTCHEL

Nosov Magnitogorsk State Technical University
38 Lenina St., 455038 Magnitogorsk, Russian Federation
votchellm@mail.ru

Natalya IVASHINA

Nosov Magnitogorsk State Technical University
38 Lenina St., 455038 Magnitogorsk, Russian Federation
elefteria85@mail.ru

Valeriya VIKULINA

Nosov Magnitogorsk State Technical University
38 Lenina St., 455038 Magnitogorsk, Russian Federation
vvvlerkin@mail.ru

Abstract. *Recent years, the macroeconomic situation divulged a complex of problems in the quickly developing system of mortgage lending in Russia – the fall in the cost of property pledge, a sharp rise of the overdue arrears in the issued mortgage credits, the low efficiency of the work of Mortgage and Housing Lending Agency. In spite of the negative factors and conditions, accompanying the development of Russian system of mortgage lending, the experience of industrially developed countries shows that in the market economy the mentioned form of credit relations is one of the main instruments in solving social-economic problems – first of all, enhancing accessibility and providing the population with housing. There arises the objective necessity of modernizing the existing and developing the new trends in improvement of the mortgage lending system under the conditions of post-crisis development of Russian economy. The paper aims in the theoretical founding of the necessity to modernize the existing and develop the new trends in improvement of the mortgage lending system under the conditions of economic post-crisis development in Russia. We use the dialectical method, providing the objective character of study and the systematic approach to the examination of complex economic processes and phenomena. Methods of abstract-logical, comparative-analytical, statistical and economic-mathematical analysis were applied in different combinations on all the stages of the investigation. This enabled us to provide the grounds for the induced offsprings. We put forward a complex indicator to exercise estimation of the mortgage lending system functioning efficiency; to propose the algorithm of determining this indicator; to realize*

the economic-mathematical modeling of quantitative prospects for the national system of the mortgage. The monitoring of the mortgage lending system functioning efficiency in Russia showed the significant increase of efficiency in the organization of financial-economic and organizational-legal relations, formed in the process of mortgage lending system functioning. The proposed complex indicator acts as such, enabling to provide spatial-temporal compatibility of criteria and indicators of state in the primary and secondary markets of mortgage lending, to form the integral and accessible information base of the system development dynamics as well as of its elements, to expound the priority trends in the regulation of specific for this country type of credits.

Keywords: mortgage lending; integral efficiency indicator; credit organization; mortgage lending market; commercial bank.

Introduction

The research gap covered by this paper is a lack of an integrated approach to the methodological provision of Russian mortgage lending system functioning. Without integral approach, the high-interest rate stipulates high profitability in the business of the banking sector but tells negatively on the financial position of the population. The enlarging of benefit crediting on account of the budgetary means makes housing more accessible but leads to the additional load on the finances of the state. In this research, we provide an integral indicator for evaluating the efficiency degree of the state policy regarding mortgage lending, taking into account the budgetary, commercial and social-economic efficiency of the mortgage lending system.

The theoretical and historic grounds of the mortgage lending organization, the analysis of the global practice, first of all, in the developed countries, as well as the study of mortgage lending development problems in Russia are reflected in the works of Ambrose, Benjamin and Chinloy (2003), Becker, Osborn and Yildirim (2012), Booth and Walsh (2001), Chen, Chen and Chou (2010), Cushman (2012), Courchane, Darolia and Zom (2014), Crawford and Rosenblatt (1999), Diaz-Serrano and Raya (2014), Gary-Bobo and Larribeau (2014), Goremykin (2014), Mintz (2012), Nesiba (2003), Stolbov (2012), Torluccio and Dorakh (2011). In spite of a number of works of the above-mentioned authors, a significant number of materials in the problems of mortgage lending development, the specialists in this field are of no accord in the line of the most perspective trends in improving the mortgage lending system of Russia.

Therefore, being of a high opinion of the results, arrived at in the papers of the mentioned authors, we deem it necessary to note that there are a number of aspects, requiring keen analysis, introducing corrections and additions.

The progressive integration of the Russian economy into the world economic system requires incorporation of the national mortgage market into the international financial system. Participation in the international mortgage mechanisms leads to an intensification of cross-country capital movement, consolidation of the countries' financial spheres and approximation of international finance to the needs of the real economy, which will provide the basis for the stable development of the world economy.

In Russia, the mortgage lending institutions assume greater importance due to the systemic crisis recovery under the economic sanctions imposed in 2014. Development of the mortgage lending will allow diversifying business portfolios of national and international banks, insurance and investment companies. This is also necessary to improve the investment climate, to improve the standards and quality of living. The Russian mortgage market is at a critical juncture of its development, given its institutional deficiencies, infrastructural and administrative constraints imposed on its development.

The *Aim of the paper* is the investigation of one of the trends in improving the system of mortgage lending in the country, of the mortgage lending system efficiency complex estimation in the country, taking into account the interests of all the participants: of the population, state, financial-credit institutions, having at their disposal temporary free money units, and offering them for temporary use.

The *tasks* are: to investigate the topical problems of mortgage lending system functioning; to put forward the complex indicator to estimate the efficiency of mortgage lending system functioning; to examine the relevance of the worked out complex indicator practical application as well as of the presented algorithm, its defining in the estimation of mortgage lending system functioning efficiency; to realize economic-mathematical modelling of quantitative prospects in the national mortgage lending system development.

Materials and methods

In the present work, the key category is “the credit relations model”, because the organization of mortgage lending in different countries is characterized by special features, due to the various levels of their social-economic development, the specifics of financial-credit system functioning, historical and modern norms of legislation, regulating relations in the sphere of real estate pawn. Cross-country comparisons revealed a strong empirical relationship between levels of effectiveness of legal systems, comprehensive accounting and auditing standards, and credit registries, on the one hand, and the stability of financial systems, on the other hand (Badev et al., 2014, p.6). We can implement this rational approach to the classification of mortgage lending models in the developed and developing countries:

- the balanced autonomous model (contract-saving) of mortgage lending, based on allowance-saving functioning principle after the type of German “constructing savings-banks” (co-operatives);
- the reduced (traditional, one-tier or one-level, cut-open), a simplified model of mortgage lending, based on the primary transfer of pawns, presupposing the acceptance of securities on the provided credits by the clients of the financial-credit organization, and the next use of them as a provision for the part of attracted outer resources. This model of mortgage lending developed in Great Britain, France, Denmark, Spain, Israel and a number of other countries in Europe, Australia, South America, and also in such developing countries as Bulgaria, Poland, Hungary;
- the expanded open model (spread-open, two-tier, secondary mortgage market model), based on the secondary transfer of pawns, presupposing re-financing of financial-credit organizations with the help of securities market, specially organized for

this purpose – the securities, provided with pledges on the objects of real estate. A credit size depends on the client's income and credit history (Bricker et al., 2017). The present model of mortgage lending got development in the USA. It is noteworthy that the spread-open model of mortgage lending acts as a priority in Russia. Let us explain this further.

The *balanced autonomous model* is a "closed" financial structure, starting with the formation of an authorized capital – the source of financing to provide credit. Moreover, all the funds of the "construction bank", both equity and debt, are used only to fulfill its statutory activities, i.e. these funds are spent on real estate construction and granting housing loans. The balanced autonomous (contract-saving) model of mortgage lending is most successfully practiced in Germany and involves the following stages: within 2-10 years prior to the purchase of the real estate object, the creditor begins to make targeted savings in the "construction banks" or other specialized financial and credit institutions; once the amount reaches 45.0% of the property value, the buyer receives a state subsidy at a rate of 10.0% of the property value, along with a subsidized loan for 10-15 years to cover the remaining cost (Carragher & Webster, 2011).

The use of balanced autonomous model (contract-saving) of mortgage lending in real estate construction in Germany is determined by the dominance of its advantages: being closed, it is not directly affected by changes in the financial market; the borrower does not have to confirm his income, since his solvency is checked at the stage of saving; the interest rate on the mortgage is much lower than the average; the model ensures availability of loans for borrowers with different income levels and high efficiency of construction or acquisition of the real estate objects at low cost. The shortcomings are: the borrower has the right to purchase a real estate object only after the end of the saving period; this model helps to limit the volume of financial resources flow to the real estate sector due to restricting access of investors' resources to the mortgage market. There were several attempts to introduce cooperatives in Russia and recently there have been renewed attempts, but this practice remains underdeveloped (Mazure, 2012).

In Russia, the implementation of the surveyed mortgage-lending model is currently unreasonable because: it restricts the amount of mobilized resources only by the volumes of savings of investors interested in obtaining loans for purchase or construction of real estate, and does not cover savings and free financial resources of other economic entities; high inflation and a constant probability of an increase of its acceleration and increase in interest rates on competing savings programs and, accordingly, the need for higher government subsidies as the only way to preserve the attractiveness of contractual savings.

At present, the product line of some commercial banks operating in Russia offers special savings deposits or "mortgage deposits", which allow customers to collect a certain amount of savings within a few years, and then use it to pay part of the property cost and obtain a mortgage credit on better terms.

The relative simplicity determines the popularity of *reduced (cut-open) model*: in the Anglo-Saxon mortgage system, individuals may not notarize the act. At the same time, the subject of a pledge is not clearly defined (Blackwell & Kohl, 2017). Among the shortcomings are: interest rates on mortgage loans depend on the state of the national financial market, which affects the decline in lending activity during periods of crisis; no strict standards for mortgage lending – duration, cost; limited availability of credit

resources. Despite the fact that the reduced model (traditional, one-tier, cut-open) model of mortgage lending is a prototype of the market model for organizing credit relations, it is not acceptable in Russia.

In the *expanded open model*, mortgage lending with households acting as the borrower plays the key role. In the housing sector of Russia, private ownership of households in residential buildings is prevailing, and the cost of their houses significantly exceeds the annual income of their owners. Accordingly, obtaining a home loan in financial and credit institutions for purchase or construction of housing is almost the only means of financing, while mortgage lending is the most reliable loan method for economic entities. In the US, this model provided a huge growth in the real estate sector (Leathers, Raines & Richardson-Bono, 2015). It might be of interest to Russia since it involves self-sufficiency and self-financing; the model is rather stable due to the fact that most of the securities ensuring the inflow of credit resources have previously declared profitability and repayment period; it implies openness and focuses on obtaining financial resources from the capital market by independent investors.

Results and discussion: Methods of the mortgage lending system functioning efficiency

Complex estimation should be an integral indicator, which includes the data, taking into consideration different aspects of mortgage lending system efficiency – budgetary, commercial and social-economic. In this paper, we used statistic materials of the Central Bank of Russia (CBR), Rosstat, the data in official reports of the Housing and Mortgage Lending Agency (AHML).

The efficiency of the analyzed credit form is determined by social-economic, budgetary and commercial efficiency of mortgage lending. The subjects, acting as the pawnbrokers, creditors, and regulators of credit relations are the population (households), the state and the private sector. All these subjects pursue different aims: the population – improvement of housing conditions, the private sector – acquiring benefits, the state – enhancing the efficiency of the country's economy, overall, and improving the well-being of the population, in particular.

Our methods of the mortgage lending system efficiency estimation systematize the criteria and indicators for the estimation efficiency from different angles:

- it is supposed to carry on the estimation under the criteria and statistic indicators, considering social-economic, budgetary and commercial efficiency of the mortgage lending system, that ensures regarding the interests of all the parties concerned – the population, the representatives of mortgage community and the state;
- it is recommended to take into consideration the integral coefficient in the developed algorithm, that enables to compare the mortgage lending system management efficiency in dynamics and to estimate the condition of analogous systems in other countries (regions within the country).

The complex estimation of the mortgage lending system functioning efficiency presupposes several stages: constructing the rating system of the mortgage lending system functioning efficiency, based on the statistic indicators; carrying out the estimation of statistic indicators influence trends in the system of mortgage lending; developing an integral indicator of the mortgage lending system functioning efficiency in the country.

The set of the mortgage lending system functioning efficiency estimation criteria and the corresponding statistic indicators are represented in Table 1.

Table 1. The set of indicators, characterizing the mortgage lending system functioning efficiency (Composed on the base of the expert estimations method by Courchane, Darolia & Zom, 2014; Diaz-Serrano, 2015)

Criteria of estimation	Name of the indicator
social-economic efficiency	<ul style="list-style-type: none"> – the ratio of the amount of paid and issued mortgage credits – the level of the interest rate in mortgage lending – the level of the average terms in mortgage lending
budgetary efficiency	<ul style="list-style-type: none"> – the number of credit organizations – participants in the mortgage lending market – the number of credit organizations – participants in the secondary mortgage lending market – the number of overdue payments in mortgage credits
commercial efficiency	<ul style="list-style-type: none"> – the number of issued mortgage credits – the number of mortgage credits re-financing

The indicators, reflected in Table 1 and participating in the determining of the mortgage lending system functioning efficiency, are not always the same in value, and their mere sum may lead to an error in estimation of the integral indicator. This circumstance is explained by the following reasons:

- first, it is a generally accepted and necessary requirement for the calculation of any integral indicator to compare all the indicators of estimation, from the point of view of the universal system of measuring;
- second, the high figure of the integral indicator can be got through high figures of the less important statistical indicators, while the more important ones will have rather insignificant figures.

In this respect, there arises the necessity to apply weight figures to the indicators, participating in the mortgage lending system functioning efficiency determination. It is noteworthy, that the determination of weights in statistical figures through purely mathematical methods is impossible. That is why, in order to solve the arising problem, the most important of heuristic methods of investigation – the expert estimations method – was used. The received results testify to the fact, that the most important characteristics of the mortgage lending system functioning process efficiency are „social-economic results” (20 points), and the least one – is „commercial results” (12 points). The specialists in the banking business, on the whole, and in mortgage lending, in particular (Mintz, 2012), stick to the same position, regarding the mortgage lending system development as aimed in providing accessible housing for the Russian citizens – the system, basing on market principles, free from monopolism.

The next stage is the figuring of weights of each criterion, characterizing the efficiency of the mortgage lending system functioning efficiency by means of dividing the total estimation of the expert groups' members in each criterion by the total sum of estimations. The results of ranging the values of the mortgage lending system functioning efficiency criteria, based on the set of statistical indicators, in combination with the opinions of experts together with the calculations of the indicators weights are cited in Table 2.

Table 2. The final rating and weight of criteria in mortgage lending system functioning efficiency estimation (Composed by the authors on the basis of the data from AHML 2014, 2015, 2016; Rosstat 2014, 2017; CBR, 2018)

The criterion of the mortgage lending system efficiency evaluation	The final rating	The indicator weight
The criterion of social-economic efficiency	20	0,42
The criterion of budgetary efficiency	16	0,33
The criterion of commercial efficiency	12	0,25
Total	48	1

Thus, with the method of expert estimations, let us determine the weight figures of the statistical indicators inside the groups of the mortgage lending system functioning efficiency estimation criteria, where more than one indicator is calculated. Because the number of estimated positions is insignificant, a five-point scale was applied. The results of value ranging and calculating the weights for the criteria of social-economic, budgetary and commercial efficiency are reflected in Table 3.

Table 3. Ranging the values and calculating the indicators' weights for the criteria of social-economic, budgetary and commercial efficiency in the mortgage lending system (Composed by the authors on the basis of the expert estimations method by Courchane, Darolia & Zom, 2014; Diaz-Serrano, 2015)

The criterion of the mortgage lending system efficiency evaluation	The final rating	The indicator weight
The criterion of social-economic efficiency	20	0,42
The criterion of budgetary efficiency	16	0,33
The criterion of commercial efficiency	12	0,25
Total	48	1

The next stage in carrying out the complex estimation of the mortgage lending system functioning efficiency is determining the influence trend of each statistical indicator on the total indicator. This estimation was held, considering the leading Russian economists' positions Goremykin (2014) and Cochman (2012) put forward by them in their works, while analyzing this or that indicator. The opinions of experts are also taken into consideration – of those of the staff and the clients of the branches, additional offices of the Public Auctioneering Companies: Sberbank, Vneshtorgbank-24 (VTB-24), Rosselkhozbank, Gazprombank, situated on the territory of Magnitogorsk. The results of each statistical indicator's calculating trend in proportion with the total indicator during 2012-2016 are represented in Table 4.

Table 4. The estimation of statistical indicators' influence on the total indicator of the mortgage lending system functioning efficiency (Courchane, Darolia & Zom, 2014; Diaz-Serrano, 2015)

The indicators, enhancing the figure of the total indicator	Indicators, deteriorating the figure of the total indicator
$\Pi_{1.1}$ – the ratio of the amount of paid and issued mortgage credits	$\Pi_{1.2}$ – the level of the interest rates in mortgage credits
$\Pi_{2.2}$ – the number of credit organizations-participants of the secondary market in	$\Pi_{1.3}$ – the level of the average terms in mortgage credits
$\Pi_{3.1}$ – the number of issued mortgage credits	$\Pi_{2.1}$ – the number of credit organizations-participants in the primary market of mortgage lending
$\Pi_{3.2}$ – the amount of re-financing mortgage credits	$\Pi_{2.3}$ – the amount of arrears on mortgage credits

The carried out research testifies to the fact that statistical indicators have the contradicting influence on the state of the mortgage lending system. This fact should be taken into consideration in calculating the total indicator. The order of calculating the complex indicator of the mortgage lending system functioning efficiency estimation through the use of the statistical indicators integrity can be represented in the form of the following formula (1):

$$\Pi = \sum_{i=1}^n (P_i \times \sum_{j=1}^{\Pi_i} Q_{ij} \Pi_{ij}), \quad (1)$$

where P_i is the weight of the point in the i^{th} group of statistical indicators, or the value of statistical indicators separate group in the total estimation, $\sum P_i = 1$;

Q_{ij} – the weight of the point in the j^{th} statistical indicator in the i^{th} group, or the value of the separate indicator in the corresponding group, $\sum |Q_{ij}| = 1$. In case, if the increase of the j^{th} indicator tells positively on the quality of the mortgage lending system, then $Q_{ij} > 0$; in another case - $Q_{ij} < 0$;

Π_{ij} – the j^{th} statistical indicator, included in the i^{th} group, or its deviation from the optimal measure, in case, it does not fall under the range of optimal meanings;

– n – the number of indicators' groups (in our case $n = 3$);

– Π_i – the number of statistical indicators in the i^{th} group (in our case $\sum \Pi_i = 8$).

The results of calculating the complex indicator, represented in Table 5, enable us to speak about the enhancing of financial-economic and organization-legal relations organization efficiency. These relations are formed in the process of the mortgage lending system functioning under the Russian conditions from 0,97 in 2012 to 1,34 in 2016 (Table 5).

Table 5. The dynamics of the mortgage lending system efficiency integral indicator in the Russian Federation (Composed by the authors on the basis of the data from AHML 2014, 2015, 2016; Rosstat 2014, 2017; CBR, 2018)

Year	2012	2013	2014	2015	2016
The Figure of the Integral Indicator	0,97	0,98	0,95	1,17	1,34

So, the special complex indicator, proposed in the framework of the present article, ensures spatial-temporal compatibility of the criteria and indicators in the state of the primary and the secondary markets of mortgage lending, forming the universal and accessible information base in the dynamics of system development, as well as of its elements, exposing priority trends in regulation of the country-specific kind of crediting through the analysis and indicator diagnostics.

Today, residential construction in Russia is dependent on mortgage lending, which rates are high in comparison with Western countries. To adapt different mortgage models used in foreign countries to the Russian conditions, it is necessary to implement the following provisions in domestic legislation: implementation and realization of mortgage mechanisms with State participation; introduction and implementation of leasing schemes to purchase housing; development of the federal and regional programs to prevent risks in the housing market; interaction of the Bank of Russia and commercial banks to provide housing for the population.

Today it is objectively necessary to develop savings and loan programs institutionalized through construction banks. However, challenges remain such as standardization of mortgage lending procedures, its maintenance, and refinancing, reduction of transaction risks and costs, the enhanced development effectiveness of mortgage markets.

Conclusions

The examination of the financial-economic and organization-legal relations on the whole, arising in the framework of the Russian mortgage lending market exposed the insufficient working out of the issue under consideration – the lack of the unified approach to the study on the base of statistic indicators and the total indicator of efficiency in the country's mortgage lending system functioning.

The analysis of three key models, characteristic of the foreign practice in mortgage lending, their compatibility with the national priorities enable us to point out the initial positions of any order forming the system of credit relations in question in the country, namely: guarding the creditor's and the debtor's interests in the mortgage lending relations; providing conditions of mortgage credits accessibility to the common citizens and, in the credit sphere – the priority for organizations, specializing in mortgage lending; activation of the state part in mortgage lending relations.

In the framework of the present paper we issue the algorithm, which *in contrast to the already presented* in the literature methods aids, systematizes the criteria and indicators of the mortgage lending system functioning efficacy of the estimation, grounding on the following stages: constructing the rating system, estimating the criteria of the mortgage lending functional efficiency, regarding the total of statistical indicators: carrying out the estimation of influential trends of statistical indicators in the state of the mortgage

lending system; working out the integral indicator of the country's mortgage lending system functioning efficiency.

The results enable us to speak about the significant efficiency enhancing of the financial-economic and organization-legal relations, forming in the process of the Russian mortgage lending system, from 0,97 in 2012 to 1,34 in 2016. The practical application of the developed complex indicator provides the possibility of economic-mathematical modeling in quantitative prospects of the national mortgage lending system and is a need for the state, but also provides banks instruments for making forecasts and improving the efficiency of their business. The implementation of a proposed algorithm for mortgage lending system efficiency assessment can strengthen Russia's positions in the global financial market and reduce social tension caused by low level of housing affordability for the simple citizen who borrows money from banks.

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