

# The Optimization of the Mechanism of State Regulation of the Local Housing Market of the Subject of Russian Federation Under Budget Constraints

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**Abstract.** The article presents a methodological approach to improving the mechanism of state regulation of the local housing market based on optimizing the allocation of budgetary resources in accordance with the effectiveness of the tools. To obtain the optimal distribution structure of budgetary funds in accordance with the conditions of effective distribution, determined in accordance with the state of the local housing market, a simplex method is used. The results of approbation this method are given on the example of the subject of Russian Federation with budgetary restrictions - the Republic Buryatia.

## 1. Introduction

In modern conditions of social orientation of the market economy, the increasing role of the state in the functioning of market processes acquires special significance. Given the special economic role of housing - housing is one of the basic human needs, the organizing basis of life and consumption - the need for state regulation of the housing market is indisputable.

It should be noted the high regional differentiation of efficiency indicators for solving the housing problem, the objective factors of high differentiation of the socio-economic development of the constituent entities of the Russian Federation make it difficult to implement measures of state housing programs (Sierra, 2017; Vlasov, 2018). Efficiency is influenced not only by the level of strategic justification of the policy, but also by the limited budgetary resources that territorial authorities can direct to the development of the housing market of the territories (Khominich et al., 2008).

Improving the mechanism of state regulation of the local housing market in conditions of limited budgetary resources, in our opinion, is possible by optimizing the structure of the mechanism by selecting the optimal combination of tools that can ensure the maximum effect from implementation (Detels et al., 2009; Leksin, 2012).

## 2. Relevance of the topic

The modern strategy of socio-economic development of Russia defines as one of the priorities the provision of affordable housing for the population. The real situation in the housing sector is characterized by insufficient housing provision and low solvent demand of the population in the housing market. Given the special role of housing in the reproduction of the population and wealth, as

well as the multiplier effect on the territory, the development of the housing market has a significant impact on the efficiency and sustainability of the economy.

Despite the measures taken, the problem of providing the population with affordable and comfortable housing remains one of the most acute. The housing supply of the population of Russia continues to be insufficient, the area of housing per inhabitant at the end of 2017 is 25.2 m<sup>2</sup> / person, which is significantly lower than the UN-defined standard of 30 m<sup>2</sup> / person. It should also be noted the high regional differentiation of housing provision: the gap between the maximum and minimum values of this indicator for the constituent entities of the Russian Federation is 2.3 times.

The effectiveness of solving the housing problem is influenced not only by the level of strategic justification of the policy, but also by budgetary constraints.

The need to solve the problems of the housing market, identifying factors to increase the affordability of housing, as well as developing principles and main directions for the development of mechanisms for regulating local housing markets under budgetary constraints, made this study relevant.

The problems of state regulation of the residential real estate market are widely developed in the studies of both Russian and foreign authors. The market mechanism for the functioning of the housing sector was studied in the works of J Friedman, N Hordeway, D North, G Mankyu, M I Kamenetsky, A B Kopeikin, N B Kosareva, A N Asaul, V V Buzyrev, G M Sternik, E Yu Faerman, S R Khachatryan, A B Khutoretsky.

The experience of state regulation of housing markets was studied in the works of A Börsch-Supan, D Blanc, A-M Watunen, A Laferrère, S K Lum, M Oxley, D E Rappoport, I A Rahman, T M Turner, M Huffner, C Hilber, O Schöni, R K Edelstein.

Despite the wide scope of research on the formation and functioning of the housing market, a number of theoretical and practical issues related to the regulation of local housing markets, assessing its effectiveness and optimization, taking into account the territorial characteristics of housing markets in individual entities, have not been sufficiently developed.

The need to develop mechanisms of state regulation of local housing markets on the basis of new approaches and methods for assessing their effectiveness to justify a system of measures to increase housing affordability under budgetary constraints identified the object and subject of the study, determined the choice of research topic.

### **3. Problem formulation**

As a first step to optimize the structure of the mechanism of state regulation of the local housing market, it is necessary to evaluate the effectiveness of the tools included in it, which is defined as the ratio of the effect produced by the instrument and the resources expended on its implementation.

As an effect from the implementation of the tool, the impact on the criteria is evaluated:

- $K^1$  - provision with the total area of housing (excluding the area of emergency housing),
- $K^2$  - the proportion of families who are available to purchase housing using mortgage lending;
- $K^3$  - the average annual volume of housing input per capita.

The effectiveness of the tools is determined by each criterion, which allows us to assess the direction of the impact:

$$\Theta_i(K^1) = \frac{RES_i(K^1)}{EXP_i}, \tag{1}$$

where  $\Theta_i(K^1)$  is the efficiency of the  $i$ -th instrument by the criterion  $K^1$ ;  
 $RES_i(K^1)$  is the effect of the implementation of the  $i$ -th instrument on the criterion  $K^1$ ;  
 $EXP_i$  is the cost of implementing the  $i$ -th instrument.

$$\Theta_i(K^2) = \frac{RES_i(K^2)}{EXP_i} \tag{2}$$

where  $\Theta_i(K^2)$  is the efficiency of the  $i$ -th instrument by the criterion  $K^2$ ;  
 $RES_i(K^2)$  is the effect of the implementation of the  $i$ -th instrument on the criterion  $K^2$ ;  
 $EXP_i$  is the cost of implementing the  $i$ -th instrument.

$$\vartheta_i(K^3) = \frac{RES_i(K^3)}{EXP_i} \quad (3)$$

where  $\vartheta_i(K^3)$  is the efficiency of the  $i$ -th instrument by the criterion  $K^3$ ;

$RES_i(K^3)$  is the effect of the implementation of the  $i$ -th instrument on the criterion  $K^3$ ;

$EXP_i$  is the cost of implementing the  $i$ -th instrument.

The effect of the implementation of the  $i$ -th instrument, exerted on the criterion  $K^1$ , is defined as the increase in the provision with the total area of housing (excluding the area of emergency housing) as a result of applying the  $i$ -th tool in % to the base value:

$$RES_i(K^1) = \frac{(K_{t i}^1 - K_{t-1 i}^1)}{K_{t-1 i}^1} * 100\% \quad (4)$$

The effect of the implementation of the  $i$ -th instrument, provided for the  $K^2$  criterion, is defined as the increase in the share of families for whom housing purchase is available using mortgage lending as a result of applying the  $i$ -th instrument in % to the base value:

$$RES_i(K^2) = \frac{(K_{t i}^2 - K_{t-1 i}^2)}{K_{t-1 i}^2} * 100\% \quad (5)$$

The effect of the implementation of the  $i$ -th instrument on the  $K^3$  criterion is defined as the increase in the average annual volume of housing input per capita as a result of applying the  $i$ -th instrument in % to the base value:

$$RES_i(K^3) = \frac{(K_{t i}^3 - K_{t-1 i}^3)}{K_{t-1 i}^3} * 100\% \quad (6)$$

Improving the mechanism of state regulation of the local housing market in conditions of limited budgetary resources, in our opinion, should be done by optimizing the structure of the mechanism by selecting the optimal combination of instruments capable of ensuring the maximum effect from the implementation, while the costs of their implementation are unchanged.

Given the state of the local housing market of the republic, the priority of state regulation of the housing market is to maintain a balance of the impact on supply and demand on the housing market. In accordance with this condition, the effective allocation was defined as:

$$\left\{ \begin{array}{l} \vartheta(K^1) \Rightarrow \max \\ \vartheta(K^2) = \vartheta(K^3) \\ C \geq \sum_{i=1}^n Exp_i \\ Exp_i \geq 0 \end{array} \right. \quad (7)$$

where  $C$  is the maximum amount of expenditures of the budget of the Republic Buryatia for the regulation of the housing market. The maximum amount of expenditures of the budget of the Republic Buryatia for 2017 was defined as the actual amount of financing of instruments from the republican budget (38.422 mln. rub.)<sup>1</sup>.

#### 4. Problem solution

The results of the evaluation of the effectiveness of state regulation instruments for the housing market of the Republic of Buryatia based on the proposed methodology are presented in Table 1.

The calculations of the effectiveness of the housing market regulation instruments show that the greatest impact on the housing security of the population (criterion  $K^1$ ) is the provision of concessional loans to developers; to increase the share of families for whom housing purchases are available using mortgage lending (criterion  $K^2$ ) - subsidies from the republican budget for compensation of a part of bank interest to developers and compensation of a part of the interest rate on a mortgage loan; to increase the amount of housing input per capita (criterion  $K^3$ ) - subsidies from the republican budget for compensation of a part of bank interest to developers.

<sup>1</sup> The Law of the Republic Buryatia of 06/07/2018 No. 3136-V "On the execution of the republican budget for 2017" - <http://budget.govrb.ru/ebudget/Show/Content/218>

**Table 1.** Indicators for assessing the effectiveness of state instruments for regulating the housing market of the Republic Buryatia and the actual distribution of funds from the republican budget in 2017.

№	State instruments for regulating the housing market of the Republic Buryatia	The efficiency of the instrument by the criterion		
		$K^1$	$K^2$	$K^3$
1	<i>Granting preferential loans to developers</i>	0.161	0.004	0.045
2	<i>Grants from the republican budget to reimburse part of the costs associated with paying bank interest to developers</i>	0.12	0.259	2.679
3	<i>Providing guarantees of the Guarantee Fund of the Republic Buryatia on loans provided by Russian credit institutions</i>	0.002	0.002	0.016
4	<i>Subsidies from the republican budget to local budgets of municipalities for the integrated development and development of territories for the construction of economy-class housing</i>	0.009	0.048	0.496
5	<i>Free provision of land owned by the state and municipal property for individual housing construction</i>	0.01	0.046	0.789
6	<i>Subsidies for providing housing to young families</i>	0.001	0.082	0.008
7	<i>Social payments for the provision of young families at birth (adoption) of a child</i>	0.001	0.065	0.006
8	<i>Social payments to provide housing for young specialists</i>	0.00004	0.032	0.003
9	<i>Compensation of a part of the interest rate on a mortgage loan in case of exceeding the annual interest for using the loan 8.5 percent</i>	0.002	0.156	0.015
10	<i>Compensation of part of the cost of paying the down payment on mortgage housing loans to participants in the construction of youth housing cooperatives</i>	0.0008	0.063	0.006

Improving the mechanism of state regulation of the local housing market in conditions of limited budgetary resources, in our opinion, should be done by optimizing the structure of the mechanism by selecting the optimal combination of tools capable of ensuring the maximum effect from the implementation, while the costs of their implementation are unchanged. Using data on the distribution of funds of the republican budget for 2017 and the results of calculating the effectiveness of tools, the values of the total efficiency of tools  $\mathcal{A}_i(K^1)$ ,  $\mathcal{A}_i(K^2)$ ,  $\mathcal{A}_i(K^3)$  were determined, which indicate the imbalance of the mechanism structure state regulation of the local housing market of the republic. The support measures implemented exerted the greatest influence on the  $K^2$  indicator, which characterizes the value of effective demand for housing, the  $K^3$  indicator on instruments, the supply indicator on the primary housing market, was significantly less.

To obtain the optimal distribution structure of budget funds in accordance with conditions (7), a simplex method was used.

The optimal structure of budget expenditures, aimed at regulation of the housing market of the Republic Buryatia (Table 2) was determined by solving this problem.

**Table 2.** The actual and optimal structure of budget expenditures of the Republic Buryatia, aimed at regulating the housing market in 2017.

<b>№</b>	<b>State instruments for regulating the housing market of the Republic Buryatia</b>	<b>Actual structure, mln.rub.</b>	<b>Optimal structure, mln.rub.</b>
1	<i>Granting preferential loans to developers</i>	0	2.130
2	<i>Grants from the republican budget to reimburse part of the costs associated with paying bank interest to developers</i>	0	0.705
3	<i>Providing guarantees of the Guarantee Fund of the Republic Buryatia on loans provided by Russian credit institutions</i>	0	0
4	<i>Subsidies from the republican budget to local budgets of municipalities for the integrated development and development of territories for the construction of economy-class housing</i>	0	0
5	<i>Free provision of land owned by the state and municipal property for individual housing construction</i>	2.1	2.1
6	<i>Subsidies for providing housing to young families</i>	20.563	20.563
7	<i>Social payments for the provision of young families at birth (adoption) of a child</i>	6.9	0
8	<i>Social payments to provide housing for young specialists</i>	6.254	0
9	<i>Compensation of a part of the interest rate on a mortgage loan in case of exceeding the annual interest for using the loan 8.5 percent</i>	2.605	12.924
10	<i>Compensation of part of the cost of paying the down payment on mortgage housing loans to participants in the construction of youth housing cooperatives</i>	0	0

It is proposed to use the provision of concessional loans to developers and the free provision of state-owned and state-owned land plots for individual housing construction as priority tools to support housing supply. The main measures to support effective demand for housing should be subsidies to provide housing for young families and to compensate part of the interest rate on a mortgage loan.

**Table 3.** The effect of optimizing the structure of budget expenditures of the Republic Buryatia on the regulation of the housing market (2017).

<b>The total effectiveness of the mechanism of state regulation to the criteria</b>	<b>Actual structure</b>	<b>Optimal structure</b>
$K^1, \%$	0.05	0.5
$K^2, \%$	2.84	4
$K^3, \%$	1.92	4

The redistribution of budget financing of instruments for regulating the housing market of the Republic of Buryatia in 2017 would increase the level of housing provision by 0.5%, the share of the population for which housing purchases using mortgage lending are available, and the amount of housing input per capita by 4% (Table 3). In addition, with this structure of instruments, the impact on supply and demand on the housing market is more balanced.

## 5. Conclusion

The proposed method of optimizing the structure of the mechanism of state regulation of the local housing market, taking into account the effectiveness of the tools and the state of the market, makes it

possible to determine the directions for improving the territory's housing policy in the context of limited budgetary resources.

The approbation of the developed methodological approach to the example of the Republic of Buryatia testifies to the effectiveness of optimizing the mechanism of state regulation of the housing market and the possibility of applying the proposed approach by state authorities in managing local housing markets.

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