Financial stimulation as factor of competitiveness rise of residential developers

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Abstract. The paper deals with the analysis of scientific works about resettlement from dilapidated housing in Voronezh. Authors offered the system of financial stimulation for construction projects, which are based on government-private partnership. The financial stimulation is based on different mechanisms and its purpose is to rise influence on financial interests of participants investment-construction projects. This is solution to the problem of dilapidated housing and developer’s competitiveness rise. The solution has two instruments: first is tax stimulation and the second is rise of program efficiency by using financial resources. Preliminary evaluation has shown that algorithm of design and introduction allows achieving the following results: decrease tax load, decrease investor’s need in finance, and transparency rise and quality of finance control rise. The risk exists because non-purpose usage of developer’s income at the best case in any period leads to losing the opportunity of finalizing construction object, or in the worst case – bankruptcy. Project financing with current mechanism helps to decrease expenditures and to rise competitiveness of residential developers.

Key words: construction, contract of equity participation, escrow-account, accidental house, financial stimulation, value added tax, profit tax, profitability.

1 Introduction

There is pessimistic prognosis of Russian Federation construction branch’s progress. Construction market achieved its limit - supply overhead demand and the stagnation began. While citizens’ revenues are falling down, the demand on residential estate is falling down too. The demand on residential houses in Russia could be stimulated by two ways: the first is to rise citizens’ revenue, the second is to decrease percent rate of credits. This reinforces the role of government in subsidizing or lowering house prices. Due to the increase of price for transportation and building materials, VAT, tax, price for square meter increased too. Citizens’ paying capacity has fallen down. This time in Russia the main tool to purchase a hosing is mortgage. Living space of new apartments in modern projects decreased by 12% (according to Rosstat 2018). For a citizen, who is going to buy apartment, it is more profitable to invest his own money on equity participation than pay more for some square meters for ready-to-use houses on 30-40%. This investment carries risk. This risk exists because non-purpose usage of developer’s income in the best case at any period leads to losing the opportunity of finalizing construction object, or in the worst case - bankruptcy. Citizens could lose money and house. For the developer the main source for money’s attraction are bank credits, government, population and in less degree its own money. The studies presented in the article are based on the provisions of foreign authors, for example, Fan Marta Gross, Ryszard Żróbek [7] on systems management, Han Jiang, Sarah Payne and Liyin Shen, Zhenyu Zhang, Xiaoling Zhang on green building [19, 23], Linda Kauškale,
Ineta Geipele, Qingshan Chen, Shah Muhammad Kamran, Hongzhong [21, 22, 24]. The works of Russian authors, including those of Voronezh [1-4, 9, 24-28], are devoted to this topic.

2 Materials and methods
From January 2017 in Russian Federal Law № 214 “About participation in equity participation construction of residential houses and other real estate properties and about changes in some law acts of Russia” the following changes were made: the creation the escrow accounts. This change in Federal Law gave citizens the opportunity for protection their investments in the equity participation partnership and obligates each developer to perform his duties for equity owner on contract of equity participation in construction. From 1 July 2018 by conclusion each new contract developer can choose one of two ways of financing – send money to compensation fond or allow equity owner to make count through escrow account. From the 1 of July 2019 all payments between stakeholders and developers on new construction projects should be obligatory made through escrow account [15-18].

Escrow-account in the equity participation partnership is a special account, which is opened in the bank. The frozen money of equity owners is located on this account during the period of house construction. After finishing the construction, the money is transferred to the developer only after performing his obligations for equity owner. At concluding the contract of equity participation, the equity owner has to transmit the money to the bank on escrow-account, but not to the developer. Only after setting into operation the facility, the developer get access to money on a bank account. If the developer had not executed his obligations of equity participation contract, the bank could take back the money from the account to equity owner. The question is – what money should a developer use to build the house? A bank, holder of escrow-account as usual credit, provide money to the developer. According to old Russian Federal Law, money of equity owners was in turnover for free and without interests. Because the developers should make payments in equity participation contracts through escrow-account, the cost of contract operation rises total cost of construction [19, 20].

In connection with increased strictness of the equity participation contracts Law, many construction companies became bankrupt, because they couldn’t use citizens’ investments. Rise of construction didn’t take place and the number of houses set into operation decreased. The profit rate in construction branch in 2017 is 7.2% on average. This case doesn’t allow developers to decrease prices still further. Compared to other countries, the annual pre-tax salary available for buying new standard-size apartments is much less diverse than in Russia. Availability of housing in Russia is yet strong in developed cities. In the largest Russian cities people account for 1.5-2 times fewer square meters than in foreign capitals. This indicator of high necessity in housing is confirmed by the data of social survey: 40% of families note the need to improve housing conditions – an increase in the area of apartments. To achieve the rate of housing availability of foreign countries (40 m\(^2\) per person), more 2.2 mrд. m\(^2\) is needed [21, 23].

According to the changed Law #214 “About participation in equity participation residential houses and other real estate objects and about changes in some laws” each developer must open the escrow-account in the bank for each built house. First, the developer receives a construction allowance. Secondly, the developer must invest his own money to finance at least 10% of the total costs of the current construction project and has the right to receive a loan from the bank. He must have experience of more than 5 years. Equity owners, when signing the contract, invest money to the bank in the escrow-account, where it will be frozen until the house goes into operation and registration of the first equity owner. Thus, equity participation is forwarded under bank system control and it is naturally part of construction business revenue’s, banks get triple profit from this case:

1) the bank grants a mortgage loan to individuals;
2) individuals give this money to the bank without interest on escrow-account;
3) the bank gives this money to construction companies at interest.

Our proposal (figure 1) also considers the remaining legal norms of construction before changes in law of equity participation:

1) to restrict sales equity participation with volume of executed works by project, this means that volume of finished work of the facility is 10% of total costs contract equity participation should not exceed 10% of sales;
2) control of executing works, number of owners, architectural control done before don’t have a right for direct sales;
3) adoption of legal acts to transfer some functions to architectural control.

One of the main areas of activity of the Voronezh city administration is the relocation of citizens from dilapidated housing to new housing. Long time financial lack on house repair in city is followed by high erosion of housing fond and rise of number of accidents. This time in Voronezh, there are 65 residential buildings established as dilapidated housing, houses that are recognized as unacceptable for permanent residence. In the period 2013-2017, within the framework of the current program for financial support of the federal regional budget (figure 2), a decision was made on the resettlement of families and the demolition of accidental houses. The amount of funding for the program is 2 million rubles. Of this amount, 186 million rubles were sent for the implementation of measures for the relocation of citizens [22].

**Figure 1.** Schedule of spending money on the construction of the facility.

**Figure 2.** Expenditures of resettlement from accidental housing in Voronezh city.
After the completion of the Russian Federal program for the resettlement of citizens from emergency buildings in September 2017, the administration of the Voronezh region decided to continue improving the living conditions of citizens in accordance with the capabilities of the regional and municipal budgets. In 2018, 453 million rubles were allocated to the Voronezh region. Private investment should be used to resolve this issue. Every time we build in new territories, this means creating an urban comfortable environment. Due to the strict limited price per square meter of an economy-class house, an increase in infrastructure costs should not adversely affect the quality of construction. There is only one solution: to attract long-term investments. Government-private partnership (hereinafter GPP) allows attracting this method of investment and providing all the necessary guarantees. Profit for the government consists in attracting private investment, reducing budget expenditures. For business, it is clear that the advantages are the possibility of implementing long-term projects with government guarantees of profitability, minimal pressure from the government and the formation of a good image, increasing the competitiveness of construction companies [23].

Construction projects with mortgage schemes are a new area where the GPP plays an important role. Partnership members are provided with additional profits to make the house more acceptable for citizens. For this, the supply of economy-class houses and social houses will increase initially. Real estate development companies usually compete in the land phase of construction. At the second stage, the purchasing power of middle-class citizens is stimulated by a mortgage with an affordable interest. On the part of the government, it not only develops infrastructure, but also accelerates construction, counting on the removal of documentary obstacles that also attract private capital. The degree of involvement of the government and private business depends on the selected GPP model. There are following variants of scenarios:
- the government and the company draw up a contract that spells out the activities of each party;
- government or municipal property is temporary rented by private partner;
- partners conclude a concession agreement where the government is the owner of the object which provides the private company with certain rights so that the object can function normally;
- open a concession agreement in which the government and business draw up an agreement on the diversification of products;
- creation of a joint company with continuous direct participation [24].

Municipal-private partnership is of particular interest at the GPP. Participants in this partnership are not just contractors and companies - operators that, upon completion of construction, take over the management of socially significant facilities (children's yards, elderly people's home) for several more years. These same companies are just beginning to appear in our market and show great promise. It is possible that in the process of establishing partnerships between the government and business in the field of housing, a number of problems will arise. According to the expert society, they can lead to the following points:
- when developing legislative norms, it is necessary to cooperate with the business community to a greater extent. The interests of the business at the GPP are currently insufficiently protected;
- the procedure for selecting private partners for GPP projects should be more transparent with the established criteria for the selection of participants;
- it is necessary to interest the private partner of the GPP to implement a large degree of cooperation between members of the business community.
- it is necessary to develop the information base for the GPP projects and, to a greater extent, cover the news.

To make a successful GPP project, it is necessary to have as few negative conclusions as possible taking into account the exact risks before evaluating the cost. For the government, this is a dangerous case when a business partner violates the contract. In case of unsolved problems of the project, repairing the damage lies with the taxpayers. For the private part of the partnership, the risk will come if the costs are higher than in the project. There are risks of reducing the service life, etc. The government may refuse to amend the terms of the agreement on the rate of inflation tax in foreign currency, etc. In the end, there is a risk of force majeure.
on both sides: natural, social, war. At the stage of project development, all possible risks should be identified and fully described. If possible, the possible conclusions in money should be evaluated equally. It is necessary to know how much each risk is possible and create protection mechanisms.

These risks have one important advantage of GPP. The government can use power and administrative leverage to prevent potential losses. Problem of residential housing for citizens cannot be solved only by government or only by business. A correct forecast of the whole effect of the project helps to understand the visible achievements in numbers (tables 1-4) for both sides. With the advent of the GPP in the investment complex, a formatted mechanism has appeared that allows creating a sufficient reserve to save money on infrastructure. This savings increase supply for private sector in process of object creation [25].

Financial stimulation is the use of various mechanisms to enhance the impact on the financial interests of participants in investment and construction projects. The authors propose a solution to the problem of dilapidated housing and increasing the competitiveness of the developer. This solution is an approach for combining two instruments: tax stimulation and improving the efficiency of the use of financial resources. The development and implementation algorithm allows achieving the following results: reduce the tax burden on the project, reduce its need for finances from outside investors and increase transparency and quality of financial control (financial efficiency). The following taxes are used in this project model: value added tax and profit tax. In this model, the period of the most possible value added tax (hereinafter VAT) is 6 months. The following calculation of VAT for each time takes the Eq. (1):

$$
S_{HI[Cax]}(t) = (d(t) - d_{возм}) * (S_{HI[Cax]}(t) - S_{HI[Cax]}(t-1)),
$$

where $S_{HI[Cax]}(t)$ – amount of VAT to return in period t;

$d(t)$ – time period of project’s cash flow in months (12 months);

$d_{возм}$ – time period of delay VAT to return in months (12 months);

$S_{HI[Cax]}(t)$ – amount of VAT output for period t;

$S_{HI[Cax]}$ – accumulated VAT input.

3 Results

The final stage of this article consists of practical and theoretical recommendations for improving financial efficiency in the construction industry for companies involved in real estate development. The financial and economic analysis was carried out taking into account the impact of future income on the facilities. In this financial and economic analysis, a commercial property shows two options for investing in a project:

- option 1 – only private investments;
- option 2 – government-private partnership.

Option 1: the attracted investments consist of all the construction costs, and subsequent operation of the facility fully attracts a private investor. Option 2: government is co-investor and it brings 35% investment cost, supplies with loyal rent price (0,6 square ha) and prepares engineer infrastructure [26-28].

| Parameter | 1  | 2   | 3   | 4   | 5   |
|-----------|----|-----|-----|-----|-----|
| Private investments |    |     |     |     |     |
| Investment costs      | 44,70 | 89,39 | 89,39 | -  | 223,48 |
| VAT in construction capital costs | -8,94 | -17,88 | -17,88 | -  | -44,70 |
| Return VAT           | -4,47 | -13,41 | -13,41 | -13,41 | -44,70 |
| Increased tax        | -4,47 | -4,47 | -4,47 | 13,41 | 0   |
| Costs with VAT with financial stimulation mechanism | 49,17 | 102,80 | 102,80 | 13,41 | 268,18 |
| Costs with VAT without financial stimulation mechanism | 53,64 | 107,27 | 107,27 | -  | 268,18 |
| Government-private partnership (GPP) |
|-------------------------------------|
| Investment costs                    | 29,05 | 58,11 | 58,11 | - | 145,26 |
| VAT in construction capital costs   | -5,81 | -11,62| -11,62| - | -29,05 |
| Return VAT                          | -2,91 | -8,72 | -8,72 | - | -29,05 |
| Increased tax                       | -2,91 | -2,91 | -2,91 | 8,72 | 0 |
| Costs with VAT with financial stimulation mechanism | 31,96 | 66,82 | 66,82 | 8,72 | 174,32 |
| Costs with VAT without financial stimulation mechanism | 34,86 | 69,73 | 69,73 | - | 174,32 |

| Private investments |
|---------------------|
| Profit before tax   | 80,53 | 107,37| 187,90| 161,05 | 536,84 |
| Tax on profit       | -16,11| -21,47| -37,58| -32,21 | 107,37 |
| Return on tax on profit | -8,05 | -18,79| -21,47| -57,27 | 105,58 |
| Increased tax on profit | -8,05 | -2,68 | -16,11| 25,06 | 0 |
| Profit with tax with mechanism of financial stimulation | 88,58 | 126,16| 209,37| 218,32 | 642,43 |
| Profit with tax without mechanism of financial stimulation | 96,63 | 128,84| 225,47| 193,26 | 644,21 |

| Government-private partnership (GPP) |
|-------------------------------------|
| Profit before tax                    | 64,40 | 85,87 | 150,27| 128,80 | 429,34 |
| Tax on profit                        | -12,88| -17,17| -30,05| -25,76 | -85,87 |
| Return on tax on profit              | -6,44 | -15,03| -17,17| -45,80 | -84,44 |
| Increased tax on profit              | -6,44 | -2,15 | -12,88| 20,04 | 0 |
| Profit with tax with mechanism of financial stimulation | 70,84 | 100,90| 167,45| 174,61 | 513,79 |
| Profit with tax without mechanism of financial stimulation | 77,28 | 103,04| 180,33| 154,57 | 515,22 |

Table 2. Calculation of discount percent rate.

| Private investments | GPP |
|---------------------|-----|
| Rate without risk, %| 7,50%| 7,50%|
| Additive for low liquidity, %| 1,38%| 1,38%|
| Correction on risk of investment to real estate, %| 2,40%| 1,00%|
| Correction on investment management, % | 2,00%| 1,00%|
| Rate of discount  | 13,08%| 10,88%|

Table 3. Calculation of main parameters of investment project efficiency.

| Private investments |
|---------------------|
| Costs with VAT      | -53,64 | -107,27| -107,27 |
| Profit with tax     | 0,00 | 96,63 | 128,84 | 225,47 | 193,26 |
| Cash flow           | -53,64 | -10,64 | 21,57 | 225,47 | 193,26 |
| Discount coefficient | 1,00 | 0,88 | 0,78 | 0,69 | 0,61 |
| Discounted cash flow| -53,64 | -9,41 | 16,87 | 155,93 | 118,20 |
### Table 4. Calculation of main parameters of investment efficiency with use financial stimulation mechanism.

| Private investments |                |                |                |                |                |
|---------------------|----------------|----------------|----------------|----------------|----------------|
| Costs with VAT      | -49,17         | -102,80        | -102,80        | -13,41         |
| Profit with tax     | 0,00           | 88,58          | 126,16         | 209,37         | 218,32         |
| Cash flow           | -49,17         | -14,22         | 23,36          | 195,96         | 218,32         |
| Coefficient of discount | 1,00     | 0,88           | 0,78           | 0,69           | 0,61           |
| Discounted cash flow | -49,17         | -12,58         | 18,27          | 135,52         | 133,52         |
| Accumulated cash flow | -49,17         | -61,74         | -43,48         | 92,04          | 225,57         |
| NPV                 |                |                |                | 225,57         |
| Payback period      |                |                |                | 2,311          |
| IR                  |                |                |                | 1,08           |

| Government-private partnership (GPP) |                |                |                |                |                |
|--------------------------------------|----------------|----------------|----------------|----------------|----------------|
| Costs with VAT                       | -31,96         | -66,82         | -66,82         | -8,72          |
| Profit with tax                      | 70,84          | 100,90         | 167,45         | 174,61         |
| Cash flow                            | -31,96         | 4,02           | 34,08          | 158,73         | 174,61         |
| Discount coefficient                 | 1,00           | 0,902          | 0,813          | 0,734          | 0,662          |
| Discounted cash flow                 | -31,96         | 3,63           | 27,72          | 116,44         | 115,52         |
| Accumulated cash flow                | -31,96         | -28,33         | -0,61          | 115,82         | 231,34         |
| NPV                                 |                |                |                | 231,34         |
| Payback period                      |                |                |                | 2,005          |
| IR                                  |                |                |                | 1,59           |

#### 4 Discussions

According to the simulation results, it is noted that the VAT refund does not reduce the amount of VAT and allows refinancing uniformly all VAT obligations in time. Previous 6 months amount of money influences the current period of work operations. VAT will be included in the budget with delay, with the exception of the last period. If an investor has this analytical model, he can decrease VAT to reduce the governmental involvement. In this case, VAT is allowed for a later period when the government has obligations. Financing projects using the existing mechanism helps to reduce costs and increase the competitiveness of developers.
References
[1] Vasylchicova E V 2019 Analysis of competitable investment-construction complex Russia and Voronezh Region Alleya nauki, T1 (1) 28, pp 528-531.
[2] Trukhina N I, Sergeeva E M 2013 Government-private partnership as efficient mechanism of attraction investments and innovations in civil infrastructure service Nauchny vestnik VGASU. Seria: Econimica y predprinimatelstvo, 11, pp 17-23.
[3] Romanova A I, Romanov D S, Maksimchuk O V, Voronin A V 2018 Basic principles of innovation management in the urban economy of smart-city International Journal of Engineering and Technology (UAE) T. 7, 4, pp 412-415. doi: 10.14419/ijet.v7i4.38.24593
[4] Romanova A I, Illina E V, Dobroserdova E A, Shindina T A, Mironova M D 2015 The movement of capital in the field of information services Journal of Internet Banking and Commerce, T. 20 № S1 10 p. doi: 10.4172/1204-5357.S1-010
[5] Popova O A, Vasilchikova E V, Barinov V N 2018 Instrumenty I mechanizmy effectivnogo vzaimodeystvia kontragentov v proektah gosudarstvenno-chastnogo partnerstva Student i nauka, 3 (6) pp 50-57.
[6] Trukhina N I, Barinov V N, Chernyshyhyna I I 2014 Osnovy economiki nedvigimosti. Text book, Voronezh, 189 p.
[7] Fan Marta Gross, Ryszard Źróbek 2015 Good governance in some public real estate management systems Land Use Policy, Vol. 49 December, pp 352-364. doi: 10.1016/j.landusepol.2015.08.017
[8] Popova O A, Vasilchikova E V, Barinov V N 2018 Realizacija proektov v sfere gosudarstvenno-chastnogo partnerstva v industrialnoi srede Student i nauka 3 (6) pp 42-47.
[9] Kuleshov A M, Barinov V N, Vasilchikova E V, Vasilyov V B 2018 Upravlenie gradostroitelnymy otosheniyami v municipalnyh obrazovaniyah: problemnye voprosy y sposoby sovershenstovania. Voronezh, 182 p.
[10] 2020 International Real Estate Investment and Urban Development: An Analysis of Korean Activities in Hanoi. Vietnam Land Use Policy, Vol. 94 May Article 104486. doi: 10.1016/j.landusepol.2020.104486
[11] Mishchenko V Ya, Meschcherjakova O K, Meschcherjakova M A 2019 Enhancement of residential construction of urban agglomerations based on the modern financial mechanisms Всборнике: IOP Conference Series: Materials Science and Engineering, p 012056. doi: 10.1088/1757-899X/481/1/012056
[12] Kuksova L I, Trukhina N I 2018 Upravlenie processami likvidacii vethogozhilishnogo fonda Student y nauka, 1 (4), pp 29-32.
[13] Grabovoym P G, Kharitonov V A 2013 Reconstruction and renovation of current housing. Handbook. Moscow: Prospect, 712 p.
[14] Soma K, Dijkshoorn-Dekker M W C, Polman N B P 2018 Stakeholder contributions through transition stowards urban sustainability Sustainable Cities and Society, Vol. 37, pp 438-450. doi: 10.1016/j.scs.2017.10.003
[15] Trukhina N, Barinov V, Andryumin Ya, Panenkov A, Vvoytolovskyi N 2019 Innovation and certification as the basis for the development of energy-efficient construction E3S Web of Conferences p 02125. doi: 10.1051/e3sconf/201911002125
[16] Mishchenko V Ya, Barinov V N, Vasilchikova E, Potekhin I 2019 Energy savingin construction processes as a developer competitiveness enhancement factor Advances in Intelligent Systems and Computing, T. 983 pp 107-115. doi: 10.1007/978-3-030-19868-8_10
[17] Trukhina N, Okolelova E 2018 Modeling optimal solutions with the use of heat technologies based on graph theory MATEC Web of Conferences p 03002. doi: 10.1051/matecconf/201819303002
[18] Trukhina N I, Okolelova E Yu 2018 The efficiency of use of energy saving technologies in construction MATEC Web of Conferences p 03003. doi: 10.1051/matecconf/201819303003
[19] Han Jiang, Sarah Payne 2019 Green housing transition in the Chinese housingmarket:
A behavioural analysis of real estate enterprises. *Journal of Cleaner Production*, Vol. 24120

December. Article 118381. doi: 10.1016/j.jclepro.2019.118381

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[20] Linda Kauškale, Ineta Geipele 2017 Integrated Approach of Real Estate Market Analysis in Sustainable Development Context for Decision Making *Procedia Engineering*, Vol. 172, pp 505-512.

[21] Guo-liang Yang, Hirofumi Fukuyama, Kun Chen Hyung Min Kim 2019 Investigating the regional sustainable performance of the Chinese real estate industry: A slack-based DEA approach *Omega*, Vol. 84 April, pp 141-159. doi: 10.1016/j.omega.2018.04.009

[22] Liyin Shen, Zhenyu Zhang, Xiaoling Zhang 2017 Key factors affecting greenprocurement in real estate development: a China study *Journal of Cleaner Production*, Vol. 1531 June, pp 372-383. doi: 10.1016/j.jclepro.2016.02.021

[23] Qingshan Chen, Shah Muhammad Kamran, Hongzhong 2019 Real estate investment and energy efficiency: Evidence from China's policy experiment *Journal of Cleaner Production*, Vol. 21720 April, pp 440-447. doi: 10.1016/j.jclepro.2019.01.274

[24] Mishchenko V Ya, Gorbaneva E P, Sheina S G 2019 Increase of energy efficiency during overhaul of housing stock in Russian Federation *IOP Conference Series: Materials Science and Engineering*, p 012031. doi: 10.1088/1757-899X/481/1/012031

[25] Okolelova E Yu, Shulgina L V, Trukhina N I, Shibaeva M A, Shulgin A V 2019 The mechanism of evaluation under the conditions of uncertainty of innovational project as a random process *Advances in Intelligent Systems and Computing*, T. 726 pp 56-63. doi: 10.1007/978-3-319-90835-9_7

[26] Okolelova E, Shibaeva M, Trukhina N 2018 Model of investment appraisal of high-rise construction with account of cost of land resources *E3S Web of Conferences* D. 03014. doi: 10.1051/e3sconf/20183303014

[27] Okolelova E, Trukhina N 2016 Development of mechanisms for innovative projects management based on their identification and results forecast in the risk environment *MATEC Web of Conferences*, p 04069. doi: 10.1051/matecconf/20168604069

[28] Vasilchikova E V, Potekhin I A 2018 Razrabotka imitacionnoy modely ocenki concurrentosposobnosti developera *Vysokie tehnologii v stroitelnom komplekse*, 2, pp 7-13.