Rent contradictions in land valuation, cadastral and investment activities

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Abstract. The article considers a new scientific concept of rent impact on investment processes in agribusiness based on optimization of rent income by eliminating rent contradictions in cadastral and land valuation activities. The problem of land transfer from production turnover as a result of rent distortions hinders the innovative development of the agricultural economy. The analysis and evaluation of factor income confirms the high interdependence of rent factors in the combination of labor, capital and land. The degradation of one of them hinders the development of the others. Therefore, it is important to balance the development of production resources by regulating factor income. Imbalances in rental income result in losses of resources. The research is aimed at developing a scientific approach to the implementation of innovative priorities in the development of agribusiness by eliminating rent contradictions in land valuation and cadastral activities. The results of the research are reduced to the development of a system of rent regulators for innovative development of the agricultural economy through the introduction of methods for structuring rental income in land valuation and cadastral activities. Localization of intensive rental income in agricultural production becomes possible only in the conditions of redistribution of extensive forms of rental income (differential rent first, natural rent, monopoly rent), which is a fundamental condition for creating a competitive environment and investment development of the agricultural economy.

1. Introduction
The steady persistence of investment problems in the Russian economy revives scientific interest in the theory of income distribution and estimated regulators of investment activity, which include the cadastral and market value of land resources, which under the influence of rental excess income lose consistency.

The lack of consistency between the market and cadastral value of land indicates a violation of the law of value and creates a gap in land prices relative to the types of functional use, which contributes to the withdrawal of land assets from production.

Classical science, trying to solve the problem of value, has created a rent theory, according to which all income increases in excess of the socially necessary price of production are subject to the action of the rent mechanism, in which the extensive influence of differential rent of the first kind is hidden.

In the conditions of monopolization, the dominant analog of differential rent of the first kind is natural rent, which is the main reason for the inconsistency of investment motives and land valuation results.

Therefore, the study of rental methods to eliminate contradictions in land valuation, investment and market activities determines the relevance, practical and scientific significance.
1. Rent contradictions in land valuation, investment and market activities cause an imbalance of key socially significant proportions between production, socio-economic and financial factors of land use, which leads to distortions in the distribution of rental income and is accompanied by a loss of motivation to invest.

2. The study of rent contradictions in land valuation, investment and market activities, leads to the conclusion that it is possible to influence the rate of change in factor income by regulating the structure of rent income, and, accordingly, to strengthen the processes of intensification and increase the investment activity of landowners and land users.

In the context of globalization, when competition rules are being tightened, the scientific significance of the problem of using rent regulators in the development of investment and innovation activity acquires strategic importance.

2. Problem statement
The rent methodology for cadastral valuation of agricultural land makes it possible to structure rental factors and rental income relative to their intensive or extensive nature with the justification of regulators.

1. Research of rental factors of land use with the development of land valuation models based on the structuring of rental income in order to identify intensive rents, the capitalization of which will bring the cadastral and market value of land to the socially required numbers, at which the investment motive of rights holders is triggered.

2. The implementation of rent uniformity in the methodology of cadastral and market land valuation will help to maintain consistency of land valuation results and activate the investment functions of the land revenue and payment system.

3. Research question
Rent theory contains rules for the impact of rental income on investment activity, reveals the mechanism for the formation of intensive rent, which is the source of the formation of investment motives of subjects of land relations.

1. Rental income is characterized by a multidirectional influence on investment interests.

Thus, in the conditions of localization of natural rents, the conditions for the formation of intensive rents are suppressed and investment interests are devalued, which is the basis for structuring rental income and eliminating the negative impact of natural rents by redistributing income.

The formation of investment interests in the agro-industrial complex is based on the results of cadastral land valuation, but it has contained rental substitutions since the time of the administrative-planned economy.

Intensive rent as an excess income from the use of intensification factors determines the investment motives of land owners, which obliges to its identification and use in the methodology of cadastral land valuation.

Investment decisions are based on the results of intensive rents, which have specific features related to the laws of production, which must be taken into account in the land valuation methodology.

By regulating rental income on the basis of retaining the priorities of intensive rent through land valuation activities, it is possible to influence investment decisions in the agro-industrial complex up to a certain limit.

The control limit determines the level of substitution of expensive factors for cheap ones in production functions (figure 1).

If the use of land in production becomes expensive due to an increasing land tax, then there is a reduction in land use from L to L2 in response to an increase in the income of other factors from x1 to x2, but further substitution is not possible, it leads to a shift in the graph y and y' and a shift in production volumes.

Land is both an income source and an expense item, which the producer constantly strives to minimize. Therefore, by regulating the value of land, it is possible to encourage the producer to make
investment decisions for the sake of production.

In the process of evaluation, according to certain rules, priority areas of land use are developed, and, accordingly, through land evaluation activities, investment interest can be formed.

![Diagram](image)

**Figure 1.** The movement of the production function in the process of intensive rent formation (differential rent II). *Source:* Developed by the authors.

The mechanism for making investment decisions depends mainly on intensive rents, which affect scientific and technological progress.

State regulation of investment activity through the redistribution of income is based on land valuation activities.

2. The current land valuation model does not have any intensification factors, which does not allow structuring rental income in order to identify intensive rents, the capitalization of which will bring the cadastral and market value of land to the socially required values, at which the investment motive of the right holders is triggered.

The current land valuation model is the standard yield model by crop:

\[ SY = 33.2 \times 1.4 \times AP / 10 \times C_1 \times C_2 \times C_3 \times C_4, \]  

where

- **SY** - standard yield of grain crops, C / ha;
- **AP** - value of local agro-ecological potential of crops;
- **10** - the base value of AP;
- **1.4** - coefficient of conversion to the level of yield under intensive cultivation technology;
- **33.2** - standard yield (C / ha) of grain crops on the reference soil, corresponding to the standards of zonal technologies at the base value of AP (10.0);
- **C1-C4** correction coefficients for:
  - **C1** - humus content in the arable layer;
  - **C2** - capacity of the humus horizon;
  - **C3** - content of physical clay in the arable layer;
  - **C4** - negative soil properties.

The method of cadastral valuation of land does not take into account the factors of intensification, which leads to distortion of the cadastral value.

Conditions and factors of implementation of the main principle of land legislation, that is the rational use of land resources, contradict the current criteria for the formation and distribution of rental income, which are subject to the existing land relations in the Russian Federation, which contributes to the growth of the number of disturbed lands.
4. Purpose of the study
To reveal the rent inconsistency of land valuation, cadastral and investment activities, to justify the methodological ways to eliminate it.

1. To investigate the process of rent formation with the justification of motivational divergence of elements in the structure of rental income that determine rent contradictions in land valuation, cadastral and investment activities.

2. To propose methodological techniques for structuring rental income and identifying intensive rents in order to eliminate rent contradictions in land valuation, cadastral and investment activities.

5. Methods of research
The research methodology consists of the use of techniques for comparative analysis of the provisions of rent theory, analysis of statistical information, and application of stochastic methods for calculating land valuation models for different values of rental income factors.

1. The study of the current land valuation practice on the example of cadastral valuation of agricultural land suitable for arable land confirms the results of unacceptable distortions of the rent theory.

All four rounds of cadastral valuation of agricultural land in the Russian Federation were held in violation of the rent methodology of land valuation activities.

The cadastral value has traditionally been based on rental income, but the depersonalization of extensive and intensive rents by refusing to structure rental income in the assessment has led to distortion of land valuation results and an unreasonably high separation of the cadastral value from the real value of transactions.

The retirement of land from turnover was accompanied by an increase in the cost of land.

The range of variation of the rent differential in the Russian Federation was about 100, and in the Leningrad region, it was about 80 times (table 1).

| Name of the municipal district, subject of the Russian Federation | Value of a specific indicator of the cadastral value of agricultural land Group, (Rub/sq. m) | Total (without division into groups), (Rub/sq. m) |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Leningrad region minimal                                      | 0.09 0.31 3.73 0.09 0.12 0.09                                                                | 0.09                                            |
|                                              average            | 5.93 4.97 6.9 0.09 0.27 5.88                                                                |                                                 |

In the Leningrad region in 2008, the range of variation in the subdivision of agricultural land amounted to 65.8 times.

2. The formation of land income and payments is not linked to the movement of rental income, which is a barrier to investment development.

The lack of rent consistency in cadastral valuation has led to the decline of investment functions of tax regulators and has resulted in an increase of the contestation of the results of cadastral valuation of land. The volume of land payments unreasonably double every 5 years.

In the period from 2014 to 2015, the cadastral value as a result of contesting 65.1 thousand objects decreased by 3970.8 billion rubles [2].

The modern methodology of cadastral valuation of agricultural arable land still does not take into account the multidirectional effects of elements of rental income and is based on the use of the method of capitalization of total rental income:
Cadastral Value of the Land Plot (CV LP) = (Gross Income - Expenses) / capitalization rate.

As a result, the cadastral value of a land plot was calculated as the difference between gross income and the cost of cultivation, harvesting of agricultural products, and the cost of maintaining soil fertility for each crop rotation.

The projected sales price for each crop was calculated based on an analysis of the average annual market sales prices for the 3-5 period preceding the year of cadastral value determination, on the terms of goods collection, but without taking into account the factors of oligopolization of regional agri-food markets, which contradicts the law of value and distorts the essence of gross income.

The principle of rent-linked prices is determined by the rules of compliance with the law of value [3].

As a result, the specific indicator of the cadastral value of land contains a methodological distortion, introduces a rent error in land relations, and therefore, the land tax calculated on its basis does not contain investment incentives.

According to the results of modeling the normal (calculated) yield of grain crops in the Leningrad region, with different combinations of factors, the range of variation is 16 times, and in the 2019 methodology it is 2 times, which confirms the artificial narrowing of the modeling limits, the separation of the cost from the production criteria, and indicates a distortion of the rental logic (table 2).

Table 2. An enlarged comparative analysis of the results of the 2019 State Cadastral Survey (SCS) of the Land Plot on the territory of the Leningrad region with market data (fragment) [2].

| № Seq.No | Segment, Group of objects subject to SCS | Number of evaluation objects, item. | Amount of market data, item. | The range of market data, Rub/sq m | The range of calculated cadastral units, Rub/sq.m |
|----------|----------------------------------------|------------------------------------|-------------------------------|----------------------------------|-----------------------------------------------|
| 1        | Segment 1 “Agricultural use”            |                                    |                               | 3.85 – 7.22                     | 3.85 – 7.22                                  |
| 1.1      | Agrarian Lands “Agricultural use”       | 24 423                             | 409                           | 2.00 – 47.00                    |                                               |
| 1.2      | Settlement Lands “Agricultural use”     | 2 934                              |                               | 3.85 – 7.22                     |                                               |

The current procedure for distributing natural rents has become an obstacle to investment development [4].

Extensive rent still dominates the rental income, which contradicts the conditions of competition and is the reason for the passivity of land relations, including the cadastre. As a result, the cadastre loses its information integrity and reliability (table 3).

Table 3. The impact of remarks to interim reporting documents on the interim results of the SCS in the Leningrad region [2].

| № Seq.No | Land Category    | Number of objects subject to SCS, item | The total amount of the cadastral value, mln.Rubles. | Changes in the cadastral value based on the results of elimination of remarks, mln.Rubles. | % |
|----------|------------------|----------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|---|
| 1        | Agrarian Lands   | 647 185                                | 1 501 301.26                                        | -568 049.06                                                                     | -37.84% |
| 2        | Settlement Lands | 622 526                                | 1 124 080.37                                        | -42 614.95                                                                      | -3.79%  |

| Total    |                  | 1 269 766                               | 2 626 693.59                                        | -610 553.50                                                                     | -23.24% |

Numerous contestations of cadastral value indicate the use of an erroneous methodology, which is
once again confirmed by the appearance of new administrative acts in the field of cadastral valuation.

Thus, by the order of the government of the Leningrad region dated February 03, 2020 No. 65-R the year of the state cadastral assessment of agricultural land, settlements and water resources was shifted from 2019 to 2020, which makes it possible to introduce methodological adjustments to the calculation of land rents.

“The most important feature of the cadastre is its completeness – the availability of information about all legally used land plots and other real estate objects” [5].

Countries that lag behind in industrial development lose intensive rents, which hinder the development of competition and obliges to create equal starting conditions for managing at the intersectoral and interregional level. “Creating a market mechanism obliges, first of all, to provide conditions for competition” [6].

To localize rental income in the production sector and develop competition, it is advisable to use the method of justifying the system of rental regulators that ensure a balance of key dependencies between rental income and investment priorities [4].

In the conditions of differentiation of budget provision in the regions of the Russian Federation, this problem becomes of socio-economic significance [7].

The study concludes that through the redistribution of rental income, it is possible to maintain a balance of factor income and, accordingly, promote competition and investment activities, which in turn will increase the demand for cadastral services and ensure that information is fully revealed in the cadastre.

To date, the boundaries of half of the legally used land plots are not registered in the cadastre [8]. The growing gap in intersectoral income motivates the transfer of agricultural land to other land categories.

The scientific and technological lag of organized agribusiness entities and the constant reduction of acreage is a consequence of the influence of rent contradictions on land relations, which threatens the food security of the Russian Federation.

6. Findings
The results of calculating intensive rents that have a stimulating effect on investment to prevent capital leakage from agriculture and the country as a whole are proposed.

If agriculture loses intensive rents, the capital from it goes to other industries, activities, regions.

1. Using the normal yield model for grain crops, the values of intensive rent were obtained (table 5).

| Table 4. Intensive rent on grain crops of the Leningrad region, (fragment). |
|---------------------------------------------------------------|
| Indicator          | Economic factors | Economic factors |
|                   | Average values   | Maximum values  |
|                   | Land factors     | Land factors   |
|                   | Average          | Average        |
| C / ha             | Min.             | Max.           |
| Intensive rent     | 10.94            | 32.72          |
|                    | 10.94            | 32.72          |
|                    | 10.94            | 32.72          |
|                    | 32.72            | 32.72          |

The mechanism of intensive rent in market conditions is the organizing force for the growth of the competitiveness of domestic agricultural producers.

6.2. Based on land valuation modeling, it is possible to structure rental income and justify the regulators of balanced use of land resources in agriculture, which will inevitably cause an investment effect. The rate of technological modernization of agriculture is linked to the rate of growth of intensive forms of land rents, which must be identified in the cadastral assessment and, under the influence of regulators, localized in production in the form of investment.
Industrialization based on land valuation regulation is based on a high level of use of all economic factors, including labor resources, which obliges to improve the quality of education, but in the current structure of employment in the Russian Federation, more than 1.2% of the employed do not even have basic secondary education.

The main reason for the decline in the level of education of rural workers is the decline in the level of socio-economic development of rural regions [9].

Since the 1990s, the problem of interregional socio-economic differentiation has caused a gap in the development of many countries, including the EU, which has begun to collapse [10]. Regional heterogeneity and structural differences naturally cause the Balassa-Samuelson effect. Interregional socio-economic differentiation is a consequence of unequal development of land relations (table 5).

Table 5. Indicators of interregional socio-economic differentiation in the Russian Federation for 2018 (Rosstat).

| Indicator         | RF    | The Leningrad region | The Novgorod region | Republic of Tyva |
|-------------------|-------|----------------------|---------------------|------------------|
| Fund ratio        | 15.3  | 12.1                 | 11.2                | 10.6             |
| The decile coefficient | 7     | 5.9                  | 5.6                 | 5.3              |
| The Gini coefficient | 0.41  | 0.377                | 0.366               | 0.358            |

Interregional socio-economic differentiation in the Russian Federation is increasing, hindering the development of industries. Under these conditions, the joint power synthesis trap is triggered [11].

Reduced rights and opportunities lead to less motivation to work, which leads to a lower level of organizational communication [12].

According to the experience of developed countries, increased investment activity is carried out by regulating resource prices. To this end, industrial, public organizations and all levels of government should interact [13].

The entire economic system is presented as consisting of two heterogeneous sectors – planned and market by J. K. Galbraith in the theory of the new industrial society. He attributed large corporations that introduce new technologies and determine new prices to the planning system, and the small businesses to the second system.

The use of fiscal instruments to equalize socio-economic differentiation is possible only in conditions of investment activity [14].

Land valuation through the implementation of the priority of intensive rent can affect investment incentives and motives.

7. Conclusion

Insufficient development of rent regulators is the reason for the long-term persistence of rent contradictions in cadastral, land valuation and investment activities, which reduces the opportunities of the use of land valuation methodology in regulating the investment activity of land rights holders.

1. To eliminate rent contradictions in cadastral, land valuation and investment activities, the concept of popularization of intensive rent priorities based on the structuring of rent income and regulation of land income is proposed.

2. The implementation of intensive rent priorities through fair taxation of land will eliminate rent contradictions, ensure the involvement of land in the production turnover in the agro-industrial complex,
contributing to the development of competition, creating equal starting conditions, income growth and smoothing intersectoral socio-economic differentiation.

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