International Journal of Engineering & Technology, 7 (4.8) (2018) 370-375

International Journal of Engineering & Technology

Website:www.sciencepubco.com/index.php/IJET

Research paper



Land Management with due Regard to Quasi-Rent

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Abstract

Methodological approach to calculating the differential rent of type "I" according to spacing (allocation) of lands to market outlets has been offered in this article. In the result of research, we have ascertained that in transport rent formation there encounters another one, more concealed as for net profit type of rent – quasi-rent. The contributors have also substantiated the factors that affect quasi-rental value and have determined the main dominant features, which allow identification of quasi-rent on land.

Keywords: *land management, quasi-rent, capitalization, transport and sales/marketing infrastructure, transportation problem.*

1. Introduction

Additional distribution costs, which commodity producers will permanently bear, depend on land allocation towards the markets. To the contrary, savings or price margin from their more advantageous and hospitable placement to specific markets in comparison with the producers, whose lands are more distant to these markets, should be considered as additional income of commodity producers. The specified is unambiguous as for the possibilities of the manufacturer to appropriate this rent.

This problem is particularly characteristic of small producers and the ones who cannot invest funds in the transport component, and because of this, under otherwise equal conditions, the selling price of their products will have a lower standard of price compared to the market prices. Farms, that do not deliver their products to the market, do not fully take advantage of better and medium land allocation towards the market outlets. In the case in point, middleman transport and marketing organizations (corn traders) wholly or partially embezzle surplus revenue of land allocation towards markets, which exteriorly shows itself in the lowballing of purchase prices for corn. In farms, transport companies directly form lower prices than in those cases when farms on their own steam supply their products to the market (elevators, harbors, reception centers, storage facilities, factories, etc.). In these farms, there is a surplus revenue, which is the rent for the land allocation towards the markets.

The appearance of neighborhood effects (externalities) is no exception, when business entities (economic subjects) use the existing transport infrastructure, into which the funds of other business entities were invested. This statement is especially correct for transport intermediaries (integrator companies), since they do not pay local taxes, which are used for the support of the transport infrastructure, but only use it extensively. However, the transport problem is much more complicated than it appears at first thought.

2. Theoretical aspects of rental relations in the agricultural sector

Theoretically and methodologically, the question of the formation and the very core of the existence of differential rent for the land allocation towards the markets is one of the most urgent. Nevertheless, the English classical economic theory, according to A. Marshall, gave little attention to this problem, at the same time the land fertility problem was the prevailing one. A. Marshall argued that England was so small and so densely populated that even milk and vegetables that should be delivered to the market quickly, and even the hay, despite its volume, could be transported across the entire country without excessive costs ... Subject to the foregoing, English economists attributed the fertility performance a crucial role among the factors that determine the cost of farmland, and believed that its allocation was of secondary importance [5, p. 432].

However, A. Smith, when he was speaking about the influence of land allocation towards the markets, made an apposite remark. He was convinced that the land rent varies not only depending on the land fertility, whatever would be the product obtained from it, but also depending on its location, no matter what its fertility was [7, p. 122]. In general, he attached value to the impact of the transport criterion in the overall development of the country. He emphasized, that good roads, channels and navigable waterways reduce transportation costs and put particular parts of the country in approximately the same position as those located near big cities. Viewed in this way, transport improvements are the greatest of all the improvements.

A. Marshall also stood for the importance of the transport component role in the formation of land rent. He noted that it must be remembered that inequality of allocation in relation to the best markets is that strong factor that causes the occurrence of inequali-

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ty in the producer surplus, as well as the inequality in absolute productive efficiency. As it is evident from the foregoing, the transport component plays an important role in the formation of differential rent, and this role becomes more vital with the increase in shared transport costs. It will be reflected in the difference between the individual prices of production at land lots, which are at different distances to the market or, likewise, as the difference between market prices of production and individual prices of production of outputs at the same land lots.

According to A.O. Varlamov, the profit, attributable to the location, is expressed in the cost of surplus transportation costs, taking into account the proximity of labor power to the market, whereas additional product that can be obtained from the favorable plot allocation, increases the amount of the spatial rent depending on the location [2, p. 96]. The scientist gives accent to various instances of transport component, which extend beyond the market outlet of agricultural products.

Broadly speaking, market infrastructure is quite a significant and in-depth concept. Per exemplum, in the source [20; 11; 1, p. 153] it is explained as the complex of market institutes that spur, accelerate and ease treaty-making process and foster untrammeled economic performance. In this research, we do not set a goal of considering all the special aspects, our goal is to take into account the most important components of market infrastructure. Transport and sales companies play a significant role for business entities on the land, but their own transport and storage/retrieval infrastructure remains more significant, especially for agricultural enterprises (farm business).

The formation of differential land rent for the allocation towards the market, basically, is not different from land rent, which is formed as a result of the difference in the land capacity/land fertility at different lands (land lots). The value of differential rent depends not on the absolute, but on the relative value of manufacturing expenses and transportation costs [19; 3; 4, p. 495]. That is, the differential rent in general, and spatial (situation) rent in particular, is formed in consequence of restrictions that lead to the emergence of marginal costs. It is the marginal approach to the definition that reflects the slightest differences between the lands where the output, which in future will be delivered (transported) to the consumer, is produced.

3. Primary methodological approaches to rent determination

Transport and sales activity of business entities (economic subjects) is the general basis for the formation and rent seeking of differential spatial land rent for allocation towards the markets. This is the ultimate principle of the assumption about the possibility of farms to withdraw this kind of rent, inasmuch as we ought to consider the land for its intended purpose, which is agricultural (farm) production from the standpoint of the potential opportunity of rent-formation on the territory of Poltava region.

To do this, it is necessary to have a factor (criterion) that would be able to characterize the mechanism of transport rent formation, the level and distribution of this rent, as well as interconnection of other rent forms in agriculture (farm economy), being herewith an integral part of the methodological approach, which would fully correspond to the theory of land rent.

The first priority step in the calculation of the differential rent of type "I" on lands with their various allocation towards the markets is to define (identify) worse land lots by their spatial location, considering either a district or a region, as well as any other territorial cluster or array. In order to determine the distinctions between lands according to their allocation towards market outlets it is critical to compare them.

In order to define what the difference between them according to the geographic distribution is, it is necessary to specify the optimal assignment (distribution) of actual production. The criterion for such an optimum as one of the variants, is meant to be satisfaction of all the customer needs (according to the markets) in the matter of the ability to meet the producers' demands for each type of production. For example, customer needs are supplied not only in winter (fall) wheat, but also in general as for grain crops, or by a set of some of their species, when, in this case, calculations are made even for five crop plants.

It should be noted that under this approach the focus is more on manufacturers than on consumers. Manufacturers are the target of research, and therefore they decide how to distribute their own output in the optimum way. There are two important and essential cases. In the former case the situation with the best possible distribution of production to the market outlets will be balanced in favor of manufacturers, that is, they are able to sell their production in full, and there will be supplementary reserves for them. The latter relates to the following production runs (intervals). In the second case, there occurs the situation when manufacturers will fail to sell their production on a separately analyzed territory (district, region, etc.). In such a way, this is already an open model, in other words, manufacturers' marketable surpluses can be sold only outside the investigated area.

In both variants, it is anticipated that manufacturers would be able to distribute in the optimal way all the available output that is sent to consumers (at markets). The specified variants are partial occurrences of equation by manufacturers, not by consumers.

The optimal plan of manufacturers' distribution on the studied territory will rest on the distribution of national crop (agricultural production) turnover. The commodity weight, which has to be distributed, is not a constant value, and, more importantly, the choice of methodical approach to the calculation of the commodity output volume will influence the optimum.

There are two key aspects when it comes to methodology. The first one is referred to the real sales revenue of the output that can come to the market annually. Though the second one is related to the factual data, it plays the role of the regulatory factor. For one, in calculating the commodity output for sale, this aspect takes into account not only the actual manufacturing or the output of products (for a certain period), but also the size of the seed fund for the purposes of satisfying the manufacturers' domestic needs. As for the farms, which have animal production, the second key aspect has regard to the needs of feeding stuff, which are covered at the expense of their own production. If we leave out of account the needs for seeds and feeding stuff in farms, the entire received surplus is the average annual commodity output that will come to consumers (on the market) and will require optimal assignment (allocation).

In order to optimally allocate the manufacturers' commodity output according to customer needs, it is proposed to form an economic and mathematical problem. In this problem, it is necessary to distribute commodity flows between some participants (manufacturers) and other (consumers). Thuswise, we propose to use a specific class of such problems, namely the transportation problem. Considering that the primary and sufficient condition of this problem is redistribution of manufacturers' marketable output among consumers (in the markets), owing to this, it is considered as an unbalanced one. Making allowance for above-mentioned auxiliary conditions, the variants of this problem as a closed or open system are considered acceptable. Hence, an unbalanced model of the transportation problem with its open or closed type is the possible option for this consideration of cases.

Nevertheless, when solving the imposed premises (initial conditions) of the transportation problem, the unbalanced model has to be transformed (when required) into a balanced one. This condition corresponds to the hypothesis of the first theorem, in which it is maintained that, in order that the transportation problem could have feasible plans, it is necessary and sufficient to make it balanced [18; 14; 13; 8; 9, p. 95].

During the transportation of marketable output, as a rule, the target function is the minimum size of cargo turnover or the aggregate delivery cost. The cost criterion for cargo carriage is the effective

value of 1 tkm, so in this case, the price matrix has good reason for further calculation of transport component of the rent.

In general, various methods have been developed for solving transportation problems, although the transportation problem itself is a special case of linear programming with $n+m$ constraint equations and $n+m$ unknown quantities, but herein one of these equations depends on others and, as a result, the entire system has not a single solution, but an immense amount of solutions [16; 15; 6, p. 175].

The transportation problem, being intrinsically the problem of linear programming, can be reduced to the solution by the simplex method algorithm (simplex technique), thus being a manifestation of the simplex problem. That is why, leaning against peculiar features of the transportation problem (in the problem the constraints are given in the form of linear equations, unknown quantities simultaneously refer to two equations, and their sum of coefficients at unknown quantities equals to one), a simplified method - the method of potentials was developed.

Meanwhile, there are other ad hoc methods. As a general matter, terminating algorithms for solving the transportation problem are divided into two groups. The first group includes methods based on a simplex algorithm - the method of potentials. However, apart from it, this group also contains the income approach/distribution method, the Gleyzal method, and the squares method. The second group, which provides for approaches related to sequential reduction of discrepancies, includes the following: methods of solution summands, differential rent and Hungarian method with various alternate versions [12, 6, p. 176].

Among income approaches/distribution methods for constructing initial plans of the transportation problem, two are widely known. The first is "the Northwest Corner Method", and the second is the "minimal element method". As the calculations [12, p.145-147; 9, p. 96] show, according to these methods, a peculiar initial plan, which has been built, either does not always correspond to the optimality criterion, or it is not determined.

In order to verify correspondence to the optimal initial plan, it is necessary to estimate the reported baseline values by the optimality criterion. In turn, the deduced basis variables must fulfil the conditions of Theorem 2, which provides such an option to fill table cells of the initial plan, which should correspond to the size of $n+m-1$, that is, be equal to the system rank [6, p. 132]. It will appear as follows 1:

$$\begin{cases} \sum\limits_{S=1}^{n} Z_{S(q)}^{K} = M_{K}^{Q}, K = 1,2,..., m; \\ \sum\limits_{K=1}^{m} Z_{S(q)}^{K} = N_{S}^{Q}, S = 1,2,..., n, \end{cases} \quad (1)$$

where $Z_{S(q)}^{K}$ – the commodity output (Z) by its q -group (type), which is kept available by the K -manufacturer in order to supply the needs of the S -consumer, thousand tons;

M_{K}^{Q} – the total capacity of manufacturers' supplies of the Q -group (type) of marketable output, thousand tons;

N_{S}^{Q} – summed demand of consumers for a Q -group (type) of marketable output, thousand tons;

m – the number of manufacturers who are able to supply the market with the q group (type) of marketable output;

n – the number of consumers who are able to get/purchase (buy) the q group (type) of marketable output;

The solution to the system of linear equations and deduced values of variables will conform to the conditions of the basic set. The optimality criterion assumes that the basic distribution of supply is optimal only in that case if the estimates in all the free cells are nonnegative [17; 10; 6, p. 135].

Making the initial plan of the transportation problem under our conditions is connected with the single cost parameter of cargo carriage for the entire region, so it does not take into account all the peculiarities that are associated with every cargo carrier or every manufacturer. There is no longer any necessity of optimizing upon the criterion of reducing the carriage cost, and there is no need for carrying out the calculation of the tariff matrix. The target function of minimizing the cargo carriage volume 2 takes centre stage:

$$F^{Q} = \sum_{S=1}^{n}\sum_{K=1}^{m} L_{S(q)}^{K} \cdot Z_{S(q)}^{K} \to \min, \quad (2)$$

where F^{Q} – the total cargo carriage volume of marketable output by its Q -group (type), as the marginal linear function of the boundary tending to the minimum, thousand tkm;

$L_{S(q)}^{K}$ – average cargo transportation distance of a q -group (type) of marketable output to the S - consumer (buyer or keeper) from its K - manufacturer, km.

Having a simplified statement of the transportation problem, it eventually gave the opportunity to choose "the Northwest Corner Method" in order to solve this problem. In this problem, the target function minimizes the cargo carriage volume between the districts of Poltava region.

As a consequence of the solution to this transportation problem, we receive a demonstrable and finite basic key plan of attack. It contains variables (fluents) that innovate and streamline the overall volume of transportation (carriage) for a q -group (type) of marketable output for Poltava region.

The obtained data of the transportation problem basic plan is used as an important and integral material for further calculations of rental value for land allocation towards the markets. However, for that end, it is necessary to enter new figures. For example, the average distance of cargo transportation, can be calculated using the formula 3:

$$L_{C(q)i}^{K} = \sum_{S=1}^{S} V_{S(q)}^{K} \Big/ \dot{\sum} CO_{(q)}^{K}, \quad (3)$$

where $L_{C(q)i}^{K}$ – the average distance of cargo transportation from the K -manufacturer of the q -group (type) of farm products in the i -district of the region, km;

$V_{S(q)}^{K}$ – the cargo carriage volume from the K -manufacturer to the S -consumers of the q -group (type) of farm products, thousand tkm;

$CO_{(q)}^{K}$ – the commodity output (physical volume/quantity), which is subject to transportation (conveying) from the K - manufacturer by the q -group (type) of farm products, thousand tons.

Taking into account average conveying (carrying) distances of marketable output transportation at agricultural enterprises of the corresponding districts, we calculate the differential rent for land allocation towards the markets from the formula (4):

$$DR_{(\varepsilon)i}^{TL} = \frac{CE_{(\varepsilon)i}^{a} \cdot Tc}{10} \cdot \left(\max L_{C(q)}^{K} - L_{C(q)i}^{K}\right) \cdot Pc, \quad (4)$$

where $DR_{(\varepsilon)i}^{TL}$ – the differential rent for allocation of lands, which belong to goods producers, towards market outlets at ε -variant of assessment in general for the ^{3} district of the region, UAH / ha;

$CE^{a}_{(\varepsilon)i}$ – actual crop earnest (yield level) of crop plants, included in the ε - variant of assessment in the ^{3} district of the region, dt/ha (hundredweight / ha);
Tc – the average level of marketable value of products output at agricultural enterprises (at the mean, it makes 80-90%),%;
Pc – average cargo carriage cost per tkm, UAH.

One of the most important indicators in the formation of transport component in the differential rent of type "I" is the development of transport and sales/marketing infrastructure, by virtue of the fact that we consider the open system of transport conveying and storage of agricultural marketable output. Under this approach, there arise situations in which some administrative-territorial units have more opportunities for their own commodity production at a shorter distance of transportation, while the others suffer from deficiency of local output when it comes to the consignment of their own grain crops.
Therefore, the latter are forced to transport their output at longer distances and, consequently, they incur incremental (extra) costs due to underdevelopment of transport infrastructure in regards to market conditions and requirements. Given that the development of transport and marketing/sales infrastructure influences the formation of surplus value, which is in fact transport rent, this fact must be taken into account in the calculation of rent and in the process of redistribution between market participants. This kind of rent has to be analyzed from the standpoint of processes variability in the development of transport and marketing/sales infrastructure, and therefore the above-noted rent justly bears the marks of temporality, and this rent is not always excluded/withdrawn to the benefit of agricultural producers, and, in such a way, it functions as quasi-rent.

4. The methodological approach to the calculation of quasi-rent as the component of effective land management

The need to include quasi-rent into the calculation stems from the fact that the existing overcapacity from the sale and storage of farm products at shorter distances can become an impetus and fillip to increase the manufacturing of farm products. The existence of well-developed and extended transport and marketing/sales infrastructure gives prospects for the development of rural commodity producers. Surpluses of value, received through the production ramp-up, should be considered as quasi-rent due to uneven development of transport and marketing/sales infrastructure in the region.
In the formation of transport rent as part of the differential rent of type "I" there occurs a more hidden, but an important type of rent – quasi-rent. Quasi-rent is formed by the factor of developed transport and sales/marketing activity in the farming sector. Factors, that influence quasi-rent, are the following:
1) unbalanced supply and demand for farm products in terms of territories;
2) non-uniform territorial density and considerable distances between manufacturers that form the difference in the cost of cargo carriage;
3) there have appeared uneven and sometimes tremendous advantages in the market capacity when it concerns production in certain regions, which will not be covered with manufacturability in these regions;
4) key distinctions in the capacity of markets to make producers launch manufacturing taking into account the mentioned factor, which often leads to the violation of reasonable and well-minded land use and land tenure;
5) unstable development level of transport and marketing/sales infrastructure determines the situation when, in order to adjust to market conditions, production systems should become more dynamic and flexible, which forms additional risks and extra expenditures when planning the setup for production, and their development;
6) volatility (instability) of financial and investment markets compel agricultural commodity producers to restrain their own sales possibilities (market expectations), as opposed to private transportation carriers and powerful intermediate sellers, which reinforces the differences between producers depending on their internal performance capabilities (the effect of the limitation factor, that clampdowns (restricts) the accumulation and growth of their own distributing stocks and warehouse complexes/storage compounds);
7) underdeveloped cooperative connections, almost total absence of vertically and horizontally integrated associations or amalgamations between manufacturers (except agroholdings) and sales (retail) companies. The indicated factors do not allow to form market ratio (proportions) from below, but high and strong unused potential in one place and the lack of this potential in the other place, is the testimony to the monopoly power of traders in the fraction (segment) of the market which provides transport, sales, distribution, storage and other types of services.
It is worthwhile to examine the question of quasi-rent assessment in the context of unequal, lop-sided distribution through the territories. Quasi-rent has a direct relationship to that part of the rent, which is connected with uneven spacing (placement) of agricultural producers to market outlets. The basis of this inequality, providing that there is surplus value, is the homogeneity of transport and sales/marketing infrastructure, included in estimates. This sales/marketing infrastructure, depending on the "surplus" or "deficiency" of such capacities (possibilities), causes the enhancement or weakening of the influence of quasi-rent marketing within certain territories (districts). A peculiar feature of quasi-rent is the redistributive nature of its overall size throughout the territory, but which for manufacturers will exert within the limits of particular territories. The common quality and feature of quasi-rent and rent is generated by uneven spacing (placement) of agricultural producers to market outlets. Consequently, quasi-rent has a comparative character between better and worse conditions, only according to the degree of transport and sales/marketing infrastructure development on a certain territory [21].
The important features in identifying quasi-rent for land, caused by uneven development of transport and sales/marketing infrastructure, as well as by the market capacity, are as follows:
1) transport and sales/marketing infrastructure is not a separate element of the common agricultural market outlet, but it must not be neglected and as it affects the direct size of the withdrawal of land rent for spacing (allocation) of manufacturers to market outlets (storage locations, transshipment locations, product finishing/reprocessing locations, etc.);
2) the existing comparative nature, which is common to rent and is caused by the number of differences between "worse" and "better" conditions of spacing, allocation or by distinctions in the degree of territorial development of transport and sales/marketing infrastructure;
3) relative independence of agricultural producers from placement and siting of sales/marketing organizations and their level of development according to territories;
4) quasi-rent, as well as transport rent for allocation of manufacturers to market outlets, is tied not to special (individual) terms and conditions that correspond to specific manufacturers, but to the existing traffic flow and service availability level, provided by sales/marketing organizations (enterprises) throughout the entire territory;
5) one of quasi-rent characteristics is the nature of its direct formation and origin, which is connected not with separate, individual differences between territorial entities/units (districts), but with the distinctions which are assigned to a region or a part of the country, that is, between the general and the individual (particular);
6) quasi-rent is a less firm value than spatial rent, since manufacturers are more mobile in granting their requests than in the case of their direct allocation (placement), since, taking into account

peculiar features of natural scarcity (lack of resources availability) and their mobility, they do not allow to "transfer" their production capacities from one territorial unit (district) to another, in order to defray more fully the expenses caused by uneven territorial development of transport and sales/marketing infrastructure;

7) quasi-rent as opposed to rent, has unburdensome possibilities to change the rent-receiver (the manufacturers, who take out/transport their output themselves are obviously able to lay hands on (appropriate) quasi-rent, but in cases, when the output is transported by sales and logistics organizations, traders and other independent organizations - quasi-rent is embezzled by them), therefore it advances and promotes facilitation of its evaluation, and such changes do not require any changes in sales capacities of the territories;

8) quasi-rent is a part of the total surplus of value, formed by transport, sales and market activities of enterprises, and regardless of who will eventually receive (appropriate) its value, it will remain an important component in the assessment of land resources (it is compulsory to include it into the evaluation without reference to the rent-receiver).

Proceeding from the premises, described above, our understanding is that in the calculation of quasi-rent it is necessary to take into account the degree of development of transport and sales/marketing infrastructure on a certain territory (region, country, etc.). In this particular case, one of the criteria of this is the ratio of the dimensions of standardized values (variables) according to the indicators of cargo transportation distance and cargo transportation volumes, that is, the coherence of the distance and the size of trade flow in a certain area of the district, region or country as a whole. We have considered the theoretical and application model of transport operations using the example of Poltava region. The choice of alternatives is related to argumentation and justification of the differential rent formation in Poltava region, and the flows beyond the region boundaries are considered as possible, but secondary ones. In the process of formation quasi-rent value this model isolates itself at the level of the region, but herewith, it is an open model that reflects the continuation of formation of the differential rent of type "I" in the part of the spacing (allocation) of manufacturers (enterprises) to market outlets for their products on the ground of free choice.

The standardized value for the average distance of cargo transportation of agricultural products has been calculated according to the formula 5:

$$IL_{(\varepsilon)i}^{C(n)} = \frac{L_{(\varepsilon)i}^{C}}{\max\{L_{\varepsilon}^{C}\}}, \quad (5)$$

where $IL_{(\varepsilon)i}^{C(n)}$ – the index on the assumption of the standardized value for the average distance of cargo transportation of agricultural products and their groups for the ε-type of assessment in the i-district;

$\max\{L_{\varepsilon}^{C}\}$ – the largest value according to the index of the average distance of cargo transportation of the corresponding agricultural products and their groups for the ε-type of assessment among all the districts of the region, km.

The standardized value according to the transportation volume of agricultural products is calculated according to the formula 6:

$$IV_{(\varepsilon)i}^{(n)} = \frac{V_{S(\varepsilon)}^{K}}{\max\{V_{S(\varepsilon)}^{K}\}} = \frac{\sum\limits_{S} V_{\varepsilon}^{K}}{\max\{\sum\limits_{S} V_{\varepsilon}^{K}\}}, \quad (6)$$

where $IV_{(\varepsilon)i}^{(n)}$ – the index of the standardized value of transportation burden (load) of agricultural products and their groups for ε-type of assessment in the i-district;

$\max\{V_{S(\varepsilon)}^{K}\}$ – the largest value in terms of the transportation volume of the corresponding agricultural products or their groups at K – manufacturers among the districts of the region, thousand tkm.

Taking into account the standardized values of the corresponding dimensions (exponents), which are expressed by numerical indices, let's proceed to the calculation of the next indicator, which will reflect the proportional index of transport and sales/marketing infrastructure development in the analysed region (7):

$$NI_{(\varepsilon)i}^{TP} = 1 - \left(IL_{(\varepsilon)i}^{C(n)} - IV_{(\varepsilon)i}^{(n)}\right), \quad (7)$$

where $NI_{(\varepsilon)i}^{TP}$ – the notional (dummy) index of development of transport and sales/marketing infrastructure and market conditions for farm (agricultural) products or their group for the ε-type of assessment in the i-region.

It is worth mentioning that for the indicator $NI_{(\varepsilon)}^{TP}$ there is a peculiar range of definitions that exists as follows: $\in[0;+2]$. In this connection, the median is number 1, which characterizes balanced utilization of the opportunities of transport and sales/marketing infrastructure of a certain territory. The absence of numerical values that can become negative, is an advantage in choosing this criterion for estimating a notional (dummy) index, inasmuch as we consider not the model of growth dynamics, but the model of the degree of development and its unevenness (disparity) when it comes to the use of the opportunities by the manufacturers in the studied geographic area (region). If the value of the indicator is $NI_{(\varepsilon)}^{TP} \to 0$, some territorial units have fewer possibilities to make maximal use of transport and sales benefits across the entire territory, and their ultimate ability to lay hands on (appropriate) quasi-rent is minimized or absent at all. If this indicator exceeds median value, there is predominance of opportunities and amplification of distortions among the manufacturers located in the given districts of the region regarding distribution of quasi-rent.

The notional (dummy) index of development of transport and sales/marketing infrastructure and market conditions raises the possibility of using the potential enshrined in the corresponding territory (region), rather than the size of distribution and the assignment of quasi-rent by agricultural producers.

Quasi-rent has the properties of comparison between worse (the worst) and the best conditions for the degree of infrastructure development. Hence, it follows that it is not necessary for the manufacturers, who constitute a part of a district or any other territorial unit, to have the indicator value $NI_{(\varepsilon)}^{TP}$, which is equal to 1. The lowest number among these indicators arouses interest, because it becomes the limit, after crossing which, there appear opportunities for redistribution of quasi-rent. It should be reminded, that the source of its formation is not the level of transport and sales infrastructure development, but the difference in development within a certain territory.

Let's calculate the size of relative "benefits" that will take into account the index of general development. The index has been artificially "cleared of" the threshold (border/boundary) value at which quasi-rent may form, according to the formula 8:

$$I_{(\varepsilon)i}^{TЗI} = NI_{(\varepsilon)i}^{TЗI} - \min\{NI_{(\varepsilon)}^{TP}\}, \quad (8)$$

where $I_{(\varepsilon)i}^{TЗI}$ – the index of general development of transport and sales/marketing infrastructure and market conditions for agricultural products or their group for the ε-type of assessment in the i district;

$\min\{NI_{(\varepsilon)}^{TP}\}$ – the least (minimum) value at conditional index of development of transport and sales/marketing infrastructure and

market conditions for agricultural products or their group for the ε -type of assessment in the i district;

Having used the rental value for transportation of agricultural products in Poltava region to their market outlets, where the latter has a direct link, but at least an indirect link to the transport and sales/distribution infrastructure, we have calculated quasi-rent for the corresponding districts of the region (9):

$$QR^{TP}_{(\varepsilon)i} = I^{TP}_{(\varepsilon)i} \cdot \overline{DR}^{TL}_{(\varepsilon)}, \quad (9)$$

where $QR^{TP}_{(\varepsilon)i}$ – the quasi-rent value for the degree of development of transport and sales/marketing infrastructure and market conditions for agricultural products or their group for the ε -type of assessment in the i -district, UAH / ha;

$\overline{DR}^{TL}_{(\varepsilon)}$ – the average size of the differential land rent for the allocation of lands, which belong to manufacturers, towards market outlets at ε -variant of assessment in the region as a whole, UAH / ha.

Having the calculated (target) value of rent and quasi-rent, we can create a link between them, as they both relate to the transport and market component of rent forming, and reflect the differences in the connection to market outlets, to the development of transport and sales infrastructure and market conditions of separate areas of the region. The size (value) of quasi-rent may decrease and increase in comparison with the direct rent. In case of unfavorable transport location (connection) of the district to the market outlet of agricultural producers (enterprises) that either have minimum rent or it will be absent at all, we leave open the possibility that providing better use of the potential for the transport and sales infrastructure development, there will be a receipt (inpayment) of quasi-rent. The accumulation of excess value of the output as capitalization will depend on the fact, whether agricultural producers appropriate quasi-rent. Quasi-rent serves as additory and essential leverage in the development of agricultural enterprises, an increase in the accumulation fund for renewal and investment activities, as it is one of cheap sources of restoration of assets of enterprises and especially land resources on the basis of preservation of natural properties, soil enrichment and, in general, ensuring the constancy of natural management (ecosystem exploitation).

The total value of the differential transport rent, which agricultural producers (enterprises) are able to lay hands on (appropriate), takes into account two varieties (rent and quasi-rent) and is their total reflection (10):

$$DR^{T}_{(\varepsilon)i} = DR^{TL}_{(\varepsilon)i} + QR^{TЗI}_{(\varepsilon)i}, \quad (10)$$

where $ДР^{T}_{(\varepsilon)i}$ – the total value of transport rent for the ε -variant of assessment in the i -region, UAH / ha.

Taking into account that neither classical economic school, nor the later economic school have never considered the structure of the differential rent of type "I" apart from the main two types of rent, namely with reference to the quality and spacing (allocation) of lands to market outlets, we totally adhere to the general methodological approach to the definition and substantiation of such a value (with some amendments, for example, as quasi-rent) in the analysed variant. Thus, the value will be as follows (12):

$$DR^{I}_{(\varepsilon)i} = DRI^{q.l.}_{(\varepsilon)i} + DR^{T}_{(\varepsilon)i}, \quad (11)$$

where $DR^{I}_{(\varepsilon)i}$ – the differential rent of type "I" for the ε -variant in the i -region, UAH / ha.

5. Conclusions

Thus, we have developed and proposed not only a methodological approach to the calculation of the differential rent of type I for the spacing (allocation) of lands to market outlets, but an entire algorithm which can be used in order to determine the rental value. A supporting element (pivot) of this algorithm is a transportation problem, as the results of its solution are an integral part in calculating quasi-rent. The ability of agricultural producers to assign (appropriate) quasi-rent is the condition of their correspondence to the place they occupy and the role they play in the rental relationship.

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