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Assessment of Forest Rent in the Russian Economy

Anton I. Pyzhev*,
Evgeniya V. Zander and Yulia I. Pyzheva
Siberian Federal University
79 Svobodny, Krasnoyarsk, 660041 Russia

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The aim of the paper is to give the overview of the best available techniques of forest rent assessment. First of all, we study the common theory of rent considering both "classical" and "Paretian" approach to the definition of rent. Examining the forest rent evaluation experience of Russian authors, we state that they are based on the "Paretian" approach to the rent definition and don't use the "classical" definition. However, the "Paretian" rent is much more exigent than the "classical" one, and this fact could explain why there are no modern and comprehensive studies of the forest rent for the Russian economy.

Keywords: theory of rent, forest complex, natural resource use, forest rent

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1. Introduction

It is common knowledge that the economy of Russia is based upon the extraction of natural resource, mainly intended for export as raw materials and products of low technological conversions. The inferior technological level of the Russian industry underlines the exceptional importance of forest complex's problems' studying using the most advanced modern approaches.

Forest products remain one of the most important export items in the Russian trade balance, along with oil and gas that fill up to 50 % of the country's budget. According to the assessment of the Food and Agricultural Organisation of the United Nations (FAO),

the total area of the forestlands in Russia was approximately 882 million hectares in 2010, and the overall stock of forest was 82 billion cubic metres (FAO, 2012). This implies that Russia possesses the largest stock of forest resources in the world. The problem is that only a small share of such a great potential is currently being used in mid- and long-run perspective. The first reason of such a poor state of the Russian forest complex is the impossibility of access to the main part of forestlands situated in little-developed areas with severe climate conditions. The second reason is the bad quality of forest management (Eikeland et al., 2004).

Despite the fact that there is a vast literature dedicated to the assessment of oil and gas

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* Corresponding author E-mail address: apyzhev@sfu-kras.ru

rent (Gaddy, Ickes, 2005; Gol'denberg, 2006; Gurvich, 2010; Guriev et al., 2010), the forest rent is discussed much less often. In the presented paper we try to give a review of the existing approaches to the assessment of forest rent and the accumulated experience of evaluating of the Russian forest's rent.

2. Theory of Rent

It is quite important to strictly define the term of rent prior to talk about forest rent. Let us refer to the classical modern textbook on microeconomics of P. Samuelson and W. Nordhaus (2003): "The rent is the payment for using the factors of production whose supply is fixed".

It is evaluated as the amount of money paid in a time unit (Samuelson, Nordhaus, 2003: 470). Thus, the natural rent is the payment for natural resource use paid in a time unit, for example, for one month, to the owner of production factor "natural resource".

The definition of rent expressed above sounds pretty simple and clear, nevertheless several questions arise, if one makes an attempt to evaluate the rent using this definition. Does the rent include resource reproduction costs? Is it possible to treat the rent as a fixed income of the resource's owner, independent of resource's income? What is primary: the product's price defines the rent or vice versa? These issues were in the main focus of study for the most prominent scholars of the past since "A Treatise of Taxes and Contributions" of W. Petty (1662) through the "Cours d'Économie Politique Professé a l'Université de Lausanne" of V. Pareto (1896). It is amazing to know that there was almost no significant contribution to the theory of rent in the 20th century. However, one needs to mention a well-known study of D. Worchester (1946) which contains a brilliant review of the main achievements of the theory of rent

during XVIII–XIX centuries. It is important not to forget a series of publication on so-called Sraffa's theory of rent (Sraffa, 1960), despite that it is not a purely new theory, because it is based on Ricardian definition of rent.

According to Worchester (1946), one should distinguish among three schools of rent theory: representatives of classical political economy ("classics"), neoclassical economic theory ("neoclassics"), and successors of famous Italian mathematician, statistic and economist V. Pareto ("Paretians"). Since the neoclassical school has no made significant contribution into the theory of A. Marshall (1890), except the transition from residual approach to the marginal, the visions of its representatives could be merged into one school together with "classics" (Worchester, 1946). Thus, it is worthwhile to consider two main approaches: classical and Paretian.

Classical approach to the definition of the rent suggests treating it as a remainder that yields from subtraction of capital and labour costs from the final price of the product. A proof of this statement may be found in (Worchester, 1946: 260). One way or the other, this point-of-view is shared by A. Smith, D. Ricardo and A. Marshall. Actually, this definition is equivalent to the "marginal".

V. Pareto defines the rent as the return for any agent of production greater than that required to keep it in its present employment (cited according to Worchester, 1946: 261). In other words, for Pareto and his successors the rent is the surplus appropriated by the owner of resource as a payment for its uniqueness. Meanwhile, this approach to the rent definition makes practical evaluation of the rent pretty difficult, because it is hard to extract the "normal" income that holds the possessor of the resource. It is possible if one introduce some conventional level, which would be connected to the real one only hypothetically.

3. Experience of Evaluating of the Forest Rent

As was mentioned in (Eismont et al., 2002), in highly developed countries the technique of forest rent evaluating described below is widespread. The value of the rent is calculated as the difference between market price on round wood and the cost of production including normal level of profitability. This approach supposes that there is a reliable system of accounting. It is also important to strictly follow the technique, which may be quite detailed and complex. For example, one of the Forest Service Handbooks of the US Forest Agency dedicated to the evaluation of timber standing price in the Pacific North-West consists of more than 300 pages. Unfortunately, this approach is not applicable in Russia, due to opacity of accounting and statistics in forest industry and complexity of the methodology

It is also valuable to consider the experience of the Australian island state Tasmania, where the indices for six parameters of the fixed forest area are calculated in order to assess the forest rent. The six indices are: (1) the overall available forest stock (subdivided into five classes); (2) access to the market defined as the distance of transportation (three classes); (3) climate (three classes); (4) forest quality (three classes); (5) distance to the wood processing plant (five classes); (6) topography and soil quality (three classes).

The Russian experience ascends to “The Directions for taxes evaluating for forest materials received from state dachas” (1883) based on rent theory framework. This document suggested evaluating the price of standing timber as a remainder price, or forest rent, i.e. the difference between market price of forest materials and the cost of stocking up and transportation including the profit of timber merchant.

4. Institutional Environment of the Russian Forest Sector

The forest legislation in Russia is based on the Forest Code of the Russian Federation (FC RF, 2006), which regulates the relations arising regarding the usage of forest resources. According to the part 1, article 8 of FC RF, forestland areas belong to the Russian Federation. So, there is no private ownership on forestlands in Russia.

The forest resources in Russia fully belongs to the State, so all the timber merchants use the forest lands and the resources situated on them according to the principle of payment for the forest (part 1, article 1 and 94 FC RF).

The calculation technique for the rental payment for forest resources is defined by article 73 FC RF. According to the part 2, article 73 FC RF, if a forest area is exploited in an effort to commercially extract forest resources, the minimal rental payment is defined as a rate for the unit of forest resources multiplied by the area of the forestland to be rented (part 3, article 73 FC RF). If the usage of a forestland doesn't suppose the extraction of forest resources, then the minimal rental payment is defined as a rate for the unit of forestland area multiplied by the area of the forestland to be rented (part 3, article 73 FC RF). These rates are stated by the Government of the Russian Federation, regional and local authorities (part 4, article 73 FC RF).

Article 76 FC RF determines the value of payment for the purchase of forest standings in commercial objectives. The minimal rental payment for the forest standings could be defined as the product of a rate for one unit of timber and the volume of the wood to be lumbered (part 2, article 73 LC RF). These rates are stated by the Government of the Russian Federation, regional and local authorities (part 3, article 73 FC RF).

The acting rates of payments for the unit of forest resources volume and for the unit of area of a forestland area belonging to the Russian

Federation are approved by the resolution of the Government of the Russian Federation No. 310 dated May 27, 2007. These rates are defined accurate within species of forest standings, tax classes, distances of transportation, category of timber. Every year the Government approves step-up coefficients for these rates.

Part 1, article 95 FC RF states that the evaluation of forests is conducted according to the Federal Law No. 135-FZ dated July 29, 1998 "On the evaluative activity in the Russian Federation", i.e. the Forest Code doesn't contain any specific techniques for evaluating of forest resources.

5. Evaluation of the Forest Rent in Russia

In spite of the fact that there are a some dozens of Russian scholars who develop the issues of the forest rent assessment, these works are mostly theoretical, meanwhile there is no statistically approved results in this domain. The rare exceptions from this rule are the studies (Pochinkov, 2010a, 2010b; Eismont et al., 2002).

In the works of S. Pochinkov (2010a, 2010b) the forest rent is supposed to be the remainder price, the result of subtraction of socially essential costs spent on production and consumption of forest products from its final market price. In other words, authors use the classical approach to the rent definition. The forest rent and the net income of usage and consumption of forest stands for main use cut could be evaluated at different stages of getting and selling of the forest production: (1) processing of the timber into the final product; (2) lumbering and selling of round wood materials; (3) selling of standing wood.

At the stage of processing of timber into the production of final consumption forest rent r could be evaluated as:

$$r = \frac{P_0 - C_0 - i_0 K_0}{s} - C_1 - i_1 K_1,$$

where P_0 denotes market price of one production unit of round wood and its materials (carving wood, pulp, paper, plywood etc.) in the departure station;

C_0 are the current costs on timber processing excluding the cost of raw wood including the costs on returning of main assets and interests on credit;

K_0 are the specific capital investments in processing production (buildings, structures, equipment etc.);

s is the raw wood expenditure related to one unit of the wood processing product;

i_0 is the profit rate on the main and circulating capital in wood processing;

C_1 are the current expenditures on wood stocking up and its transportation from the forest to the "low" warehouse, selling point or the processing plant, including the costs on returning of main assets and interests on credit;

K_1 is the main and circulating capital used in lumbering, including specific capital investments into removal of logs and constructing of the forest transportation roads;

i_1 is the profit rate on the main and circulating capital used in lumbering.

At the stage of selling of round wood the forest rent could be calculated as:

$$r = P_1 - C_1 - i_1 K_1,$$

where P_1 denotes the market price of one unit of round wood at the departure station, C_1 , K_1 , i_1 are the same parameters as in the formula written above. This formula could be applied if the rights on usage of the forestlands areas are provided to the timber merchants, whose production is being sell on the known markets with transparent prices.

At the stage of selling of the standing wood, forest rent r may be defined as:

$$r = r_m,$$

where r_m denotes the payment for standing wood, defined on auctions for analogous forestland. This approach is suitable for the cases when the most part of forest area is a subject of selling on the forest auction.

The particular interest should be focused on the study of O. Eismont et al. (2002). The authors analyse the application of two approaches to the assessment of forest rent: (1) excluding of all the costs from market price of forest (according to the widespread definition of rent), (2) econometrical evaluation of the forest rent based on the data from forest auctions.

In the first case the cash flow method and evaluating of net present value (NPV) method are applicable. The normal profit is treated as the cash flow yielding by some asset. This method corresponds to the Current Rent Method I of The Bureau of Economic Analysis of the USA. The dataset of Research and Design Institute of Economics, Production Management and Information for Forest, Pulp and Paper and Woodworking Industries (NIPIEIsProm, dataset No. 1) and data from regional Agencies of Forest Complex retrieved in 1998 (dataset No. 2) were used as the input data.

When calculating the rent according to the method of cash flow, the normal profit is supposed to be a cash of incomes returned by some asset. Data on incomes is contained only in dataset No. 1, and these incomes include prices "Free on Board" (FOB) and "Cost, Insurance and Freight" (CIF). Prices CIF are used to evaluate the revenue.

In the dataset No. 2 process costs are evaluated as the difference between the costs of lumbering for the forest located on the "low" warehouse and

the standing wood price. In the dataset No. 1 the costs are defined the same way. In the dataset No. 2 the sales expenses are defined as a sum of costs of lumbering for the forest located on the "low" warehouse, transport fees and the cost of loading. Then, the authors calculate the expected gross profit, which could be evaluated using the data on revenue and costs: expected gross profit = revenue – costs. It is possible to evaluate the expected volume of taxes using the data from dataset No. 2: expected taxes volume = expected gross value \times 30 % (if the gross value is positive) + standing wood price + export fees. When calculating using dataset No. 1, standing wood price is included into process costs and could not be extracted. All the other taxes including social insurance deductions are accounted in each dataset as a part of process costs. The value of standard income returned by the corresponding asset was assessed for the evaluation of normal profit for the whole forest sector (Eismont, 2002).

In the cited study the evaluation of forest rent for eight Russian regions and for the whole Russia was held (Arkhangelsk, Leningrad, Moscow, Novgorod, Pskov, Vologda Oblasts, Khabarovsk and Krasnoyarsk Krai). While estimating, there was stated that the data from both datasets are quite unreliable and could significantly vary depending on the primary source of the data. That's why Eismont et al. have made the conclusion that this approach is almost inapplicable in the Russian conditions.

The second approach supposes the econometrical modeling of the forest rent considering the following rent-producing factors: timber volume, transportation distance, soil type, site slope, forest type.

The authors of the *opus citatum* proceed from the assumption that the timber merchant acquires the right for usage of the forestland area total square of A hectares. The area to be cut

down during one year could be described with a production function:

$$Y = F(K, L, A, Q, d),$$

$$\frac{\partial F}{\partial Q} < 0, \frac{\partial F}{\partial d} < 0,$$

where K denotes capital being used, L is the number of workers, Q is the timber volume, d is the distance between the lumbering point and the railroad station or highway.

Omitting further computations, we give the final formula for the forest rent according to the model:

$$\rho = P_F M(Q) - \left[\frac{P_K - v \tau_K}{D(1 - \tau_K)} + (1 + \tau_L)w \right] \frac{D}{B} Q^\mu e^{\delta d},$$

where P_F denotes the market price of the wood excluding transportation costs (railroad or highway); v is the costs of stock usage including depreciation and normal profit; w is the overall salary of workers; P_K is the total value of capital used for lumbering counting on hectare; D is the wood volume in cubic meters counting on hectare; B is the depreciation rate accounted in the total costs.

Then the authors have conducted the forest rent evaluation using normative data on the productivity of the manual labor and machines and mechanisms. The econometrical models were estimated for the three different lumbering technologies using the data from Komi Republic in 1997. It was proved that the largest rent is returned by the technology that uses manual labor force and machines and mechanisms of non-Russian production. Mixed sets of equipment (both Russian and non-Russian) demonstrate minor results (Eismont, 2002: 35). In general, according to the data provided by lumberers, their productions were unprofitable, the rent was negative. It is likely that this statement is contrary to fact, because some part of the forest is excluded

from the official statistics and accounting and is selling using illegal ways.

Besides the forest rent assessment based on normative data, authors also used the information from the forest auctions trading the rights on lumbering (as an example dataset they used the results of such auctions in Novgorod Oblast in 1999).

The results of calculations showed that the average market price for timber are one and half times more than the auction ones, and the costs of lumbering estimated with the auction prices, are two times less than those which were calculated with the normative data. It occurs because of monopsony established on the forest production market, where there are a lot of timber merchants and a short list of consumers of the timber. The merchants are forced to sell their wood approximately up to 30 % cheaper than market price. This surplus, which includes, for sure, the forest rent, is appropriated by intermediates who don't really participate in the production process and don't possess any resources. So, legally they don't have any rights on this rent (Eismont et al., 2002: 47).

The results of the complex macro economical assessment of rental incomes in Russia in the beginning of 2000-s are presented in (Kuzyk et al., 2004; Volkonskiy et al., 2010). According to the method, set forth in the studies mentioned above, the evaluation of the rental income value represent the comparison of the income gained by the branches of natural resource use and the value of a mean income among other branches. Thus, actually this study implicitly uses the Paretian definition of the rent.

Kuzyk et al. mention that the rental income must be computed on the primary income before taxes. This restriction arise because the Russian tax legislation doesn't stipulate for attachment of the rent as a tax, so from the point-of-view of taxation the owner of mineral deposits doesn't

differ from the owner of any other capital in other sector of economy. Since the Federal Law "On subsoils" states that all the minerals disposed on the territory of the Russian Federation are the property of the State, and only the activity connected with the usage of factors of production not belonging to the State could be taxed, the rental income is not the tax. Generally spoken, it could be extracted only from the primary income returned from the selling of rent-producing natural resources.

The authors suggest such a list of the main rent-producing branches of the Russian economy: oil and gas production, ferrous and non-ferrous metallurgy. The rent income to be returned by the rent-producing branches can be computed as a difference between the primary income and the normative income of any used resources excluding natural:

$$R_i = I_i - I_i^*,$$

where I_i denotes primary income of the branch, and I_i^* denotes the normative income calculated for this specific branch.

The normative income I_i^* could be defined through the mean profitability related to the current costs or the value of main assets of national economy (or its manufacturing industry only):

$$I_i^* = K_C C_i, I_i^* = K_F F_i.$$

Here K_C and K_F are the mean profitability related to the current costs and the value of main assets, respectively; C_i are the process costs in the i -th branch; F_i is the value of main assets used for production in the i -th branch.

Then, the authors of the technique calculate the base coefficients of prime cost for all the main branches of natural resource use. Using these coefficients one could calculate the total

national (or regional) rental income with a simple formula:

$$R = \sum_i r_i V_i,$$

where V_i denotes the volume of production in the i -th branch of economy, r_i is the share of rental income in the total production of i -th branch.

The shares of rental income in the main rent-producing branches of the Russian industry were estimated in (Ryumina, Anikina, 2007: 165): oil industry–58,4 %, gas industry–61,9 %, metallurgy–35,2 %. However, since 2005 the application of these estimates is not possible anymore, because the Russian systems of statistics migrated from the old soviet system (the All-Union Nomenclature of Sectors of the National Economy, OKONKh) to the modern one (the All-Russian Classifier of Types of Economic Activity, OKVED). These systems have totally different internal structures of keys, so the application of this technique would be possible only when it is adapted to the new statistical technology OKVED.

Despite that the forest branch is not the part of main rent-producing branches of the Russian economy, the authors have evaluated the forest rent in 2000–2001 according to their methodology (Kuzyk et al., 2004: 98–103). In that period, the branch collected the main revenue from the export (approx. 55 % of the overall revenue). The same situation holds out to present day. According to the results of assessment, the rental income was about 30 % of the whole revenue (the producer's prices were used for estimation). Meanwhile, the authors state that approximately 25–30 % of the final price is appropriated by the different intermediates, and not the State or the owner of resources. This conclusion corresponds to the conclusion of Eismont et al. (2002).

6. Conclusion

Unfortunately, the assessment of the forest rent in Russia always face a specific obstacle, namely the existence of a significantly large shadow sector. By the assessment of the Federal Forestry Agency of the Russian Federation (Rosleskhoz), the volume of illegal cut of the forest in Russia in 2010 did not exceed 1 %. This would be a very optimistic situation fitting the best world standards, but there are some reasons to put it in doubt. For example, the World Bank (WB) and the World Wildlife Fund (WWF) evaluate the shadow sector of Russian forestry to be at least 20 % of the whole cut volume (16: xi–xii). Most likely, even such a huge estimate is moderate, so in fact much more forest cuts are “in shadow”.

Thereby, in the presented study we traced the evolution of the rent theory in the economical science and stated that for the time being there are two main approaches to the definition of the

notion “rent”. The “classical” approach suggests to think rent as a remainder produced by the subtraction of the labour and capital expense and the percent put on them from the final price of the product. The “Paretian” approach treats the rent as an excess over the normal income of the factor of production, i.e. the rent is the surplus appropriated by the owner of resource. During past decades the “Paretian” definition dominated in the rent theory. Particularly, the two most comprehensive and competent studies of the forest rent in the Russian economy made in early 2000s used exactly “Paretian” definition of the rent.

In our opinion, it would be interesting to get actualized estimates of the forest rent, especially for the period of the “rich” 2000s when the economy of Russia was growing by up 10 % each year. It is also important to remember that the definition of the rent have at least two purely different meanings, so one should evaluate the rent using both of them.

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Оценка лесной ренты в экономике России

А.И. Пыжев,
Е.В. Зандер, Ю.И. Пыжева
Сибирский федеральный университет
Россия 660041, Красноярск, пр. Свободный, 79

Целью статьи является обзор способов оценки лесной ренты. Прежде всего мы рассматриваем общую теорию ренты, которая выделяет классическое и паретианское определения ренты. По результатам изучения отечественного опыта оценки лесной ренты можно сказать, что все они основываются на паретианском определении ренты и не используют классическое определение. Тем не менее, паретианское определение существенно более требовательно, чем классическое. Это, по всей вероятности, объясняет тот факт, что на данный момент не существует актуальных крупномасштабных исследований, оценивающих лесную ренту в российской экономике.

Ключевые слова: теория ренты, лесной комплекс, природопользование, лесная рента

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