

Cost structure of wood harvesting in northwest Russia

Estructura de costos de la extracción de madera en el noroeste de Rusia

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Abstract:

Wood harvesting has traditionally been an industry of low profitability in Russia, and increasing forest lease payments are expected to impair the situation. Understanding the structure of wood costs and thus the factors affecting the profitability of logging operations is a prerequisite for securing a sustainable wood supply for the whole forest industry. This article reports the main findings and discusses the factors affecting the cost price of roundwood.

Key words: cost price, logging, taxes, forest lease

Resumen:

La extracción de madera ha sido tradicionalmente una industria de baja rentabilidad en Rusia, y el aumento de los pagos de arrendamiento forestal perjudica la situación. Comprender la estructura de los costos de la madera y, por lo tanto, los factores que afectan la rentabilidad de las operaciones de tala es un requisito previo para garantizar un suministro sostenible de madera para toda la industria forestal. Este artículo informa los principales hallazgos y discute los factores que afectan el precio de costo de la madera en rollo.

Palabras clave: precio de costo, tala, impuestos, arrendamiento forestal

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1. Introduction

It is often stated that wood is cheap in Russia, and low wood costs are mentioned as an advantage when investments into the forest industry are considered (AFK Sistema 2014, Rasmussen and Pihlajamäki 2012). Yet, a reliable, continuous, and sustainable wood supply cannot be considered as a matter of course, since wood harvesting has traditionally been an industry of low profitability in Russia and harvesting companies are struggling with several operational problems (State Council 2014). In addition, the companies' operating environment contains several sources of risks, the major one of which is the state and its unforeseen decisions, which have significant impacts on forest use (Katkova 2012, 2013). The lack of a direct dialogue between the state and private forest users further increases this risk.

According to the Forest Code of the Russian Federation, the state owns the forests that are included in the forest fund and allocates forest use rights mainly through long-term lease contracts, which are concluded after auction. The minimum auction price is set by government orders, and the final price for the lease right, i.e. for standing wood, is defined by the winning bid (Forest Code 2016). Thus, theoretically, the lease payment reflects the market demand for wood as well as the quality of the forest area to be leased. However, in practice, there are often only one or two participants in the auction, and the winning bid insignificantly increases the minimum price (Samolysov and Bulgakova 2017); thus, one may question to what extent the auction prices are market-based. The low level of winning bids may reflect the scarcity of potential bidders and the low profitability and solvency of the bidders, but also possible shortcomings, such as the lack of transparency and openness, in the auction system. Notwithstanding the reasons for the low winning bids, from the Russian forest authorities' point of view, forest use payments are too low, as income to budget is covering only half of the state's costs for forestry (State Duma 2017). Thus, lease payments on wood harvesting were doubled by an administrative decision in the beginning of 2018.

The Russian forest use payments are occasionally compared with stumpage prices, for example, in Finland. Using such a simplistic comparison, one would easily conclude that wood is indeed cheap in Russia. In 2016, the level of forest use payments was RUB 57 (EUR 0.77; RUB/EUR = 0.01351) per cubic metre in Russia, whereas the average stumpage price across all the timber assortments and logging methods in stumpage sales by the non-industrial private forest owners was EUR 34.74 per cubic metre in Finland (Luke 2017, Rosleshoz 2017). However, direct comparisons between Russian forest use payments and international roundwood market statistics are not rational due to differences in price formation and definitions (Petrov and Katkova 2014, 2016).

In the Russian operating environment, the forest use payments are marginal compared to other components, such as logging and transportation costs, which are included in the total wood costs or the wood price at mill gate or at terminal (Karvinen et.al. 2016, Tyukina 2010). Lesers are also bearing the costs for silvicultural measures and forest protection, i.e. forest guarding and forest fire prevention in the leased forest area, the costs of which contribute to the wood costs. In addition, taxation is a substantial burden for wood harvesting companies compared to companies carrying out only trade operations, for example. Wood harvesting companies have to pay a total of 13 types of taxes and statutory payments, which include, in addition to the forest use payment, value-added tax, corporate tax, vehicle tax, land tax, property tax of organisation, income tax of a natural person, insurance fund payments, payment for emissions and discharges of polluting materials, as well as other charges (Tax Code 2000). Thus, the price of wood at mill gate is an amalgamation of several different cost factors and the operator's profit margin. However, in a Russian context, information on the structure of wood costs and wood price at mill gate is limited and varying. The only public source for wood price information

is the producer price statistics published by the Federal State Statistics Service (hereinafter Rosstat), which was used in the study as comparison material to find out the correspondence of producer prices with actual market prices.

The gap of knowledge regarding wood price and its components prevents analysing, amongst other things, the development of Russian wood markets in general and the factors affecting profitability and efficiency of wood harvesting businesses in particular. In 2014, the Russian Forestry Agency initiated a survey focusing on wood harvesting companies in Northwest Russia in order to fill this knowledge gap. The Department of Forestry Agency in Northwest Russia and the Saint-Petersburg Forest Technical University (hereinafter SPFTU) realised the survey in collaboration. This article reports the main findings of the survey, focusing on factors affecting the profitability of harvesting companies.

Understanding the structure of wood costs and thus the factors affecting the profitability of logging operations is a prerequisite for securing a sustainable wood supply for the whole forest industry. The knowledge of the wood cost composition in Northwest Russia helps to avoid making misleading and even erroneous comparisons of wood prices between Russia and other countries, which could, at worst, bias the decision making of companies working and investing in the forest sector in Northwest Russia as well as authorities regulating the conditions for forest use.

2. Methodology

The population of the study consisted of forest leasers carrying out wood harvesting in Northwest Russia. The data were collected via a survey, which included a structured questionnaire that was sent to the respondents as well as personal expert interviews. There were approximately 900 forest leasers with the right to harvest coniferous wood in Northwest Russia in 2014 (Ministry of Industry 2014). The questionnaire was sent through regional forest authorities to all companies; in total, 40 (4%) of them answered the questionnaire. The questionnaire included questions about wood harvesting conditions, roundwood cost price, market price of wood and taxation (Annex 1). Annual data were asked to be provided separately for cut-to-length (CTL) and tree-length (TL) harvesting methods for the years 2011–2013. In 2016, the respondents were contacted again to update the data for the years 2014–2015. The respondents were grouped according to their annual wood harvesting volume into small ($< 50,000 \text{ m}^3/\text{y}$), medium-sized ($50,000\text{--}150,000 \text{ m}^3/\text{y}$) and large ($>150,000 \text{ m}^3/\text{y}$) companies.

In Russia, the concept of cost price, «*sebyestoimost*», is used for the calculation of the production and realisation costs of a product. Different kinds of classifications can be used in planning, calculation, and analysis of the cost price. In practice, two supplementary groupings are used 1) grouping according to cost elements or 2) calculation items that identify for which purpose resources are allocated. The contents of groupings depend on branch-specific features and the product type. For this study, the methodological recommendations for the forest industry were adapted (Anon 2002). According to these recommendations for wood harvesting, the average cost price is defined for one cubic metre of roundwood without regard to timber assortment or quality. Cost prices of different timber assortments are further conducted from the company's book-keeping, using coefficients that are calculated on the basis of the actual market price of the timber assortment in question. The cost price includes costs related to consumed forest resources, fixed assets, materials, fuels, energy, labour, and other production and realisation costs. In the methodology, the wood harvesting process is divided into elements on the basis of the implementation place of the operation. In this study, cost price was divided into six elements

(Table 1). In addition to the actual production costs, taxes and other statutory payments were studied. The data were analysed by using standard statistical methods.

Table 1
Cost elements in wood harvesting

Costs in control of enterprise	Costs beyond control of enterprise
1. Wood harvesting	1. Taxes
2. Transportation	2. Statutory charges
3. Loading and unloading	3. Lease payment
4. Silviculture	
5. Administration	
6. Commercial	

Source: compiled by the authors.

The Forest Policy and Economy Department of the SPFTU has cooperated closely with forest leasers in Northwest Russia during decades. The experience based on this dialogue shows that an established cost calculation method is missing in this practice. Instead, market price at terminal (EXW) is often used as the determining factor for defining the cost price in small and medium-sized companies. The calculation of cost price is based on actual costs divided into internal production and outsourced services.

The selling prices reported by the respondents were compared with the average producer prices collected by the Rosstat. The producer prices are weighted (by volume) arithmetic means of realised prices without indirect taxes, such as value-added tax, and are published monthly (Anon 2008).

3. Results

The CTL-technology was the predominant wood harvesting system, while TL-technology was used in 30 percent of the cases (Table 2).

Table 2
Background information of the respondents

Characteristic	Harvesting method	
	Cut-to-length	Tree-length
Company size according to the annual wood harvesting volume:		
small (< 50,100 m ³ /y)	6	2
medium (50,000–150,000 m ³ /y)	8	7
large (>150,000 m ³ /y)	14	3
Average wood transportation distance, km	100	50
Total output of industrial wood from total harvesting volume, %	48	48

Source: compiled by the authors.

Especially in the large companies, whose annual wood harvesting volume exceeded 150,000 cubic metres, CTL was the most used harvesting method. The average wood transportation distance was twice as long, 100 km, for

the companies using CTL than for the companies using TL technology. The difference in the average transportation distance reflects the fact that companies using CTL were larger both in terms of harvesting volumes and lease areas than companies using the traditional TL technology. Moreover, the transport distance in the case of TL is from forest to lower landing, whereas in the case of CTL, it is from forest to the customer's terminal. The output of industrial wood refers to the share of industrial wood from total logging volumes. Both in the companies using CTL and TL methods, the volumes of logged wood which does not meet the quality requirements of industrial timber assortments were substantial, accounting for over 50 percent of the total harvesting volumes.

In the respondents' companies, the full cost price for one cubic metre of roundwood was RUB 1,259 for the CTL harvesting method and RUB 1,343 for the TL method (Table 3).

Table 3
Cost price structure of roundwood in 2015,
with an average transportation distance of 90 km

№	Cost type	Cut-to-length method			Tree-length method		
		RUB/ m ³	Standard deviation	Cost share, %	RUB/ m ³	Standard deviation	Cost share, %
1	Forest use payment	52	42	4	67	18	4
2	Wood harvesting	367	50	29	397	44	30
3	Transportation	325	69	26	366	34	28
4	Loading and unloading	75	5	6	69	11	5
5	Silviculture	47	11	4	84	15	6
6	Administration	82	9	7	99	29	8
7	Commercial	311	60	25	261	66	20
8	Full cost price of 1 m ³ of roundwood	1259	126	100	1343	130	100

Source: compiled by the authors.

Wood harvesting and transportation were the two major components of the cost price. The share of harvesting was 29 percent for CTL and 30 for TL harvesting methods. The share of transportation for the average distance of 90 kilometres was 26 and 28 percent, respectively, additionally loading and unloading costs at terminals comprised 6 and 5 percent. The third component with a high share, 20 and 25 percent, was represented by commercial costs. All the other components' cost shares were below 10 percent, e.g. the forest use payment's share was 4 percent of the total costs.

The average costs related to taxes and statutory payments in total were RUB 264 for one harvested cubic meter of roundwood (Table 4).

Table 4
Taxes and statutory payments of a wood harvesting company in 2015
(cut-to-length method)

Tax or payment	RUB/m ³	%
Taxes related to revenues:		
Value-added tax	94	35
Taxes related to profit:		
Corporate tax	5	2
Vehicle tax	3	1
Land tax	1	1
Taxes related to cost price:		
Property tax of organisation	9	3
Income tax of natural person	32	12
Insurance fund payments	64	24
Forest use (lease) payment	52	20
Payment for emissions and polluting materials	1	0
Other payments	2	1
Customs duties for wood export	3	1
Total for 1 m ³ of roundwood	264	100

Source: compiled by the authors.

The main elements were value-added tax (35%) and insurance fund payments (24%). The share of forest use payment was 20 percent. Taxes and statutory payments related to cost price were RUB 167 per cubic meter; their share varied between 7 and 48 percent. Selling prices of the respondent companies and Rosstat's average producer prices in Northwest Russia are presented in Table 5.

Table 5
Average selling and producer prices in
2015, RUB/m³ (EXW, without VAT)

Timber assortment		Selling price (Std. Dev)	Producer price	Difference, % selling/producer price
Sawlogs	coniferous	1,664 (419)	1,756	-5
	non-coniferous	1,417 (576)	1,604	-12
Pulpwood	coniferous	980 (458)	988	-1
	non-coniferous	983 (491)	953	3
Energy wood		458 (106)	600	24

Source: compiled by the authors.

4. Conclusions

The main components of the roundwood cost price were wood harvesting and transportation, as expected. Significant differences in cost price between CTL and TL harvesting methods were not detected, even though the CTL method is mainly based on imported forest technology, which increases capital intensity and maintenance costs. The remarkably high share of commercial costs, related to the realisation of products together with administrative costs, allows the conclusion that an optimisation of business processes could improve the profitability of wood harvesting. The low output of industrial wood production markedly decreases the profitability of wood harvesting. The neglected forest management practices, such as the tending of seedling stands and thinnings at the current extensive forestry model, contribute to the low technical quality of forests in the areas where the respondents operate. In this regard, transferring to intensive forestry and efficient silviculture gives companies an opportunity to improve the profitability of wood harvesting operations.

Capital expenditures to the forest road infrastructure were neglected in the analysis, which considerably decreases the cost price. The construction of forest roads is costly in Russia, on average, RUB 1-1.5 million (EUR 13,500-20,300; RUB/EUR = 0.01351) per kilometre (Havimo et. al 2017, Suhanov 2015). For example, in Finland, these costs remain at the level of EUR 12,000 per kilometre (Anon. 2014). Construction and maintenance of forest roads can increase wood transportation costs by 2–2.6 times (Mayorov and Tretyakov 2014). The impacts on cost price are obvious and companies have reported, for example, a 20 percent share for road construction in wood cost when transferring to intensive forestry (Shorohov 2017). Yet, investing into forest road networks is a crucial precondition for efficient forest use and profitable wood harvesting. However, the lacking state incentives, the uncertainty related to continuation of leases combined with low profitability and lack of capital do not encourage the leaseholders to invest in forest road building.

Taxes and statutory payments form 13 percent of the roundwood cost price, and the forthcoming raises of forest use payments, will increase the share by several percent. Tax burden can be, to some extent, decreased by tax optimization; yet, the companies have little possibilities to influence this cost component. The respondents' selling prices correspond with the Rosstat's producer prices rather well.

In Russia, the state forest policy is reflected in the forest legislation, which is typically imperative and has a strong influence on the structure and level of costs in wood harvesting (Petrov 2017). Thus, the effectivity of forest use is dependent on the state forest policy. Regarding taxation, it would be important to find an equilibrium, enabling forest sector companies to develop and, at the same time, securing a stabile income for the forest owner, i.e. the state budget. So far, the state has not succeeded to reach a balance in economic relations with the industry, since the result of forestry is negative. In addition, the present approach of estimating effectivity as well as costs of forest use regarding cubic metres instead of hectares is not urging companies to intensively use forest resources and their numerous benefits. It is therefore necessary to further study the profitability and cost management in wood harvesting in order to achieve a balance between the economic interests of the state and those of the private sector.

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Annexes

Annex No 1: Questionnaire on costs and results of wood harvesting

No	Background information
1	Leased forest area, 1,000 ha
2	Allowable annual cut/Actual annual cut, 1,000 m ³
3	Tree species composition
4	Average wood volume, m ³ /ha
5	Total output of industrial wood, % (coniferous, non-coniferous)
6	Average stem size, m ³
7	Average transportation distance, km
8	Main harvesting method (cut-to-length, tree-length)
	Cost price of 1 m ³ of roundwood
9	Preparatory work, RUB/ m ³ (costs for forest road maintenance, harvesting area inventory, other)
10	Direct wood harvesting costs, RUB/m ³ , including:
10.1	Labour costs
10.2	Insurance fund payments
10.3	Maintenance and use of mechanisms
10.4	Forest use payment (lease payment)

№	Background information
10.5	Other costs
11	Direct wood transportation costs, RUB/m ³ , including:
11.1	Labour costs
11.2	Insurance fund payments
11.3	Maintenance and use of mechanisms
11.4	Other costs
12	Direct loading and unloading costs, RUB/m ³ , including:
12.1	Labour costs
12.2	Insurance fund payments
12.3	Maintenance and use of mechanisms:
12.4	Other costs
13	Costs for silvicultural work, total, RUB/m ³ (forest regeneration, forest guarding and protection, other costs)
14	Administration costs, RUB/m ³
15	Commercial costs, RUB/m ³ ,
16	Full cost price of 1 m ³ of roundwood (9+10+11+12+13+14+15)
	Additionally
17	Total revenue, 1,000 RUB, including:
17.1	Roundwood (coniferous, non-coniferous)
17.2	Sawnwood
17.3	Other wood products
18	Gross profit (deficit), 1,000 RUB
19	Net profit (deficit), 1,000 RUB
20	Average price for 1 m ³ of sawlogs (EXW), RUB without value-added tax (coniferous, non-coniferous)
21	Average price for 1 m ³ of pulpwood (EXW), RUB without value-added tax (coniferous, non-coniferous)
22	Average price for 1 m ³ of energy wood (EXW), RUB without value-added tax
23	Labour costs, RUB/year
24	Cost of forest management plan, RUB
25	Average diesel costs, RUB/ton
26	Average petrol costs, RUB/ton
27	Average price of energy, RUB/kWh
28	Value of fixed assets, 1,000 RUB
29	Wear of fixed assets, %
30	Average number of employees, person
31	Taxes, charges and payments, including:
31.1	Corporate tax
31.2	Value-added tax
31.3	Property tax of organisation
31.4	Land tax

Nº	Background information
31.5	Vehicle tax
31.6	Income tax of natural person
31.7	Insurance payments to the pension fund
31.8	Insurance payments to the social insurance fund
31.9	Insurance payments to the medical insurance fund
31.1	Forest use payment (lease payment) (to the federal budget, to the regional budget)
31.11	Tax for using simplified tax system
31.12	Uniform tax for imputed income
31.13	Payment for emissions and discharges of polluting materials
31.14	Customs charges and duties for roundwood export
31.15	Other payments