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Changes in the Market of Precious Wood: A Case Study of Submission System in Poland

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Abstract: A timber market occupies a very particular position within the economic reality. Trading of commodities such as precious timber is, indeed, strongly conditioned by the carrying capacity and the silvicultural potential of the forest ecosystem. Timber markets in Poland are characterized by a controlling position of the State Forests, and one of the possible forms of wood sale is the system of submission. A submission usually implies that small quantities of wood with unusual features are being offered to a specific group of customers. The paper presents the sale results and prices of veneer wood commercialized in submission systems and in other forms of timber sale in the territory of Krosno during the years 2000−2019. It is one of the oldest submission markets in Poland, where the most expensive log ever in Poland was sold (13,000 USD/log—close to 7000 USD/m^3). The Regional Directorate of State Forest (RDSF) of Krosno is located in the south-eastern part of Poland and manages a forest area of approximately 400,000 hectares. Annual timber harvesting amounts to 2 million m^3, of which less than 2000 m^3 annually is allocated to the submissions. The data cover a 20-year continuous time series and allow tracing changes in the wood volume offered to the market, the species population structure, and price trends for individual species. The data are being discussed against the background of the economic situation and in relation to the average prices obtained from other methods of sale. Beech was the most sold, but the demands for oak and sycamore appeared to be particularly high during the period of observation. The unity prices can be very variable even for wood from the same species, especially for sycamore. The prices are generally demand-driven and show strong influences from furniture industries and fashion. A rising demand for high quality timber and logs of big dimensions has been noticed. The submission system results in substantial economic benefits for the forest management and the region as a whole.

Keywords: precious wood; wood submission; wood price; timber market

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1. Introduction

The State Forests in Poland implement the tasks provided for in the Act on Forests of 1991 on the basis of a self-financing system [1]. This means that the State Forests, while implementing their goals, operate on a commercial basis (public sector company) and most of the expenses must cover from own income, i.e., from the sale of wood.

The State Forests, supplying wood directly to the wood industry, had to develop new rules for selling wood based on modern marketing but, due to the fact that it holds a dominant position on the market, it is supervised by the Office of Competition and Consumer Protection.

According to Szujecki [2] the wood management strategy in Poland should be dominated by the tendency to produce high quality of wood, its early sorting, and proper software of processing and protection in applications.

The necessity to produce quality-oriented wood is also expressed by German foresters [3].

The special wood raw material market in Poland is relatively small. According to Ballaun and Ślęzak [4], the precious wood market is on average 400 thousand m^3, which con-

stitutes approx. 1% of extraction in Poland including about 30 thousand m^3 of veneer wood and 370 thousand m^3 of plywood. However, the precious wood market is one of the most stable. Several methods of selling wood raw material have been developed, among which submissions, tenders and auctions for wood have been in force since 1998. RDSF Krosno was one of the first Directorates in Poland to start selling wood through submissions.

For many years, it has been an effective and proven way of selling valuable wood, which occurs sporadically in the specific stand conditions of the Krosno RDSF.

The precious wood submissions organized in this area once a year bring material benefits as well as prestige for the region and the economy of the State Forests [5–10]. The organization of the submissions requires a lot of work due to the complicated and laborious procedure of its preparation and the specificity of the product.

Every year, the Regional Director issues guidelines for the organization of the precious wood submissions, which include, inter alia, information about the technical requirements that must be met by wood prepared for the submissions. "Precious" or "valuable" wood should be understood as wood not always compliant with general standards, but endowed with specific features that make it unique. Usually, it is wood that meets the standard for veneer wood, but often also wood that does not meet this standard, which can potentially interest buyers with its properties such as large-size wood with features similar to veneer wood or sycamore (*Acer pseudoplatanus* L.) wood for veneers and musical instruments.

Technical requirements for wood raw material and species offered to potential buyers result mainly from trends in the wood industry [5]. The highest quality wood has always found its buyers quickly and its additional advantage was collecting it in one place. Due to the prestige and obtained prices, more and more Regional Directorates of the State Forests organize submissions of valuable wood, and one of the first was RDSF in Krosno.

The aim of the study was a detailed analysis of the quantity and obtained prices of individual types of wood offered on precious wood submissions taking place in the Krosno RDSF in 2000–2019. The paper presents the income obtained from the sale of wood organized by the RDSF in Krosno and conclusions were drawn about the accuracy of the decisions made on the basis of financial benefits obtained from this form of sale of wood.

2. Materials and Methods

The Information on the quantity of wood sold and the prices obtained on the precious wood submission were taken from the annual reports of the RDSF in Krosno on the acquisition and sale of raw wood and from the annual reports on the sales prices of individual assortments depending on the form of sale in the years 2000–2019.

In the field, however, after selecting wood made according to the adopted assumptions, the sorter makes a decision to qualify it for sale during the submissions. The wood is sent to submissive yards, where the individual pieces of wood are given the so-called commercial appearance.

The wood is arranged according to species and measured, and then, after assigning a submissive number (the so-called lot), a catalog of valuable wood intended for sale is prepared. The wood prepared in this way can be viewed by potential buyers for about two weeks before the start of the submissions. After all offers collected from potential buyers are entered into the computer database, the one that offered the highest price wins (first price auction). In the case of several equal price offers, the buyer is randomly selected by a computer system. After the settlement of the submissions, the Director of the Regional Directorate of State Forests, on behalf of forest districts, signs contracts with contractors within seven days, who collect the wood material after paying.

3. Results

For 20 years of the history of the Krosno's submissions has offered a total of over 30,000 m^3 of wood raw material. About 95% of the offered raw material was sold on average.

The data presented in Figure 1 clearly indicate the collapse of the offer in 2008–2009, which was related to the economic crisis. From year 2012, a slow increase in the offer can

be noticed until 2019. The analysis of wood sales on the valuable wood submission in the years 2000–2019 showed that the sales of such types as beech (*Fagus sylvatica* L.) and oak (*Quercus* L.) dominate, which results mainly from the species structure of Carpathian stands. The species most often sold in the analyzed period is beech in the amount of 11,783.86 m^3, which accounted for 38.02% of the total amount of wood sold (Figure 2). beech is primarily used by the veneer industry. In the years 2000–2008, beech dominated the total amount of wood sold at the submission, while its share has been lower since 2009.

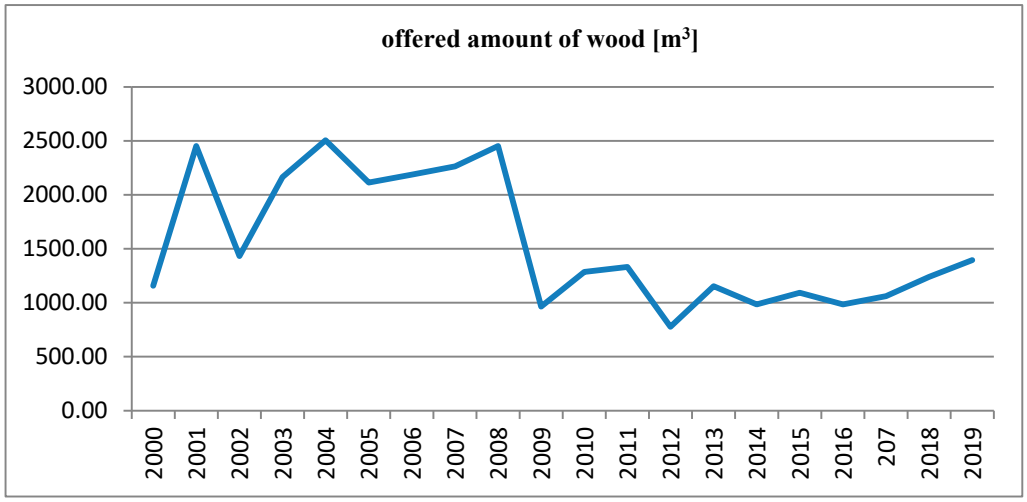

Figure 1. Offered amount of wood on RDSF Krosno submissions (in m^3).

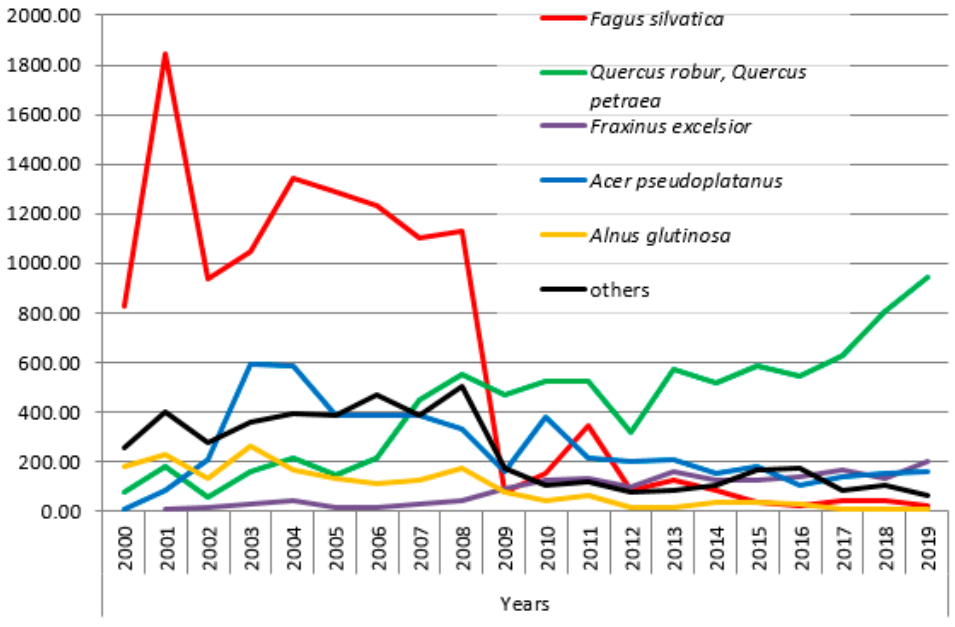

Figure 2. Annual changes of amount of offered wood by species (in m^3).

Since the beginning of the precious wood submission, oak wood has been exhibited, 8485.77 m^3 of which was sold, and its share in the total sale was 27.38%. Since 2007, there has been a clear increase in the amount of oak wood sold, while in 2010–2019 wood of this species dominated the submissions, which was caused by an increase in interest in it and greater use in the wood industry.

The demand for sycamore wood results from the presence of resonance wood features in this species, mainly used for the production of musical instruments. The demand for

sycamore wood grew steadily in 2000–2004 and, in the following years, there was a decline in interest. In the entire analyzed period, sycamore wood accounted for 16.19% of the total amount of wood sold in the submissions. Black alder (*Alnus glutinosa* (L.) *Gaertn.*) and ash (*Fraxinus excelsior* L.) wood are also purchased on the precious wood submission, and their share in total sales was 6.02 and 5.47%, respectively. Due to the small quantities and the sporadic nature of the offer, the "others" category includes birch (*Betula pendula Roth)*, walnut (*Juglans regia* L.), cherry (*Prunus avium* L.), maple (*Acer platanoides* L.), linden (*Tilia platyphyllos Scop.*), larch *(Larix decidua Mill.*), pine (*Pinus sylvestris* L.), poplar (*Populus tremula* L.) and elm (*Ulmus* L.) wood.

After analyzing the results on prices obtained from the sale of wood on the valuable wood submission in 2000–2019, it was found that for species such as beech (Figure 3), birch, sycamore (Figure 4) and black alder the lowest prices were recorded in 2006 and they ranged from PLN 109/m^3 (USD 28) for sycamore to 166 PLN/m^3 (USD 42) for black alder. On the other hand, the lowest prices for oak (Figure 5) and ash wood were obtained in 2010 and they amounted to 251 and 321 PLN/m^3 (USD 63 and USD 81). Minimum prices throughout the analyzed period do not remain at a similar level but fluctuate.

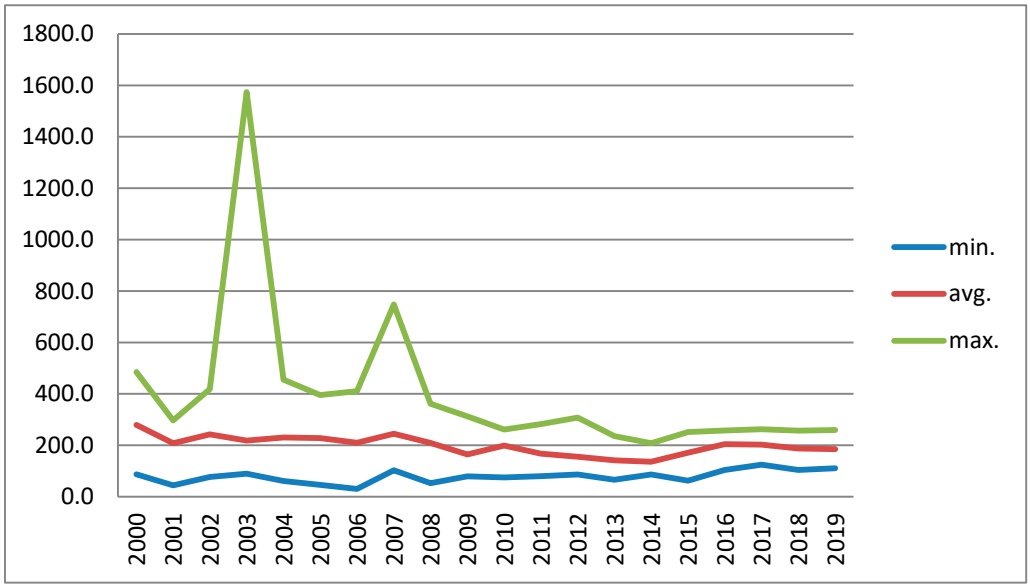

Figure 3. Annual wood prices [USD/m^3] of beech wood offered at the Krosno submission.

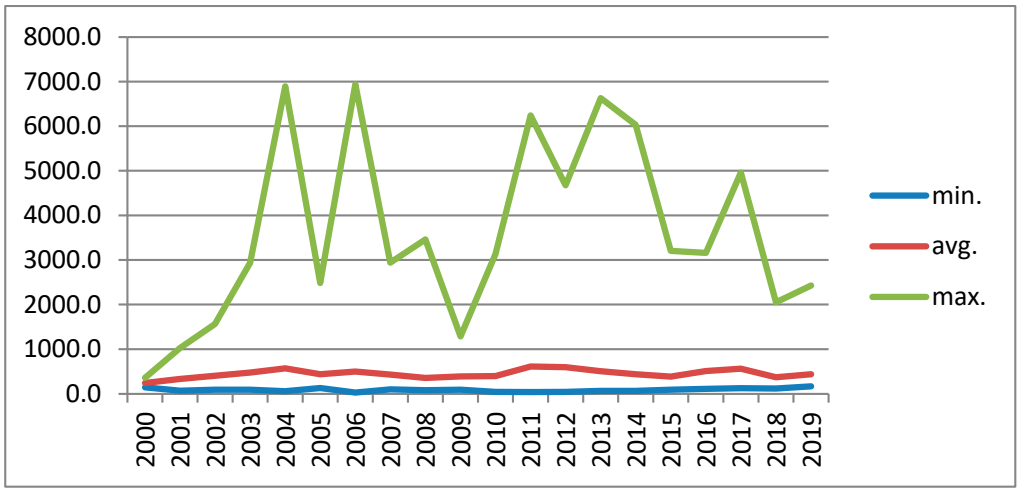

Figure 4. Annual wood prices [USD/m^3] of Sycamore wood offered at the Krosno submission.

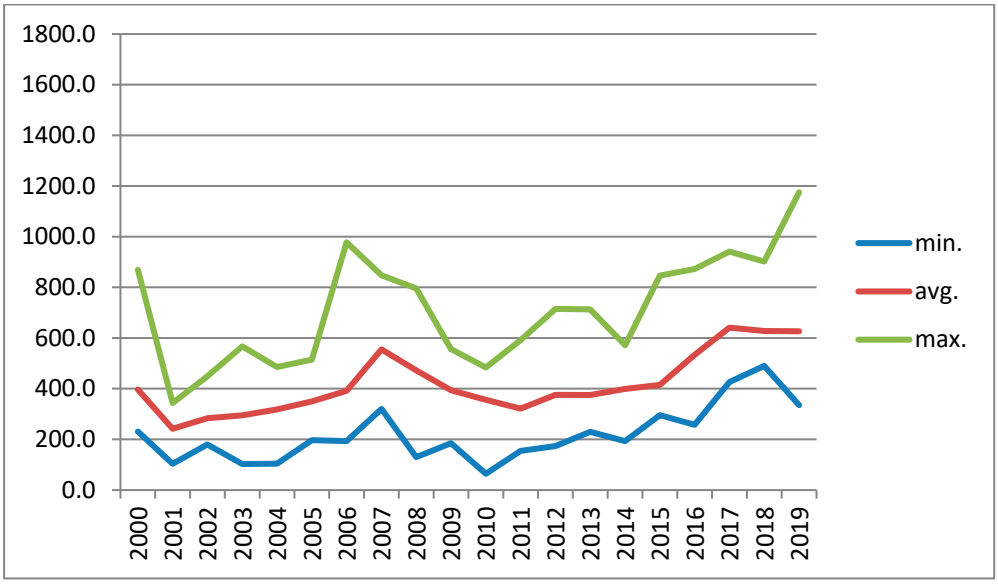

Figure 5. Annual wood prices (USD/m^3) of Oak wood offered at the Krosno submission.

The lowest average price of beech wood (the most common in the precious wood submission) was found in 2014 and it amounted to PLN 532/m^3 (USD 135). In the case of sycamore wood, the lowest average price, amounting to PLN 948/m^3 (USD 240), was achieved in 2000. In 2001, the lowest average price was obtained for oak wood, amounting to PLN 948/m^3 (USD 240). The lowest average price for ash, PLN 494/m^3 (USD 125), was obtained in 2003, and for black alder in 2015, PLN 606/m^3 (USD 153).

In the analyzed period, the maximum price for ash and beech was obtained in 2003 and it was, respectively, PLN 4719 and PLN 6138/m^3 USD1195 and 1554). In 2004, the highest price in the history of the precious wood submission was achieved by black alder wood, for which PLN 2976/m^3 (USD 753) was paid, respectively. In 2006, the highest prices for sycamore were obtained, amounting to PLN 27,072/m^3 (USD 6854). The highest price was paid for oak wood in 2019, which amounted to PLN 4585/m^3 (USD 1161).

When analyzing the average, maximum and minimum prices obtained for individual logs, we can see that the prices of beech and oak wood are not subject to large fluctuations in individual years. The exception was in 2003, when one of the beech logs was sold for a price seven times higher than the average.

The situation on the sycamore wood market is completely different; there, you have to pay for selected logs at least ten times the average price of this wood. The reason for such a situation may be the varied purpose of this wood. Most of the sycamore wood offered in the submissions is most likely intended for veneers, but the selected logs are intended for the production of musical instruments and they generate the maximum prices.

4. Discussion

The analysis of trends of the changes in the wood raw material market is a complex activity [11,12]. Among many factors, the wood raw material market is influenced by the availability of raw material, assortment, wood harvesting technology, and the situation on the forest services market [13–17]. Another group of factors is forest policy, nature protection or natural disasters [18–21]. Many studies were undertaken to combine the analyzed factors into coherent forecasts for the development of the wood market [22–29] however, local markets have their own specificity and do not always reflect trends in a broader perspective [30]

Wood raw material prices in Poland generally are close to the average prices in Europe, but the precious wood market has its own specificity.

Merchants often come to the submissions in Krosno for a very specific log, and they are able to pay a lot of money for it, as was the case in 2004 and 2006. In 2004 and 2006, merchants paid over 13,000 USD/log—close to 7000 USD/m^3 and this is the highest price ever paid for timber in Poland.

In order to reduce transport costs, participants of the submissions usually also purchase other logs in the amount depending on the size of the transport set.

Every year, 30–39 companies from the wood industry, mainly from Poland, Austria, Estonia and Germany, participate in the submissions, and the prices per m^3 of wood achieved in the submissions are average two to three times higher than the prices achieved in ordinary forms of sale.

The obtained maximum prices of wood of individual species are not comparable with the minimum and average prices. The unit price obtained on the submissions may be due to the better quality of the displayed raw material and the greater interest of buyers in a given product in a given year [6]. Additional factors influencing the obtained unit price are: fashion in the furniture industry, trends in the wood market, demand for a given species, demand for wood and demand for specific wood raw materials in other countries, and the zloty exchange rate. All these factors make it difficult to determine the amount of wood that should be prepared each year for a precious wood submission, so that after deducting the costs incurred for its organization the economic results obtained were satisfactory. The organization of the precious wood submission is a well-thought-out activity of the forest administration resulting from the increase in demand for wood of a certain quality, as individual veneering companies operating in the Krosno RDSF were purchasing only small amounts of the best quality raw material. In fact, there was much more of such wood, and the lack of competition had a direct impact on the sales volume and the level of prices achieved. However, the most important advantage of submissive sales is the ability to independently select the wood by the customer who, after examining the raw material, determines its suitability for production and makes a valuation. A very important effect of the organized precious wood submissions is the attraction of large and well-known European veneer companies to the regional market in Poland. It would not be possible if this wood was sold in an amount from several to several dozen m^3 directly by forest districts, because a small amount of wood purchased due to transport distances would not be an attraction for Austrian or German contractors. Selling timber on the submission also allows you to gather enough timber for cost-effective transportation of dispersed species such as linden, elm or walnut which, due to local occurrence, have not been offered to buyers. This is of particular importance for the economy at a time when we implement the model of sustainable forestry.

The management of rare species, which often play a biocenotic role in the forest and increase biodiversity, has a significant impact on the economic benefits of forest owners [31]. Increased revenues from the sale of rare or less popular species found in forests may balance, and sometimes exceed the costs of, complications resulting from the increased labor-intensity of caring for and obtaining wood raw material from such forests [32,33].

Thanks to the annual submissions of precious wood, it was possible to promote the local wood material from Podkarpacie not only in Europe, but also in the world through identification.

5. Conclusions

1. During the precious wood submissions organized by the Krosno RDSF in 2000–2019, a total of 30,994.52 m^3 of wood was sold, with beech wood the most sold. Oak and sycamore wood was very popular among buyers.
2. The prices obtained during the precious wood submissions organized by the Krosno RDSF are constantly changing for individual species. The largest difference in the price of wood was found in 2006 for sycamore, where the minimum price per 1 m^3 was PLN 109 (USD 28) and the maximum price was PLN 27,072 (USD 6942). The average

price for wood sold in the precious wood submission in the Krosno RDSF was PLN 1270.74/m^3 (USD 325).

3. Unit prices obtained for wood raw material depend on the demand for particular species, fashions in the furniture industry and trends in the wood market. On the other hand, the submission of valuable wood brings many regional and national benefits for the economy of the State Forests. Wood raw material prepared for the submission of valuable wood is of an increasingly better quality, new customers were also acquired and valuable wood was promoted on the European and global market.
4. The expectations of potential buyers as to the quality and dimensions of wood are getting higher and more difficult to meet by the State Forests. The organized submission of valuable wood enables the collection of wood that meets the requirements of the recipients. The supply of the highest quality wood fluctuates from year to year, while its average price increases.

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