

Review article

Overview of Reports on Price Fluctuations of Beech, Oak, Spruce, Fir, Pine and Lindenwood in Europe, with a Focus on the Potential of Linden in the Future of the Timber Market

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Abstract

In this paper, we will analyze the literature that provides specific data on the growth and decline of prices of various wood products from the most important tree species in Europe. These are mainly products that were the best-selling or most sought-after on the wood market in the previous period. The focus is on 2024 and European countries, with a special emphasis on Germany. For a certain reason, the overview of product price fluctuations on the wood market is focused on Germany, because this market is considered an indicator of trends in the European forest products market. Beech, oak, fir, spruce and pine are the most common commercial wood species, which have a long tradition of use in different parts of Europe. Commercial tree species are increasingly threatened by fires, various pathogens and calamitous insects, as well as the complex drying process, which leads to a high level of tree mortality. Some of the most harmful factors that seriously threaten forestry production are the appearance of bark beetles, then devastating forest fires that follow years of extreme drought, as well as soil drying and loss of moisture and useful substances from the soil necessary for plant growth and development. This research includes a meta-analysis of scientific literature and economic reports with specific data on price fluctuations of products from commercial tree species in Europe, especially in Germany, while one part of the paper will also deal with the analysis of prices of certain linden products. The overview of prices of linden (Tilia) wood products is informative in nature and there is a need to investigate the prices of these products since, according to recent research, linden is slowly emerging as a potential "tree of the future". This article should serve as a foundation in terms of basic information on the most important changes in the most popular wood products in Europe, especially in the previous year 2024.

Keywords: Prices, Fluctuation, Wood Market, Europe, Tilia, Commercial Species, Reports

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INTRODUCTION

The traditional production of numerous wood products is characterized by the participation of Beech, Oak, Pine, Spruce and Fir (Federal Ministry of Food and Agriculture, n.d.). Naturally, other tree species, such as Douglas fir, Maple, Elm, Ash and others, have a special importance for the production of numerous types of wood products on the European market, and European forestry, as a science and industry, is largely based on the traditional needs of the population and the market for specific wood products (European Commission, Joint Research Centre, 2016). The significant presence of beech and oak trees is also understandable from an evolutionary perspective, since several thousand years ago, the *Fagus* and *Quercus* genera took over dominance in numerous parts of the European continent (Bennett & Tzedakis, 2008). Any specific commercial production, which relies on the use of wood in its economic cycle, is closely linked to the stability of the wood market. Price fluctuations are not only related to economic processes and phenomena in the world, but also to natural processes and climate changes (Kubat et al., 2023, Johnston, 2024).

The occurrence of forest fires in Europe has significantly disrupted the stability of the market for wood products and forestry services because fires, similar to the damage caused by bark beetles, significantly affect the increase in wood mass of certain groups or tree species that are directly affected by these disasters, causing an imbalance in the representation of tree groups and species (conifers versus broadleaved trees, etc.) (Hlásny et al., 2023). Numerous studies indicate an increased mortality rate of commercial tree species in forestry production, which is why it is very important for the forestry industry and forest company managers to strategically find solutions to potential problems in the production and supply of wood to the market, in order to meet the needs of the population and the economy in Europe (Senf et al., 2022).

It is interesting that numerous studies also point to the problems of the complex health condition of forests, with particular emphasis on the phenomenon of drying out of entire forest stands (most often if it concerns a single species of tree), and that the soil substrate should be analyzed in detail in the context of finding solutions (or alternatives) for future planting in affected locations (Bădescu et al., 2024).

One of the "trees of the future" is certainly the linden (*Tilia*), which in the future, according to the writings of numerous authors, dominated the European continent. (Stobbe & Gumnior, 2021). Pollen maps indicate the presence of this genus in almost all of Europe, and the potential of the land for future planting of linden in affected locations of dried forests can justifiably be considered as a basis for plantations of commercial linden stands. How the prices of linden wood move on the European market and what the potentials of increased production of commercial linden wood are, we will see through the analysis in this article.

MATERIAL and METHOD

This paper is only a review paper. It summarizes briefly information on price fluctuations

of wood products on the European wood market, with a focus on the year 2024. The paper performs a meta-analysis of multiple scientific articles and wood market related reports that provide direct and concrete information on the prices of the most popular wood products of Beech, Oak, Spruce, Fir, Pine, and provides an overview of the demand for linden wood and the prices of the most popular products of the genus Tilia in forestry. Detailed analyses were not carried.

The paper used peer-reviewed articles and officially published reports, while the literature was found and selected based on a search of the following keywords: 1) prices, 2) fluctuation, 3) wood market, 4) Europe, 5) Tilia, 6) commercial species, and 7) reports, - of course in the sense of searching for literature on the mentioned commercial tree species. The main aim was to get an image on price fluctuation for the main commercial tree species but at the same time to get any preliminary information on lime wood products - are they being sold, and what is happening with the most popular products of lime.

RESULTS and DISCUSSION

The results of the analysis will be presented in seven short subchapters, for better clarity. Most important information was planned to represent in tables, followed by appropriate comments of the review information.

Commonly Used Commercial Tree Species with A Long Tradition in Europe

In this subsection, we will review the research focuses and main results from a few sources of information, mostly coming from the direct analysis of the situation in the wood assortment market. Traditionally, Beech, Oak, Spruce, Fir and Pine represent a very important species pool in the European, but also global wood market (Bundesministerium für Ernährung und Landwirtschaft, n.d.), which can be witnessed by the data collected in Table 1.

The following table provides an overview of the most commonly used tree species in Europe for the production of the most needed wood products, for the society and industry needs.

Table 1. Overview of the best-selling wood products in Europe for the previous period.

Wood species	Best-selling wood products in Europe for 2024	The most important features of the listed products
European beech / <i>Fagus sylvatica</i>	1.Furniture and cabinetry (about 50 percent), 2.Flooring (about 30 percent), 3.Sawn timber and veneer, and 4.Wood pellets (wood biomass).	The products are characterized by fine grain and strength, which makes them ideal for high-quality interior applications. They are also used in energy production as wood biomass. (Verified Market Reports, 2024, DataHorizzon Research, 2024)
Oaks / <i>Quercus spp.</i>	1.Real wood flooring (about 83 percent of the total EU hardwood floors), 2.High-end furniture, 3.Barrels for wine and whiskey, and 4.Veneer.	Oak is the dominant wood in hardwood flooring due to its durability and aesthetics. Wooden barrels are essential for wine and spirit production. (Global Wood, 2024)
Spruces / <i>Picea spp.</i>	1.Structural wood for construction purposes – “CLT” (or cross-laminated timber), and 2.Glulam panels for the production of musical instruments.	This wood is used in the Alpine and Nordic regions, as it is both a light and hard wood for extremely wide use in those parts of Europe. It is quite widely used in modern timber construction. (Global Growth Insights, 2024)
Pines / <i>Pinus spp.</i>	1.Furniture and flooring, 2.Outdoor structural wood (decking, installation of fences), and 3.Packaging (such as pallets and crates)	This is a wood that is easy to work with and affordable for customers. It is used a lot for general purposes. (Global Growth Insights, 2024)
Silver Fir / <i>Abies alba</i>	1.Roof trusses and beams, 2.Paneling and veneers, and 3.Construction lumber (for example, road mixed with spruce)	This wood is most commonly used in Central Europe, and is most often mixed with spruce. It is used for the production of structural wood and for visual applications. (Global Growth Insight, 2024)

It has been observed that dominant commercial tree species has the most popular usage in the construction materials production, furniture and veneers, which is very rich and advanced in the European market, reaching extremely high prices, but also in the paneling, which has enormous application in gastronomy objects buildings, design and construction. It has been observed that different parts of the European continent are diverse in the aspect of tree group usage (Forest Europe Liaison Unit Bratislava, Eds. 2020). As an example, northern or central European parts of the continent may have increased application of the coniferous trees, which is rooted in the century or even thousands of years long tradition of forest management, species maintenance and local climate conditions. Application of the wood in barrels production is extremely important and tightly correlated to European wine

production, having in mind vineyards estates in some of the biggest European countries, such France, Italy or Spain.

Fluctuation of Prices of Beech Wood Products on the Wood Products Market in Germany

The next table shows what was actually happening on the wood assortments market in the previous year (2024), since the complete year was characterized with market hits and destabilization, impacting also the global wood market. Since the European wood market represents a respectable part of the global market, a brief review on fluctuation in prices of Beech wood assortment is very interesting. Germany was identified as an indicator (Timber Online, 2025, March 24) of happenings on the wood market, at least according to the reviewed reports, so the next table represents a valuable source of information for us.

Table 2. Price fluctuations of Beech wood products on the wood assortment market in Germany (data for 2024).

Time period	Price index	Change versus previous month
March, 2024	122.40	↓ -1.80 % from February 2024 (Fordaq, 2024)
May, 2024	120.60	↓ -1.10 % from April 2024 (Fordaq, 2024)
June, 2024	116.20	↓ -3.60 % from May 2024 (Fordaq, 2024)
July, 2024	116.80	↑ +0.50 % from June 2024 (Fordaq, 2024)

The track changes of the price indices of wood products are showing a gradual decline in the Spring of 2024. It is followed by the slight increase in July, which is also somehow understandable from the aspect of climate. Dryer summer brings challenges in harvesting enough Beech timber. A slight increase is characterized by the price index of 116,80, which does not necessarily represent a bad price index although in March 2024 it exceeded 122.

Fluctuation of Prices of Oak Wood Products on the Wood Assortment Market in Germany

In the next table we have the opportunity to see the brief overview of the Price index fluctuating in the market of Oak wood products. As a tree with a long growing and application tradition in Europe. Oak is always an attractive species for trade analyses.

Table 3. Fluctuation of prices of oak wood products on the wood assortment market in Germany (data for 2024).

Time period	Price index (base = 100 in the year 2024)	Change <i>versus</i> previous month
March, 2024	130.00	↓ -2.20 % (Fordaq, 2024)
April, 2024	135.90	↑ +5.90 % (Fingerlos, 2024)
September, 2024	124.90	↑ +4.40 % (Fordaq, 2024)
October, 2024	131.60	↑ +5.40 % (Fordaq, 2024)

Here it is observed that March 2024 was characterized by the presence of a modest decline in the price index, which amounted to -2.20 percent. A very sharp increase occurred in April of the same year, when the price index increased by as much as 5.90 percent. September was also marked as a positive month, with a positive growth of the price index by 4.40 percent, and October also brought growth. Of course, differences are observed despite the positive (green) scores, because it is obvious that the other months of the year were characterized by price indices that indicate non-negligible differences. It is also necessary to revisit the complex state of health of natural oak forests , the occurrence of drying, forest fires (Lopes et al., 2024), but also the challenges that arise due to geopolitics. Wood transport and the business of chains that deal with the production and distribution of wood products (one example is furniture).

Fluctuation of prices of Spruce products in Germany as an indicator on the Central European market

The following table provides an insight into the price fluctuations of spruce products, which is a widely used and popular wood. Numerous chains that manufacture furniture, structural materials (Waldwissen.net, n.d.) and furnish business premises use spruce in their regular production. Unfortunately, the last years of spruce production and management have been marked by the fight against fires caused by the dangerous bark beetle, which is capable of destroying even entire spruce stands.

Table 4. Fluctuation of prices of products from Spruce in Germany as an indicator on the Central European market according to data for 2024 and 2025.

Time period	Price index / €/m ³	Change versus previous period
May, 2024	98,50 points (base = 100 in year 2015); B-quality @104.4 points.	↑ +1,20 pp versus April 2024 (+2.50 pp YTD) (Nöstler, 2024)
July, 2024	€ 90,00 up to 102,00 / m ³ (BC 2b+ sawlogs, for the Lower Saxony region, Germany)	A slight increase in the quantity in the amount ~ € 5 / m ³ (Global Wood, 2024-a, July 31)
October, 2024	102,00 points in average; B-quality @104,10 (+2,30 % overall)	↑ +2,30 % versus September 2024 (Fordaq, 2024)
February, 2025	€ 105,00 – 115,00 / m ³ (fixed-length, quality B/C)	↑ +€ 5,00 – 10,00 /m ³ versus 2024 season (Forest Machine, 2025)

Price index in April 2024 according to the producers reached 98,50 (+1,20 points) in comparison to April, which represents a moderate rebound. July 2024 was interesting, with regional prices rising up to 90 to 102 Euro per cubic meter of BC and sawlogs)products). October 2024 gave hope to a higher price index, which reached 102,10 to 104,10 points, which characterize rising up to 2,30 percent in comparison to September same year. Already February this year (2025) showed sawlog prices rose to 105 to 115 euro per cubic meter, which was caused due to previous year low supply and stronger demand in Oak wood products.

Price Fluctuation Analysis for Pine Log Wood

The next table shows what happened with the price indices for the Pine wood products in Germany in 2024.

Table 5. Fluctuations on Pine wood assortments market in Germany.

Time period	Price Index	Change <i>versus</i> Previous Month
September, 2024	87.00	↓ – 2,50 % (Fordaq, 2024)
December, 2024	93.00	↑ + 0,30 % (Fordaq, 2025)

Data for the last four months of 2024 indicate an unfavorable decline in the price index of pine wood assortment by 2.50 percent. In sustain, the index fell to 87.00 points. Only a slightly slower increase in the price index occurred in December, when it increased by 0.30 percent, or to 93.30 points. Since this is a type of wood that has had fluctuating prices over several decades and whose felling is greatly influenced by natural phenomena (Banaś & Kozuch, 2019), fires, and thus the destabilization of

prices due to the previous overload of pine wood mass due to extremely increased felling, the unfavorable trend in pine wood prices can be understood to some extent.

Prices Fluctuation on the Fir Wooden Assortment Market

The following table shows how the price of fir wood products fluctuated in Germany and its important forestry region Bavaria. This will also include the price of seedlings.

Table 6. Fluctuation in Prices of Fir Seedlings and Wood Products in Germany

Type of product	Region / State	Estimated price for the year 2024	General features on the products
Fir seedlings	Germany – Online selling	€ 1,29 – € 3,65 per one seedling	Retail price for <i>Abies</i> sp. seedlings from plant nursery (Die-Forstpflanze, 2024)
Firewood (energy use)	Bavaria / Germany	~9,77 ct / kWh ($\approx$ € 110,00 – 130,00 per one m ³)	Energy price based on calorific value, similar to spruce (used as heating wood) (TFZ Bayern, 2025)
Conifer log price trend	Bavaria / Germany	Increase of + € 5,00 – 10,00 per Fm (in the late 2024)	General price trend on the market for softwood logs (spruce and pine, etc. including <i>Abies alba</i>) (Zinke, 2024)

It has been observed that Fir products, including *Abies alba*, are very popular in the German region of Bavaria (Walentovski et al., 2005). This federal state is known for its forestry and nursing tradition, and also abundance of coniferous forests in the Alpine region. It has been observed that prices of both, seedlings and log, increase together with prices of the other conifers, such spruce. Spruce and Fir have a long tradition in the usage of Bavarian supply and producing chains, which can be one of the main reasons for sustainable trend of the price indices.

Potential of the Linden Wood According to the Technical Quality of the Wood

There are numerous benefits from using *Tilia* in forestry, commercial planting and furniture production. *Tilia* has been characterized as a noble tree and its hardwood can provide extraordinary quality, both regarding the technical characteristic and esthetics. Climate change related advances of this genus in Europe (DBU.de, 2021, Vejzagić et al., 2021, Vejzagić & Omerbegović, 2025) are indicating higher resistance of this species to drought and heat waves.

Table 7. Prices characteristics of linden wood products in Europe

Tie period	Country of origin	Product of wood	Volume (estimated)	General features / properties
<i>Tilia</i> / Linden edged <i>KD</i> timber, from 25 up to 55 mm	Romania	Sawn lumber - kiln-dried	100 up to 250 m ³ per one month	Wholesale export availability of this product (Fordaq, 2024)
European Linden timber, from 20 up to 32 mm	Romania	Sawn lumber of AA / AB grade	400 m ³ per one month	Kiln-dried wooden boards are on permanent demand (Fordaq, 2018)
Basswood / Linden planks, from 26+ mm	Eastern Europe	Linden hardwood boards	From 30 up to 300 m ³ per one month	KD basswood is available globally (Fordaq, 2022)
Linden plank sections f.e. planed	Germany	Retail-grade planed linden boards	Retail pieces from ~ € 263 per one m ²	Sold to consumers with help of German reseller (Modulor, 2025)
Technical properties of the linden timber	Europe (in general)	Density and workability data		European linden density is around 535 kg per one m ³ ; <i>KD</i> , fine grain (Prospiva International, n.d.)

It is notable that linden products, when reviewing log dimensions, reach 55 cm. A longer production cycle of the basswood for commercial usage can also allow higher dimensions. Higher participation of Romanian linden wood in the European market can be understood thanks to the developed linden production, its status and amount in that country. Law restrictions on Linden logging in former Yugoslav countries such as Bosnia and Herzegovina could be investigated and taken into consideration in the future research (Federation of Bosnia and Herzegovina, 2002 and 2009). Jaegere et al. (2016) confirmed that lime represents useful species in the silviculture, which opens questions about its wider usage in the silviculture.

CONCLUSION

The literature and reports review in the article indicates a strong connection between the situation on the timber market and climate change. Climate change has already begun to affect the wood market intensely. Effects can be observed in log production, distribution but also general overview of construction material trends. Global happenings, including climate change mitigation policies, should be taken into consideration in the future. The important question in the future should be also whether the traditional dominant tree species can fulfil demands of the society and industry in the future and whether national forestry strategies should start to include alternative species into planting programmes and active afforestation. Spruce, Fir and Pine are being continuously attacked by various barkbeetle species, while Oak and Beech experience tremendous losses due to drying and pathogenic fungal attacks which strengthen with intensification of climate change. It is needed to estimate potential volume of

production of Linden wood with the current funds and plan alternative biomass sources for production, beekeeping and climate change with species that endure the heat better. The task of the forest managers is, according to all listed, even more complex, because their decision will impact the global wood market in the end. Interdisciplinary studies on alternative species suggestions and fast initiative could be the key to stabilizing the global wood market if geopolitical factors are excluded.

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