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ORIGINAL PAPER

Value added in sawmilling industry in the Czech Republic

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Abstract

The paper deals with sawmilling and timber processing capacities in the territory of the Czech Republic. Selected operations are sawmills with the annual processing capacity over 10,000 m³, further divided into groups by the annual volume of processed raw material. In total 35 companies, which were chosen at random, were compared based on the indicator of value added per employee. The results show that the value added considerably differed not only among the groups but also within the individual groups of sawmill establishments.

Key words: primary timber processing; sawmills; capacity; economic indicators

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1. Introduction

Primary timber processing is one of long-tradition industries in the Czech Republic with the advantage of continually increasing stock in forest stands (Report on the state of forests and forestry 2016) and sufficient processing capacities. On the other hand, the timber processing industry in the Czech Republic (and similarly in Slovakia) shows certain problems such as "*low finalization of production, high exports of low value added products, and hence the low creation of value added in the sector (Sujová et al. 2015)".* At that, the increasing level of timber processing is one of strategic goals of the European Union (Sujová et al. 2017). In this context, it is important to use at full all available sawmilling capacities as well as their installed output whose increase in value may be the indicator of value added.

Kovalčík (2011) used indicators of gross and net value added to compare forestry sectors in various countries. Of other professional studies focused specifically on timber processing, worth mentioning is for example a publication evaluating wood processing companies in the Czech Republic, Slovakia and Austria (Sujová et al. 2015). Timber industry is also a subject of study published by Kupčák and Šmída (2015), who focused their attention on the largest sawmill operations with foreign owners in the Czech Republic.

The aim of the paper is to verify whether large sawmill operations achieve value added higher than smaller sawmills. For this purpose, the indicator of value added per employee was used, which makes it possible to compare the individual operations. In order to meet the goal, data on the selected companies had to be updated, i.e. existence, financial results and numbers of employees.

2. Material and methods

Data used in the paper were obtained through the secondary research of scientific literature, public registries – Companies Register (value added and number of employees for particular companies in their annual year reports), reports issued by the Ministry of Industry and Trade - so-called Panoramas of manufacturing industries (value added and number of employees for sub-division CZ NACE 16.1), Register of Insolvencies, Trades Register (both to verify whether the company is still active) and Reports on the State of Forests and Forestry. Above mentioned registers are available at web pages isir.justice.cz and or.justice.cz.

Default indicators applied in the paper include manufacturing capacity, value added and calculated value added per employee.

The paper further uses recalculated average values (based on simple arithmetic mean) according to the formula : $\frac{1}{n}\sum_{i=1}^{n} x_i$

Because the arithmetic mean is sensitive to extreme values, which occur within the studied set, the more accurate median was also used. Variation range (R) informs about the variability of the studied sample. It is calculated as a difference between the maximum and the

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minimum values of the selected variable; $R = x_{max} - x_{min}$. In this paper, the variation range points to differences of results reported by companies falling into the same categories (categorization of sawmilling operations see below). For better clarity, the recalculated values are rounded up to entire units.

Value added can be defined as a "*difference between the enterprise outputs and its consumption for the outputs. Outputs are revenues from the sales of own products and services, activation and change in the inventory of own activities, consumption for the outputs consisting of the consumption of materials, energies and services (Pejzl & Slonek 2006)"*. Value added in sawmill production is affected by a number of factors of internal and external character. Internal factors can be considered for example the volume of production, volume of own products sold, sale price setting, manufacturing capacity, associated costs etc. External factors reflect namely the development of input raw material price, access to the sufficient amount of raw material in demanded quantity and quality, development of demand, sector recession or boom (Pejzl & Slonek 2006). In absolute expression, the indicator of value added cannot grasp differences among the facilities, and this is why a relative variant of this indicator is used – value added per 1 employee.

For the purposes of this paper, the author selected sawmill operations with the processing capacity over 10,000 m³, i.e. medium-size sawmills, bigger medium-size sawmills, big sawmills and large-scale sawmills. Below, the categories of sawmill operations are listed by their annual processing capacities according to Detvaj (2003):

- Processing capacity up to 2,499 m³ (very small sawmills),
- Processing capacity from 2,500 – 4,999 m³ (small sawmills),
- Processing capacity from 5,000 – 9,999 m³ (smaller-size sawmills),
- Processing capacity from 10,000 – 19,999 m³ (medium-size sawmills),
- Processing capacity from 20,000 – 49,999 m³ (bigger medium-size sawmills),
- Processing capacity from 50,000 – 200,000 m³ (big sawmills),
- Processing capacity over 200,000 m³ (large-scale sawmills).

Sawmills with the annual processing capacity up to 10,000 m³ are not considered due to the limited extent of the paper. Individual sawmilling facilities were chosen for the assessment from the list of operations according to Pražan (2010). Subsequently, the establishments were divided into groups according to the respective categories by their processing capacity. In the studied period (see Pražan 2010; Pecháček 2016), the category of large-scale sawmills included 5 corporations residing in the Czech territory. At present, there is another facility that could have been included in the category of large-scale sawmills with the processing capacity over 200 000 m³ – LESS & TIMBER in Čáslav. At first, because there are five representatives in the category of large-scale sawmills, five representatives were chosen for all other categories, too. Then, there were included other companies, in order to describe the situation in each category in more detail. Because there is no official database of domestic sawmilling companies, they were chosen again at random from the list of companies according to Pražan (2010), in categories bigger sawmills and medium sawmills to represent around 1/4 of companies mentioned in respective categories, which in total means 34 companies in this article. Data on the companies were surveyed in June 2017.

Although companies in general have the duty to publish their data annually, it was not possible to find data for 2016 for all selected companies and the results would not be comparable. Because of that, 2015 was chosen as the reference year.

3. Results

3.1. Sawmill production and wood impregnation

According to the Classification of economic activities in the Czech Republic, primary timber processing is included in Section C – manufacturing industry, Division CZ NACE 16. In the sub-division CZ NACE 16.1, we find sawmill production and wood impregnation. The sub-division CZ NACE 16.2 includes manufacture of wood, cork, wicker and straw products with the exception of furniture (CZ NACE 2017). In terms of value added, the sub-division CZ NACE 16.1 contributes only with 20.8% to the value added generated within Division CZ NACE 16 (Panorama of the manufacturing industry 2016).

The level of value added in the sub-division 16.1 does not exhibit larger changes between the years. Although the value added per employee is increasing according to data, it should be pointed out that the number of employees between the years is decreasing. Selected information about division CZ NACE 16 and sub-division 16.1 are presented in Table 1.

3.2. Sawmill operations

As to the requirements for primary wood processing, sawmills are represented sufficiently in the Czech Republic, relatively regularly located across the country. Nevertheless, there are distinct differences among them – for example in their processing capacities (maximal in dependence on available technology and actually implemented capacity), structure of assortments, different standard of mechanization and automation, number of employees, customer networks, etc. The capacity of processing itself is then a good criterion in the classification of these facilities, its volume being affected by

Table 1. Indicators selected for Division CZ NACE 16 and sub-division CZ NACE 16.1.

Year	2011	2012	2013	2014	2015	2016
			CZ NACE 16			
Value added (VA) in CZK	20 848 068	20 205 569	20 702 359	22 044 295	23 143 349	24 782 688
Number of units	29 495	29 405	27 849	27 553	27 672	27 640
VA/employee in CZK	594 686	586 131	643 256	714 352	741 270	818 392
			CZ NACE 16.1			
Value added (VA) in CZK	3 910 139	3 347 464	4 042 997	4 599 906	4 411 053	5 143 072
Number of units	2 240	2 071	1 901	1 765	1 691	1 585
VA/employee in CZK	515 787	461 255	605 034	715 588	691 350	809 676

Source: Ministry of Industry and Trade, 2018.

a number of factors mentioned by Pražan (2010). With respect to the missing information sources about the current processing capacities implemented by the respective companies, the division of operations dwells on the situation in 2009 according to Pražan (2010).

The following data on sawmill operations are ordered by their size according to individual categories:

3.3. Large-scale sawmills

The category of large-scale sawmills includes sawmilling operations with the annual processing capacity over 200,000 m³ (Detvaj 2003). In addition to sawmills with foreign property participation (Mayr-Melnhof Holz Paskov (hereinafter M-M Paskov), Stora Enso Wood Products Ždírec (hereinafter SE Ždírec) and Stora Enso Wood Products Planá (hereinafter SE Planá), the category also includes Dřevozpracující družstvo (Wood Processing Cooperative) Lukavec (DD Lukavec) and the Javořice Sawmill. Tables 2 and 3 present the company names without their legal status (DD Lukavec is a cooperative, Javořice is a joint-stock company and the other three are limited liability companies (ARES 2018).

Table 2. Value added (thousand CZK) in selected sawmill operations – large-scale sawmills.

Sawmill/Year	2011	2012	2013	2014	2015	2016
DD Lukavec	254 757	247 779	274 459	361 542	331 101	N/A
Javořice	6 066	11 030	48 461	98 835	N/A[1]	N/A
SE Ždírec	382 809	360 029	567 876	649 520	596 127	N/A
SE Planá	316 129	258 693	360 177	487 514	436 833	385 727
M-M Paskov	393 258	262 036	561 008	684 934	546 203	741 517
On average	270 604	227 913	362 396	456 469	—	—

Source: Companies Register – annual reports of the individual companies; 2011 – 2017 ("Sbírka listin").

Table 3. Value added converted to 1 employee in selected sawmill operations – large-scale sawmills (in CZK).

Sawmill/Year	2011	2012	2013	2014	2015	2016
DD Lukavec	429 607	425 737	478 152	635 399	581 900	N/A
Javořice	159 632	169 692	452 907	923 692	N/A	N/A
SE Ždírec	1 020 824	949 945	1 200 584	1 402 851	1 245 662	N/A
SE Planá	1 311 739	1 119 883	1 622 419	2 267 507	2 003 821	1 662 616
M-M Paskov	1 618 346	1 056 597	2 235 092	2 604 312	2 008 099	2 657 767

Source: Companies Register – annual reports of individual companies; 2011 – 2017 ("Sbírka listin"), own compilation.

The calculated average value in Table 2 is only a very orientation criterion because it does not take into account possible distinctive deviations between the extreme values – maximum and minimum, in this case the extremely different result in the Javořice Sawmill. The low level of value added in 2011 as well as in the following years was in this sawmill a likely consequence of insolvency in 2010 and the following reconstruction of the establishment. The highest values in absolute expression as well as the highest value per employee were reported by Mayr- Melnhof Holz Paskov, Ltd., in 2016.

3.4. Big sawmills

Representatives of big sawmills (i.e. with the processing capacity from 50,000 – 200,000 m³/year) were the following companies: Jihoobal Dlouhé pole, Holz Schiller, Dřevopar (in all cases a limited liability company – "LLC"), Pila Tetčice (Tetčice Sawmill), Klaus Timber (both with legal status of joint-stock company, further used abbreviation "JSC"). Information about big sawmills are presented in Table 4.

Table 4. Value added (in CZK) in selected sawmill operations for 2015 (big sawmills).

Sawmill	Legal status	Value added (VA)	Number of employees	VA/employee
Jihoobal	LLC	11 419 036	34	335 854
Holz Schiller	LLC	197 989 000	406	487 658
Dřevopar	LLC	8 624 000	64	134 750
Pila Tetčice	JSC	23 323 000	64	364 422
Klaus Timber	JSC	148 405 000	240	618 354
Mean	—	77 952 007	162	*Variation range*
Median	—	23 323 000	64	*= 483 604*

Source: Companies Register – annual reports of individual companies; 2017, ("Sbírka listin"), own compilation.

The number of employees in the companies in this category confirms that the division of sawmill operations by the number of employees would not illustrate reality as to the establishment size. The lowest and the highest numbers of employees were 34 and 406 persons, respectively. The level of value added per employee greatly differed as well – the lowest being 134,750 CZK and the highest being 618,354 CZK. The variation range was 483,604 CZK.

[1] The value of the indicator is not accessible.

3.5. Bigger medium-size sawmills

In this category (annual breakdown capacity from 20,000 – 50 000 m³) there were representative companies see Table 5.

Rising above all the other companies in this category is Matrix, with the highest number of employees and the highest value added per employee at the same time (883,742 CZK). Variation range in the level of value added per employee is higher than in the above category – reaching 606,833 CZK.

Table 5. Value added (in CZK) in selected sawmill operations for 2015 (bigger medium-size sawmills).

Sawmill	Legal status	Value added	Number of employees	VA/employee
Cedro	LLC	6 092 000	22	276 909
Pila Černý	LLC	18 138 000	43	421 814
Pila Sedlo Servis	LLC	7 822 000	13	601 692
Kaiser	LLC	41 179 000	89	462 685
Matrix	JSC	134 329 000	152	883 743
Carman-Wood	LLC	12 146 000	34	357 235
Timber Production	LLC	18 887 000	54	349 759
Empo Holz	LLC	30 978 000	50	619 560
Dřevozávod Pražan	LLC	21 136 000	63	335 492
Mean	—	32 301 000	58	*Variation*
Median	—	18 887 000	50	*range = 606 833*

Source: Companies Register – annual reports of individual companies; 2017, ("Sbírka listin"), own compilation.

3.6. Medium-size sawmills

Representatives chosen for annual breakdown capacity from 10,000 – 20,000 m³ are 15 companies, mentioned in Table 6.

Table 6. Value added (in CZK) in selected sawmill operations for 2015 (medium-size sawmills).

Sawmill	Legal status	Value added	Number of employees	VA/employee
Pila Benda	LLC	10 082 000	19	530 632
Pila Otaslavice	LLC	2 302 000	10	230 200
Pila Hrachovec	LLC	4 458 954	15	297 264
Optima Lanškroun	LLC	4 384 000	14	313 143
Level O2	JSC	6 463 000	30	215 433
Skapo	LLC	3 310 000	14	236 429
Pila Füllsack	LLC	10 615 000	36	294 861
Pila Krnov	LLC	5 121 000	22	232 772
Gatro	LLC	6 407 000	26	246 423
Pila Zámrsk	LLC	3 859 000	15	257 267
Pila Facek	LLC	10 091 000	31	325 516
Pila Karel Vlček	LLC	20 440 000	45	454 222
B. Turner	LLC	4 763 000	11	433 000
Benko, dřevařský podnik, Kopidlno	LLC	15 523 000	74	209 770
Nema	LLC	19 199 000	54	355 537
Mean	—	8 467 864	28	*Variation*
Median	—	6 407 000	19	*range = 320 862*

Source: Companies Register – annual report of individual companies; 2017, ("Sbírka listin"), own compilation.

These establishments feature the least differences in the number of employees. Value added per employee does not differ too much either, which is documented by the lowest value of variation range within all the categories of sawmill operations (320,862 CZK).

The following Table 7 presents an information summary.

Table 7. Summary table (large-scale sawmill operations excluded).

Sawmill operation category	Number of employees (Minimum/Maximum)	Value added per 1 employee in CZK (Minimum/Maximum)	Value added – mean value in CZK	Average number of employees (mean value)
Big	34/406	134 750 / 618 354	77 952 007	162
Bigger-medium	13/152	276 909 / 883 742	31 403 000	58
Medium	10/74	209 770 / 530 632	8 467 864	28

Source: own compilation based on data from previous tables.

4. Discussion

The sector of primary timber processing has a long tradition in the Czech Republic and its current advantage is the sufficient base of raw material. However, sawmills are focused on making low-value-added products such as sawn timber, whose considerable volume is exported to neighbouring countries. Moreover, the exports show increasing trends (see for example Report on the State of Forests and Forestry 2013, 2016) and the issue of low products finalizations has been discussed for several years already. The National Forestry Programme (2008) informs that more than a half of extracted timber is exported as raw or half-finished material to foreign countries. In 2012, the Czech Republic even became the largest exporter of raw timber in the European Union (Šafařík 2013). Raw timber exports seem illogical also because various studies indicate that the country has sufficient processing capacities (see for example Pecháček 2016; APICON 2016); this means in other words that raw material, which is exported now, could be effectively manufactured in the home country.

In spite of this, the Ministry of Industry and Trade (Panoramas of Manufacturing Industries 2013, 2014, 2016) has been pointing out an opposite problem in its reports – i.e. lack of manufacturing capacities for several years. According to information from 2014, the lack of manufacturing capacities is the main reason why low-value-added products are primarily offered on the market (Panorama of the manufacturing industry, 2014). A declaration from 2016 contains a formulation about the plan to establish a forest and forest products industries fund, which would support the emergence of new sawmills and other timber processing operations in line with the increasing demand for raw wood (namely in terms of marketing) (Panorama of Manufacturing Industry, 2016). However, such a fund does not exist so far.

Another interesting fact is that although the discussions about the size and capacity of sawmill operations have been permanently continued, the statements published by Pražan (2017) still hold true: "*there is in fact no official or commonly used calculation to determine the capacity of an establishment, most manufacturers of saw-*

mill technologies indicating the maximum output of breakdown lines. Most plausible is the historically achieved amount of processed raw material reported by individual companies". The achieved level of breakdown is a base for data in this paper, too; nevertheless, obtainment of current data from the companies is somewhat problematic.

Factors influencing the sawing capacity were discussed, for example, in paper by Bomba et al. (2016), depending primarily on the number of employees, the primary technology, level of mechanisation etc. Technical efficiency in production in sawmilling industry was discussed by Šedivka (2009).

Cardinal role in determining actual and potential processing capacity plays the availability of raw material at a required amount and quality. Since the establishments are often located near populated areas, there are also some restrictions concerning manufacturing processes (noise, illumination) that may reflect into working on shifts at night or in early morning hours (Pražan 2017).

Other limitations for sawmilling facilities follow out from the setting of customer-supplier relations and reflect both in the manufacturing process and in the costs. This concerns for example supplies of certified raw material and products through PEFC and FSC systems when the companies choose a particular certification scheme with respect to requirements on the part of prominent customers. The certification of so-called consumer chains is dealt with for example by Dudík & Riedl (2015), Paluš et al. (2017, 2018).

Matrix, the company which achieved the highest value added in its category (as well as the highest value added per employee), deals in its manufacturing programme also with the reputable assortments of oak and larch sawn timber whose conversion into money is high. Thus, the level of value added is possibly affected by these factors in addition to the wide range of business activities.

The company Dřevopar exhibited the lowest value added per employee of all studied operations. In the last years of 2015 and 2016, the level of value added was lower than corresponding to the previous development. This shows that even the indicator of value added might have suggested the company's upcoming problems. Since the end of year 2017, the company has been in insolvency and current information (March 2018) signals that the company is standing before the decision on bankruptcy. With respect to the studied period (i.e. data being assessed in June 2017), the company remained in the list.

As a criterion for comparison, the author selected the indicator of value added per employee. The initial assumption about a markedly higher indicator of value added in large-scale sawmills was obvious in enterprises with the foreign participation; otherwise considerable variations were observed both among the groups of facilities and within the respective groups.

Holz Schiller provides the highest number of jobs (406 persons) while Pila (Sawmill) Otaslavice provides the lowest number of jobs (10 persons). The lowest indicator of value added was recorded in the company Dřevopar (134,750 CZK per employee) and the highest one in Mayr-Melnhof Holz Paskov (2,657,767 CZK per employee). The variation range of the indicator of value added per employee was the highest in the large-scale sawmills, the results being considerably affected by those of Pila (Sawmill) Javořice. In the studied year of 2015, bigger medium-size sawmills exhibited the highest variation range (606,833 CZK) and the lowest variation range was recorded in the last surveyed category – medium-size sawmills (320,862 CZK).

Except year 2014, there is always a higher value added per employee on average in CZ NACE 16 than in CZ NACE 16.1. All categories, except the only company – Matrix – do not reach the value added per employee higher than is the average of CZ NACE 16.1 in 2015. Large-scale sawmills, namely S-E Ždírec, S-E Planá and M-M Paskov reach at least double values of this indicator.

The indicator of value added encompasses all profit-making activities of companies. However, value added for sawmill production cannot be singled out from publicly available statistics. Value added is affected by range of business activities, size of the company, technical equipment, availability and type of processed raw material, etc. The fact remains that methods should be sought for how to increase value added in the primary sector of wood processing. One of them is promotion of wood product to the wider public.

Because the demand for wood is a driven demand depending on the situation in other industries, that use wood as a raw material (like pulp and paper industry, furniture making industry etc.), the development of value added in the wood-processing industry might be affected also by situation in these industries. The research could further deal with the comparison of value added in sawmilling in countries with similar conditions to those in the Czech Republic, like Austria and Germany. Price determination in the Czech Republic is also correlated with the price development in the above mentioned countries.

5. Conclusion

The paper is focused on selected sawmill operations, which were divided into categories by their processing capacity. Considered were companies with the annual breakdown capacity larger than 10 000 m^3 and there were 34 establishments surveyed in total.

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References

Bomba, J., Böhm, M., Šedivka, P., Friess, F., Orálková, R., 2016: Influence of selected factors on the sawing capacity of sawmills in the Czech Republic. Scientia Agriculturae Bohemica, 47:174–180.

Detvaj J., 2003: Technologia piliarskej výroby. Vysokoškolská učebnica, Zvolen, TU, 131 p.

Dudík, R., Riedl, M., 2015: The possibilities of using C-O-C certifications in the Czech Republic. In: Jelačić (eds.): Wood Processing and Furniture Manufacturing Challenges on the World Market and Wood-Based Energy Goes Global – Proceedings of Scientific Papers. WoodEMA, p. 229–233.

Kovalčík, M., 2011: Profitability and competitiveness of forestry in European countries. Journal of Forest Science, 57:369–376.

Kupčák, V., Šmída, Z., 2015: Forestry and wood sector and profitability development in the wood-processing industry of the Czech Republic. Journal of Forest Science, 61:244–249.

Paluš, H., Parobek, J., Dudík, R., Šupín, M., 2017: Assessment of chain-of-custody certification in the Czech and Slovak Republic. Sustainability, 9:1–13.

Paluš, H., Parobek, J., Vlosky, R. P. et al., 2018: The status of chain-of-custody certification in the countries of Central and South Europe. European Journal of Wood and Wood Products, 76:699–710.

Pecháček, O., 2016: Aktualizace zjištění potenciálu dřevozpracujících podniků. Lesnická práce, 95:31–33.

Pejzl, J., Slonek, L., 2006: Pilařské provozy z pohledu přidané hodnoty výroby. Lesnická práce, 85:24.

Pražan, P., 2010: Analýza faktorů možností vývoje malých a středních pilařských provozů v ČR. Disertační práce. Praha, CZU, 129 p.

Pražan, P., 2017: Jaké jsou v České republice pilařské kapacity a kolik jich je potřeba? Lesnická práce, 96:44–45.

Sujová, A., Hlaváčková, P., Šafařík, D., 2015: Analýza výkonnosti drevospracujúceho priemyslu prostredníctvom pomerových ukazovatelov. Acta Facultatis Xylologiae Zvolen, 57:165–178.

Sujová, A., Michal, J., Kupčák, V., Dudík, R., 2017: The impact of international trade of raw wood to the economic growth of forest-based sectors in the Czech and Slovak Republics, BioResoures, 12:1102–1111.

Šafařík, D., 2013: Konkurenceschopnost a ekonomická životaschopnost dřevozpracujícího průmyslu v České republice. In: Polster, P. (eds.): Semináře Komise lesnické ekonomiky Odboru Lesního hospodářství ČAZV. Sborník referátů ze seminářů s mezinárodní účastí Plumlov, Strážné. Praha, ČZU, p. 21–28.

Šedivka, P., 2009: Estimation of Technical Efficiency in Production Technologies of Czech Sawmills. Drvna Industrija, 60:197–207.

Other sources

APICON, 2016: Analýza dopadů zvýšení objemu dříví zpracovávaného na území České republiky. In: Lesy České republiky, s. p. [online]. Available at: https://lesycr.cz/wp-content/uploads/2016/12/zpracovatelsky-potencial-web.pdf

ARES, 2018: Přehled vybraných ekonomických subjektů. Administrativní registr ekonomických subjektů [online]. Praha, Ministerstvo financí. Available at: http://wwwinfo.mfcr.cz/ares/ares_es.html.cz

Ministerstvo spravedlnosti ČR, 2017: Companies register (*Veřejný rejstřík a Sbírka listin)* [online]. Available at: https://or.justice.cz/ias/ui/rejstrik

Český statistický úřad, 2017: Klasifikace ekonomických činností (CZ-NACE). Available at: https://www.czso.cz/csu/czso/klasifikace_ekonomickych_cinnosti_cz_nace

National Forestry Programme. (Národní lesnický program pro období do roku 2013: hlavní zásady společné zemědělské politiky, tržní politiky a politiky rozvoje venkova). Brandýs nad Labem, Ústav pro hospodářskou úpravu lesů, 2008.

Ministry of Industry and Trade, 2006: Panorama of the Manufacturing Industry of The Czech Republic. Praha, Ministerstvo průmyslu a obchodu.

Ministry of Agriculture, 2017: Report on the state of forests and forestry in the Czech Republic. Praha, Ministerstvo zemědělství ČR, 132 p.