Evaluation of applicability of IAS 41 – Agriculture to the valuation of growing forest stands and their accounting treatment in the Czech Republic

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ABSTRACT: The paper aims to evaluate the applicability of International Accounting Standard (IAS) 41 to the valuation of a growing stock of stands and entering its value in the corporate accounting system in the Czech Republic. In this context, IAS 41 is analysed in detail with focus on the method of reporting of the forest value in the accounting. At the same time a questionnaire survey is conducted among the forestry sector experts on the topic of willingness to report the forest value in statements. Based on the findings, an alternative solution to the application of IAS 41 to the forest accounting treatment, which would be potentially applicable, is proposed in the paper. The questionnaire survey (*n* = 317) has found that there is an increasing tendency towards the willingness to report the forest in the statements, especially in the organizations which simultaneously meet the statutory duty to disclose this value in the notes to the statements, and it is also recognized that this willingness does not depend on the legal form of organization.

Keywords: fair value; forestry accounting; International Accounting Standards, International Financial Reporting Standards; present value

The paper focuses on how to present the result of the forest production function in information systems of forestry enterprises in such a manner that the total value of forest assets is available and known to users. This requirement is mainly related to the inventory valuation method for a growing forest. The current state of knowledge of forest assets in corporate information systems in the Czech Republic provides only partial data available to internal and external users. The data which would be the output of information systems are required for economic analyses and subsequent financial management of forestry businesses. As noted by Matějíček and Dudík (2011), prior to 1990 the forest valuation as a scientific discipline was neither solved in theory nor practically applied in the Czech Republic for many decades. Now, it may be concluded that, with certain exceptions which re-

flect the specific local conditions, the knowledge database for the forest valuation has also been established in the Czech Republic (Matějíček, Skoblík 1993; Matějíček, Dudík 2011). Calculation techniques are standard procedures for the forest valuation and companies and also for the determination of compensation and an amount of damage or harm caused to forests. The calculation method is used to determine cost value (for finding out the tax base), expected value (for the purpose of property division), final cutting value (for inheritance settlement) or net present value – stumpage value (Matějíček, Dudík 2011). Matějíček and Prčina (2008) stated that forest stand may be evaluated on the basis of discounted future net revenues (from the sale of wood), in other words using the net present value method. In terms of the valuation of tangible fixed assets in accounting, the

results obtained by the net present value approach the fair market value (Matějíček, Prčina 2008).

Some of the mentioned valuation methods form a basis for the official valuation of forests under Decree No. 441/2013 Coll. implementing Act No. 151/1997 Coll. on the Valuation of Property and on the Amendment of Certain Acts (the so-called Valuation Decree).

The situation is different in the valuation of a growing forest stock for the purposes of reporting accounting data in the financial statements. Forestry accounting is perceived very differently around the globe and the evaluation and accounting treatment of forest assets remain the core problem (Hogg, Jöbstl 2009). Forests are specific assets, the production period of which takes several decades.

Recently, the international discussion on forestry accounting has developed. Environmental services as well as changes in forest assets are not to be entered into financial accounting directly, but recorded in satellite accounts and/or described in the appendix to the balance sheet – the statement of financial position according to current International Financial Reporting Standards (IFRS) terminology. This avoids the mixing of different qualities information (Jöbstl 2008). This causes that the value of reported assets is distorted, and thereby inaccurate information on the total value of assets is provided to users.

The main aim of the paper is to evaluate the applicability of International Accounting Standard (IAS) 41 – Agriculture to the valuation of growing forest stands and to the presentation of this value in the accounting system of forestry enterprises in the Czech Republic, and, based on international developments in this area, to propose possible solutions for the application. To fulfil the main aim, the following partial aims have been defined:

(*i*)   To provide a comprehensive overview of the international issues concerning the valuation of a growing forest and its accounting treatment with an emphasis on the analysis of approaches under IAS 41 – Agriculture (hereinafter referred to as IAS 41) along with explanatory notes.

(*ii*) To evaluate advantages and disadvantages of the application of IAS 41 in relation to the valuation of the growing forest in order to report the total assets value in the financial statements of forestry enterprises and also to provide information on the international trends in the application of IAS 41 in the given area.

(*iii*) To evaluate the questionnaire survey focused on the issues related to the opinion of forestry sector experts who were polled on their willingness to value the growing forest and to disclose this value in the financial statements.

The current situation in the forest valuation was described by Jöbstl (2009). Jöbstl (2009) agreed with the conclusion of Tzschupke (2005) that the lack of consideration of annual changes in forest assets is one of the main actual problems in forestry accountancy. In most cases, the incomplete inclusion of forest assets in an accounting system ends up being more confusing than helpful in measuring and reporting the performance of forest enterprises. Cost-based approaches are still widespread, but in terms of relevant information on the performance of forest enterprises these measures have to be considered as largely useless (Jöbstl 2009). However, Dvořáková (2014) claimed that historical costs result from realized transactions and provide evidence of the price verified at the moment of purchase by the market and are independently verifiable. Hogg and Jöbstl (2009) were of the opinion that values reflecting historic value or tax value are equally misleading for external users. The striving for (market) value-based measures is beneficial to improving comparability and relevance of accounting information (Hogg, Jöbstl 2009).

At present, an expert discussion on how to determine the value of a growing forest and also on how to enter this value into the accounts is taking place. The aim and purpose of the discussion mentioned are to arrive at an accounting solution which would ensure that users of financial statements will be provided with as little distorted information on the value of forest assets as possible. The outcomes of the international conference, which dealt with the aforementioned topics, were summarized by Jöbstl and Merlo (2009) in their article. Powerful instruments for measurement of forest assets are available. It was pointed out that there are many types of models and they are not easily accepted, because they are transdisciplinary. Even though there is a gap between these models and practice, models are not useless. It has been mentioned that models are now cited (that does not mean accepted) by some forest managers. Recently, there has not been developed a method which would have a wider application and thus contribute to the better comparability of statements, including the valuation of forest assets (Jöbstl, Merlo 2009). Furthermore, Jöbstl and Merlo (2009) stated that the conference participants informed about the discussion held on accounting and valuation in many countries (e.g. Austria, Germany, Italy, Ukraine, Australia, New Zealand), and he has observed that

in wood processing industries accounting and cost centres are more established tools.

Existing harmonization efforts, including the IFRS, do not take into account different business environment and forest management practices sufficiently. Accounting practices, which may appear practical, relevant and reliable in one place, cannot be transposed one to one around the world. Applications to local circumstances are necessary (Hogg, Jöbstl 2009). The release of IFRS IAS 41 by the International Accounting Standard Board (IASB) changed agricultural accounting from a domestic issue dealt with by individual countries to a global issue (Herbohn, Herbohn 2006). International Accounting Standard 41 was applied for more than 11 years (by 2011) in several countries and will be adopted in countries that are now in the process of convergence with IFRS (Aryanto 2011). International Accounting Standard 41 applies to forests and similar regenerative resources, biological assets and agricultural produce, excluded from IAS 16 – Property, Plant, and Equipment; producers' inventories of livestock, agriculture, and forest products, including those excluded from IAS 2 – Inventories, to the extent they are to be measured at net realizable value; and natural increases in herds and agricultural and forest products excluded from IAS 18 – Revenue (Mackenzie, Njikizana 2014). Amendments published by IASB – effective for annual periods beginning on or after January 1, 2016 – bring bearer plants, which no longer undergo significant biological transformation and are used solely to grow produce into the scope of IAS 16, so they are accounted for in the same way as property, plant and equipment (Delloitte 2015). Under IAS 41, a biological asset (where also forest stands fall into) shall be measured on initial recognition and at the end of each reporting period at its fair value, more precisely its fair value less costs to sell, except for the case where the fair value cannot be measured reliably (IASB 2014); in the latter instance, historical cost is to be used (Mackenzie, Njikizana 2014). At the time of its creation, IAS 41 contained the definition of fair value and the option of its determination. A new definition of fair value under IFRS 13 – Fair Value Measurement, referring to this specific standard, is currently prescribed in the standards. International Financial Reporting Standard 13 was laid down in 2011 (effective from January 1, 2013) and defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date (IASB 2014). That definition of fair value emphasises that fair value is a market-based measurement, not an entity-specific measurement. In practice the active market with the asset may not function in the way as is often the case of the growing forest, then other approaches to fair value determination will have to be employed. The hierarchy in the determination of fair value is specified in IFRS 13. Level 1 inputs are considered the most reliable evidence of fair value and are to be used whenever they are available. Level 1 inputs are quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date. Level 2 inputs are directly or indirectly observable prices in active markets for similar assets or liabilities; quoted prices for identical or similar items in markets that are not active (IASB 2014). Level 3 inputs are unobservable; those reflect management's own assumptions about the assumptions market participants would make (Mackenzie, Njikizana 2014). Originally, IAS 41 has recommended how to proceed if there is no active market for the asset. In such circumstances, it might be necessary to refer to indicators such as sector benchmarks (e.g. relating the value of a dairy farm to the kilograms of milk solids or fat produced), the net present value of expected future cash flows discounted at a risk-class rate, or net realizable values for short-cycle products for which most growth has already occurred (Epstein, Jermakowicz 2009). Dvořáková (2012) critically viewed the determination of fair value of biological assets using the net present value and said that the purpose of calculating the net present value of estimated future cash flows is to determine the fair value in its present location and present conditions. The current conditions of the biological asset definition exclude the inclusion of any expected value increases resulting from further biological transformation, harvest or sale (Dvořáková 2012).

An entity shall use valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximising the use of relevant observable inputs and minimising the use of unobservable inputs (Mackenzie, Njikizana 2014).

International Accounting Standard 41 requires that the carrying amount of biological assets be presented separately on the face of the statements of financial position (Epstein, Jermakowicz 2009). Land is to be accounted for under IAS 16 or IAS 40 – Investment Property, as is appropriate under the circumstances. Biological assets that are physically attached to land are recognized and measured at their fair value less estimated point-of-sale costs, separately from the land (Mackenzie, Njikizana

2014). A gain or loss arising on the initial recognition of a biological asset at fair value less costs to sell and from a change in fair value less costs to sell a biological asset shall be included in profit or loss for the period in which it arises (Epstein, Jermakowicz 2009; IASB 2014).

MATERIAL AND METHODS

Analysis and discussion are linked to outcome synthesis and the evaluation of research results. Based on the defined partial aims, the international situation in the forest valuation and its accounting treatment are analysed. International Accounting Standard 41 in relation to forestry is focused on. An analysis of valuation approaches under the IFRS and the assessment of their suitability in relation to the valuation of a forest as a biological asset are performed. Furthermore, an overview of the IAS 41 requirements for the recognition of identified changes in the forest value at its revaluation as of each statement of financial position (balance sheet) date is drawn up. The main part of the paper proceeds from explaining the context of the currently widespread concept (cost-based) of the forest accounting treatment to the desired concept (value-based), using the analysis of advantages and disadvantages of the IAS 41 application to the forest valuation and its accounting treatment up to the proposal of a theoretically correct method of accounting treatment of the forest. The proposal presented is based on searching for continuity with the whole conception of the IFRS. The advantages and disadvantages of the solution under IAS 41 are comprehensively summarised in the conclusion and also an overview of the experts' opinions on the solved application of IAS 41 is given.

The approach to the forest valuation and the presentation of its value under IAS 41 is fundamentally different from the approach that is applied in this area in the Czech Republic. Primary data were obtained as part of quantitative research using the questionnaire survey. The selection of respondents was intentional. Two selection criteria were set. The first criterion was the ownership of forest land by organizations and the second criterion related to respondents – experienced experts from practice, who could be either economists or accountants from the responding organizations. The sample comprised n = 317 forest enterprises.

The questionnaire survey was carried out with 317 respondents in the period from 1st March 2015 to 30th June 2015.

The representation of forest enterprises by regions is shown in Table 1.

The representation of organizations by the size of cultivated area of forest land is shown in Table 2.

The implementing Decrees applied to the forest accounting are shown in Table 3.

Table 1. Representation of organisations by regions in the Czech Republic

Region	Forest enterprises	
	number	relative frequency (%)
Central Bohemian	106	33.44
Plzeň	42	13.25
Hradec Králové	32	10.09
Pardubice	26	8.20
Ústí nad Labem	24	7.57
Highlands	22	6.94
South Bohemian	14	4.42
Olomouc	14	4.42
Liberec	12	3.79
Karlovy Vary	9	2.84
Prague	7	2.21
Moravian-Silesian	6	1.89
South Moravian	2	0.63
Zlín	1	0.32
Total	317	100.00

Table 2. Representation of organizations by the size of forest land area

Forest land area size (ha)	Forest enterprises	
	number	relative frequency (%)
< 5	33	10.41
5.1–50	63	19.87
50.1–100	43	13.56
100.1–500	87	27.44
500.1–1,000	38	11.99
1,000.1–5,000	43	13.56
5,000.1–50,000	6	1.89
> 50,000	4	1.26
Total	317	100.00

Table 3. Representation of organizations by the applied implementing Decrees to Act No. 563/1991 Coll. on Accounting

	Forest enterprises	
	number	relative frequency (%)
Decree No. 410/2009 Coll.	246	77.6
Decree No. 500/2002 Coll.	56	17.67
Decree No. 504/2002 Coll.	15	4.73
Total	317	100.00

Within the survey, relationships between selected qualitative indicators were determined on the basis of the working hypothesis formulated in the third partial aim and the following statistical null hypotheses were verified:

(*i*) H01: The need to disclose the value of a growing forest does not depend on the fact whether the reporting entity meets the statutory duty to disclose the value of the growing forest in the notes to the financial statements.

(*ii*) H02: The willingness to continuously determine and recognize the value of the growing forest in the statement of financial position and the profit or loss statement does not depend on the legal form of the organization.

The data were evaluated using the tools of descriptive statistics and the methods of comparison, induction, deduction, and synthesis. Descriptive statistics used to test the results included absolute and relative frequency, correlation analysis, and non-parametric Pearson's Chi-squared test. If the *P*-value calculated by means of Pearson's Chi-squared test was lower than the selected level of significance α = 0.05, the null hypothesis was rejected (Hendl 2006). The analysis was carried out using the MS Excel (Version 15.0.4805.1003, 2013) and IBM SPSS Statistics Desktop (Version 22.0, 2013).

The methods of synthesis and induction are also used in the discussion of results and in recommendations.

For better clarity, the term "forest" is used in the paper for the combination of words "growing stock of forest stand". From the general point of view, any entity that owns forest land with forest stands or has the right of use to it is considered to be a forestry enterprise in the paper. All movable and immovable property, including forest stands on forest land, is considered to be a forest asset in the paper.

RESULTS AND DISCUSSION

There are two levels in the process of fulfilling the main aim. The first level is to evaluate the theoretical correctness and applicability of the valuation and reporting principles of biological assets or forests under IAS 41. The second level deals with the evaluation of the openness, willingness and will of the sample experts in the Czech Republic to realize new essential steps in this area. Given the international accounting harmonization efforts, the development of opinions in the Czech Republic may partially be derived from the global trends.

Forest valuation principles and its accounting treatment

The international discussions on the forest valuation and the efforts to enter it in the books illustrate the legitimacy of the asked question. For example, a few German state forest enterprises decided even to capitalize the value of their estates and timber stock within their annual statement of financial position. The reason for that new tendency is the general trend to apply the usual bookkeeping rules also in public services and companies and furthermore the internationally widespread Anglo-American bookkeeping philosophy with its fundamental principle of "true view and fair value" (IAS) is another important argument for an annual valuation of forest assets (Tzschupke 2005). Possible approaches to the valuation and accounting treatment of forests are examined in different countries of the world and there are different opinions on them. Nowadays, cost-based approaches, in which only the expended financial means and costs of forest planting and (long-standing) tending are tracked in the accounts, are globally spread. Under the cost-based approaches, the value of such a significant asset for the company cannot often be read in the financial statements, and thus accounting does not *de facto* perform its primary function to provide useful information to users of financial statements. Due to the fact that values of individual financial statement items are distorted, distorted financial analysis ratios are determined as well. Schematically, the cost-based approach in the accounting treatment of forest could be represented as in Tables 4 and 5.

Table 4 shows that under the cost-based approach the forest value is not recognized in the assets, and the statement of financial position is only affected by financial means expenditure or expenses spent on planting and tending the forest. In fact, the forest value is increasing, but the assets and profits are

Table 4. Cost base in the course of forest growth

Statement of financial position	
Fixed assets	equity
Current assets	
Cash ↓	profit or loss ↓

Table 5. Cost base after logging

Statement of financial position	
Fixed assets	equity
Current assets	
Cash ↑	profit or loss ↑

decreasing in the accounts. Only after exhausting the wood supply from the entire forest (after several decades), profits are recognized and financial means received from the sale increase the assets (Table 5). In this case, the so-called matching principle is not observed. The matching principle is an accounting principle under which each recognized revenue should be assigned to the related cost in the given reporting period.

In this context, therefore, the international efforts to switch to (market) value-based approaches are logical. It is required that the reality be recorded in the accounts more accurately in the course of forest growth, as is illustrated in Table 6. Table 7 shows the impact of logging in the event that the forest value is recognized in the assets in the course of its growth.

The financial means spent on forest planting and tending should be capitalized, which would mean that their value would increase the forest value. At the same time the increase in the value of the forest in the course of its growth should be recognized in accounting. That should continuously be recognized in the accounts as the increase in assets and equity (Table 6). After logging the forest value would decrease in the accounts (to zero) and the equity would also decrease. Subsequently, the financial means received from logged timber would increase the equity. When using the value-based approach, the matching principal is observed, and thus there is no disproportionate increase in the equity after logging.

Evaluation of advantages and disadvantages of the application of IAS 41 in the international context

In the context of the above stated, the most globally considered tool to achieve the required valuation level of forest and its presentation in the accounts is currently IAS 41. The following text describes not only the advantages and disadvantages of the application of IAS 41 to the forest valuation and to the presentation of its value in financial statements, but also the fact how the issues are viewed in various countries. The crucial question is how to determine the required fair value of forest using the standard. When it is impossible to derive the fair value from the active market, under IAS 41 or IFRS 13 it should be determined in an alternative manner. Tzschupke (2005) performed a detailed comparison of the fair value determination by selected non-market methods in Germany.

Table 6. Value base in the course of forest growth

Statement of financial position	
Fixed assets	
Forest assets ⇈	equity ↑
Current assets	
Cash ↓	

Table 7. Value base after logging

Statement of financial position	
Fixed assets	
Forest assets ↓	equity ↕
Current assets	
Cash ↑	

He determined fair values for a municipal forestry enterprise from Baden-Württemberg, which owns over 3,000 ha of forest land. As expected by the author, it was confirmed that the determined values of forest considerably differed. It is a logical consequence of the fact that the results of individual calculations were determined by various factors. As reported by Herbohn and Herbohn (2006), the most common method used to measure the fair value of timber assets in accordance with Australian Accounting Standards Board (AASB) 1037 by Australian reporting entities with material holding of timber assets in the years 2000–2004 (Australian Accounting Standards Board 1998) is net present value, namely in eight cases out of thirteen. Other methods to determine the fair value of a growing forest are seldom used in Australia (Herbohn, Herbohn 2006). Swedish forestry companies have an unspoken agreement that they will all use the model of net discounted cash flow (Hellsten, Thorsson 2006). Čermáková et al. (2015) performed a comparison of selected valuation methods of forests in the Czech Republic, from which it resulted that values are closest to reality if the "simplified method" of valuation is used, which is based on the so-called "income approach". This method is based on discounted estimated future net revenues from the sale of timber, i.e. revenues from the sale of logged timber less costs of planting and tending activities and less administrative and tax costs. The results of the income method application take into account the specifics of the valuation of forest assets and quantify what economic results may be expected from them in the future (Pulkrab et al. 2005). The forest valuation using the net present value is included in the Valuation Decree No. 441/2013 Coll. to Act No. 151/1997 Coll. This valuation model is intended for the purposes of determining tax on acquired immovable

property (Čermáková et al. 2015). The mentioned method can be compared to the determination of fair value under IFRS 13, at Level 3, where no active market exists for the stated or similar assets and it is necessary to determine the value in a "non-market" manner.

In the interpretation and application of IAS 41, the forest value is assumed to be determined on the basis of the present value of estimated future net cash flows from the asset, as noted by Penttinen and Rantala (2008): the key IAS notion of "fair value" as the evaluation basis can be interpreted, in the case of forestry, loosely as the net present value. The expected benefits of the asset in the future should be discounted at the current market interest rate before tax, as was originally laid down in IAS 41 (before referring to IFRS 13, a new standard, in 2011). The authors believe that the determination of interest rate is the most problematic issue in the overall evaluation of the suitability of the IAS 41 application to forest assets. In essence, it is impossible to select a correct discount rate for the asset whose production cycle ranges between 70 and 100 years. Risk-free rate (represented by return on the state funding of similar items) and risk premium should be included in the determination of the appropriate discount rate. The issues of determining discount rate are dealt with in more detail for example by Hirschleifer (1970), Gamble and Cramer (1992), and Eckel et al. (2003). Their discussion shows that it is almost impossible to determine discount rate consistently, and hence also the fair value of the asset with a long production cycle. Burnside (2005), and Hellsten and Thorsson (2006) reported that three major Swedish forest enterprises and PwC, an auditing firm, use the discount rate of 6.5% for these purposes; Australian forestry firms use the rate of 8% (Herbohn, Herbohn 1998). Numerous articles claim that the implementation of IAS 41 means ambiguity and even errors in estimating the fair value, especially in using "the present value of expected net cash flows from the asset discounted at a current market-determined pre-tax rate in determining fair value" (Penttinen, Rantala 2008). It may be concluded that due to the uncertainty in the choice of discount interest rate, the determination of forest fair value under the principles of IAS 41 is very subjective and may paradoxically lead to worse comparability of financial statements between companies. Herbohn and Herbohn (2006) held the same opinion. Considering the consequences, individual enterprises may manipulate the determined value. Bigsby (2004) viewed the situation in the same way, namely that the key question in defining the fair value is the perception that it will not result in comparable estimates between forest owners because of the opportunity to define the fair value so that it suits their business. Based on the presented findings, it has been concluded that a deliberate manipulation of profit or loss may occur in direct connection with the method of fair value determination.

International Accounting Standard 41 lays down that aggregated gain or loss from a change in the fair value (less costs to sell) of biological assets shall be included in profit or loss for the period (Table 8) in which it arises (IASB 2014). Moreover, IAS 41 recommends to distinguish the increase in asset value as a result of biological transformation and as a result of changes in price over time (IASB 2014). One can therefore speak about a dualistic value change in property that consists of a dynamic portion based on the physical change, and an economic cycle portion based on stumpage prices (Niskanen et al. 2002). This requirement is related only to the disclosure of information unrelated to the separate recognition of values in the statement of financial position. Table 8 shows the principle of accounting treatment of an increase in the fair value of biological assets under the approach of IAS 41.

The essence of the approach under IAS 16 is compared in order to solve the issues of forest accounting treatment using other standards for the purposes of the following options under consideration. The principles of IAS 41 become partially incompatible with IAS 16 in profit or loss. In the event that an entity decides to apply the revaluation model in order to regularly record increases in the value of assets falling under IAS 16, these increases are recognized in the statement of financial position as a separate statement of financial position item called "revaluation surplus". Thus, the increase in the value of assets is not recognized either in profit or in loss. The reason is that it is a case of property, plant or equipment, where it is never the case of biological transformation. The cause of such an increase in the value of assets is always a consequence of changes in market price. The increase in the value of property, plant or equipment under IAS 16 is represented in Table 9.

Moreover, the recognition of changes in fair value in the profit or loss statement poses a risk, as it is the recognition of unrealized gains, as claimed by Dvořáková (2014) and the other authors. For example, Herbohn and Herbohn (2006) stated that the recognition of profits that were not realized for several years may also lead to unrealistic expecta-

tions of distributable profits amongst shareholders, in turn creating the pressure for entities to declare and pay dividends for which no funds are available (Herbohn, Herbohn 2006). The risk of recognizing unrealized gains is associated with a possible unauthorized distribution of profits among owners and the need to find a solution to the situation where the pre-distributed profits will not eventually be achieved, for instance, if the forest is destroyed by a gale. In this context, Dvořáková (2014) noted that if the influences of price changes and physical changes are separated as recommended, the risks associated with the recognition and subsequent distribution of fictitious profits are significantly reduced. In theory, a compatible solution within the IFRS would be a separate recognition of increases in a biological asset (forest asset) as a result of biological transformation in the profit or loss statement and at the same time as a result of price changes through the revaluation surplus as represented in Table 10.

The solution proposed in Table 10 represents a theoretical shift in the issues of forest accounting treatment beyond the current wording of IAS 41. This issue has long been debated. Australian recommendations require that the impact of physical changes be reported either in profit or in loss, but that of price changes as a change of capital revaluation (Herbohn, Herbohn 1998). Bohušová et al. (2009) were also in agreement and said that the impact of biological transformation should be reported either in profit or in loss in the period when the biological transformation took place in the form of profit or loss. On the contrary, the change in the fair value of agricultural assets due to the price

fluctuation should be reported in the form of the revaluation surplus as a part of equity (Bohušová et al. 2009). The authors of this paper consider this solution to be theoretically correct and propose it for application.

A summary of the advantages and disadvantages of the application of IAS 41 to the forest valuation and its subsequent presentation in the company's financial statements is given in Table 11.

The presented advantages and disadvantages in Table 11 when evaluating the application of IAS 41 to the valuation and accounting treatment of forest stands cannot be considered exhaustive. In particular, the comparability of financial statements when applying or not applying the principles cannot be unequivocally evaluated. The aforementioned statements are based on the existing international knowledge base.

The advantages and disadvantages of the application of IAS 41 are debated in different countries around the world, in particular in countries where forests cover a considerable part of the area and forestry is a major contributor to gross domestic product or an important source of employment (Australia, European Nordic countries, Austria, etc.). The application of newly issued IAS 41 in the European agricultural area was surveyed by Argilés and Slof (2001) and they concluded that the European Farm Accountancy Database Network offers an excellent tool for operationalizing IAS 41 in European farms. They were opposed by Elad (2004), who dealt with IAS 41 in a wider international context. According to Elad (2004) it is shown that it would be virtually impossible to implement IAS 41 in Francophone countries in the absence of

Table 8. Accounting treatment of an increase in the fair value of biological assets under International Accounting Standard 41

Statement of financial position			
Fixed assets		equity	
Biological assets (forest stand)	↑1,000	profit or loss	↑1,000

Table 9. Accounting treatment of an increase in the fair value of property, plant or equipment according to International Accounting Standard 16

Statement of financial position			
Fixed assets		equity	
Property, plant and equipment	↑1,000	revaluation surplus	↑1,000

Table 10. Accounting treatment of increases in fair value using a combination of solutions

Statement of financial position			
Fixed assets		equity	
Forest assets	↑1,000	revaluation surplus	↑400
		profit or loss	↑600

Table 11. Advantages and disadvantages of the application of International Accounting Standard 41 to forest stands

Advantage	Disadvantage
A truer presentation of reality, i.e. the value of forest assets	Subjective determination of fair value (determination of discount rate)
Real values (less distorted) of financial analysis ratios	Manipulation of profit or loss
More relevant information for users to make qualified decisions	Recognition of unrealized gains in profit and loss, which poses a risk of distribution of disproportionate profits that may be endangered by natural disasters in future
	Paradoxically, a lower comparability of the financial statements due to the use of different methods to determine the fair value

a fundamental revision, if not complete abandonment. Barlev and Haddad (2003) claimed that the fair value accounting of IFRS might bring about a change in management philosophy and in the management strategy of a firm. Risk management will be an integral part of business management and will involve the consistent investigation of local as well as global market trends and the use of new hedging methods. Jöbstl (2009) stated that IAS 41 covering self-generating and regenerating assets such as forests increased awareness and discussion, but it did not certainly bring a scientific solution nor is it likely to bring it – due to the limited coverage (e.g. in the America). Various studies have shown various results in the implementation of IAS 41 in practice. Australia has been a test for IAS 41 because of the close similarities between IAS 41 and the relevant Australian regulation on forestry AASB 1037 (Australian Accounting Standards Board 1998). Herbohn and Herbohn (2006) observed that evidence is presented that suggests that compliance with IAS 41 will allow statement preparers a choice of methods to determine the fair value of timber assets. The Australian experiences also clearly highlight that a certain level of sophistication of internal management information systems is necessary (Herbohn 2009).

Assessing the opinions of the polled experts from the forestry sector on the forest valuation, its accounting treatment and disclosure of the value in the financial statements – results of the statistical survey

Null statistical hypotheses were tested within the sample survey of experts' opinions and willingness to measure and disclose the accounting value of forests.

Contingency Tables, which show frequencies of combinations of individual categories, have been drawn up for both null hypotheses (Tables 12 and 13).

Table 12. Dependence of the need to measure and recognize forests in the accounts on the fulfilment of the statutory duty to disclose the information on the forest value in the financial statements

Information on the forest value in the notes to financial statements	Do you believe that the forest must be measured and recognized in the accounts?				Total
	rather yes	certainly yes	rather no	certainly no	
Yes	21	9	60	21	111
No	38	4	112	52	206
Total	59	13	172	73	317

Table 13. Dependence of the willingness to continuously determine and disclose required data on the legal form of the organisation

Category of organization	Willingness to find out and provide information		Total
	yes	no	
Municipalities	45	185	230
State-funded organizations	5	14	19
Limited liability and joint-stock companies	8	30	38
Others	9	21	30
Total	67	250	317

The test criterion was as follows: $\chi^2 = 7.951$, $df = 3$, P-value = 0.047. At the significance level of 5%, the hypothesis claiming the absence of dependence can be rejected. The dependence of the need to measure and recognize the forest value on the fact whether the company fulfils the specified statutory duty has been proved using the dependence testing. Based on the results mentioned above, it may be concluded that the organizations fulfilling the statutory duty to disclose the forest value in the notes to the financial statements also, at the same time, hold the opinion that disclosing the forest value is needed.

As for the testing described in Table 13, two combinations had to be made; for one thing, combination Q3 (there are four new categories of legal forms), and for the other, questions Q14 were combined into two categories (yes × no) so that the preconditions for using Pearson's Chi-squared test were met.

The test criterion was as follows: $\chi^2 = 2.061$, $df = 3$, P-value = 0.560. At the significance level of 5%, the hypothesis claiming the absence of dependence cannot be rejected. The dependence of the willingness to continuously find out the specified data on the legal form of the company has not been proved. It may be concluded that companies, irrespective of their legal form, primarily preferred the "no" answer. Based on the results of the statistical survey, it has been possible to conclude in summary that the forestry sector experts from the sample are aware of the legitimacy of issues related to the valuation and disclosure of the forest value in accounting systems, but at the same time they do not support this requirement. The above-mentioned findings arising from the conducted statistical survey are in accordance with the conclusions of Hinke and Stárová (2013). A questionnaire survey conducted by them revealed scepticism of economists within agricultural companies in the Czech Republic to use fair value as the measurement basis for biological assets and agricultural produce. In general, in the Czech Republic there is scepticism towards the determination of fair value; however, interesting opinions on the use of fair value for the valuation of forest stands directly were published by Burnside (2005). The respondents were representatives of three important companies in Sweden owning millions of hectares of forest area and a representative of a large auditing company dealing with IAS 41. The research showed that the experts' opinions were not unanimous, but they did not certainly refuse fair value. When respondents were asked to compare the valuation by cost and fair value with respect to reliability and relevance, perhaps rather surpris-

ingly, all representatives of the companies possessing forests responded that more reliable and more relevant is fair value, and the representative of the auditing company preferred cost value. The representatives of the Swedish companies possessing forests completely disagreed in the other answers. When assessing whether the valuation at fair value provides better or worse comparability of financial information, two respondents replied that better, one answered that the use of fair value does not affect the comparability and the representative of the auditing company responded very vaguely, both yes and no. In any case, none of the Swedish forest product companies and auditing company would have chosen to apply fair value accounting and IAS 41 if it was not mandatory (Burnside 2005).

The valuation based on acquisition costs has a long historical tradition in the Czech Republic. In most cases, increasing costs related to the determination of forest fair value that would be disclosed in the financial statements are not usually regarded with favour by forest owners. The situation is different in the academic environment of the Czech Republic. Here, the need for active involvement in the international developments in the examined area is felt strongly. In the international context, rather than "whether" to recognize the fair value of a growing forest is asked the question "how" to determine this value and how to record the increasing value of forest over time in the financial statements.

CONCLUSIONS

The international efforts in the forest valuation and its accounting treatment reflect the desire to give a true and fair view of reality leading to better awareness of users of forestry companies' financial statements and to better comparability of financial information within the forestry sector, both from the Czech Republic's and international points of view.

The main aim of this paper was, based on the findings, to evaluate the suitability of IAS 41 application to the valuation of forests in the Czech Republic and, in case of need, to propose a solution for the standard application. The knowledge base for achieving the main aim was, primarily, the elaboration of a detailed analysis of the issues examined within the first and second partial aims. The solutions of partial aims allow us to conclude that the solution under IAS 41 for the examined area is theoretically correct. IAS 41 meets the requirement for a true and fair view of reality by requiring to recognize the forest as a biological asset at its fair value

(more precisely at fair value less costs to sell). At the same time, however, the requirement of IAS 41 to recognize changes from the annual revaluation of forest assets in profit or loss is only partially correct, according to the authors. They propose to distinguish the increase in the forest value as a result of biological transformation and, at the same time, also as a result of market value changes in the financial statements. It is further proposed that the change in value resulting from biological transformation be recognized either in profit or in loss and the result of changes in market prices be recognized in the statement of financial position. This alternative proposal goes beyond the scope of IAS 41, where it is indeed required to distinguish both causes of the increase in the asset value, but only when disclosing this information in the notes to the financial statements. The fact that the approach under IAS 41 results in the recognition of unrealized gains and losses may also lead to an unauthorized distribution of profits and unsolvable situations in the future if the forest is not logged, for example by reason of natural disasters. As for the technical application of the principles mentioned above, the critical point is the determination of the fair value of an asset for which no active market exists and when its production cycle is several decades long. In connection with the second partial aim, the advantages and disadvantages of the IAS 41 application have been formulated. The advantage of IAS 41 is a truer view of reality, i.e. the value of forest assets, and therefrom resulting more real values of financial analysis ratios and, last but not least, providing more relevant information to users for implementing qualified decisions. The disadvantages of IAS 41 have been identified in the subjectivity of determining fair value due to the difficulty to determine a discount interest rate, which could eventually lead to the manipulation of profit or loss. The mentioned disadvantages of IAS 41 would cause incomparability of financial statements. The subject of the third partial aim was to survey the experts' opinions on the forest valuation and its accounting treatment using a questionnaire survey. The conducted survey of the sample has pointed out to the forestry experts' general awareness of the need to enter the forest value in the accounting information system. For the purposes of the statistical survey, two null hypotheses were defined. H01 hypothesis has been rejected by the statistical survey, since it has been proved that there is a dependence of the need to measure and recognize the forest value on the fact whether the organization fulfils its statutory duty. At the same time, these organizations regard the changes in valuation, recog-

nition and disclosure of the forest value with favour. H02 hypothesis cannot be rejected, since the dependence of the willingness to continuously determine the forest value with its subsequent recognition in the accounting system on the legal form of the organization has not been proved.

General scepticism of experienced experts permeates the examined area of the forest valuation and its accounting treatment, since it is difficult, if not absolutely impossible, to change the used and deep-rooted approaches. However, it may be concluded that the opposite efforts are in the academic environment of the Czech Republic. For the aforesaid reasons, the application of IAS 41 to the measurement and reporting of forest assets does not seem to be feasible in the Czech Republic in the foreseeable future. The key task of the future research results from the existing findings and it is the development of a universally applicable valuation model to determine the fair value of forest assets.

In conclusion, it is necessary to continue the research and discussion on the forest valuation for accounting purposes in a manner that will lead to the introduction of meaningful and representative rules for a uniform valuation of forest assets, which would not be too complicated and results of which would be generally comparable.

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