Stockholm School of Economics

Master Thesis in Accounting and Financial Management

The valuation of standing trees under IAS 41

An analysis of accounting practices before and after the amendment in 2009

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Abstract

The present study examines the valuation methods 30 forest-owning companies use to determine the fair value of their standing forests under International Accounting Standard 41 'Agriculture'. Comparison with regards to the assumptions made in applying fair value is conducted over time for the reporting periods 2005 to 2009 and among companies. Identified differences and similarities are clustered and analyzed in patterns. As the standard was reviewed and amended in 2009, the companies' assessment and reaction to the amendment is in special focus.

The study finds that the net present value method is used to determine fair value by most of the companies. Assumptions made by the forest owners are dispersed, but similarities especially among Swedish companies are observable. Significant learning processes or developments over time could not be identified in most cases. However, a movement of the companies' disclosures towards the use of the standard's wording has emerged. Further, the amendment to IAS 41 that allows for taking 'additional biological transformation' into account, when valuing immature forest holdings, appears to have been triggered by industry practice.

Keywords: *IAS 41, additional biological transformation, immature trees, fair value, compliance*

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Abbreviations

AR	Annual report
AIFRS	Australian International Financial Reporting Standards
AUD	Australian Dollars
BA	Biological assets
BC	Basis of conclusion
BU	Business unit
BvD	Bureau van Dijk
DCF	Discounted cash flow (model)
FAO	Food and Agriculture Organization of the United Nations
FAS	Financial Accounting Standards
FV	Fair value
FVA	Fair value accounting
HC	Historical cost
HCA	Historical cost accounting
IAS	International Accounting Standard
IASB	International Accounting Standards Board
IASC	International Accounting Standard Committee
IFRS	International Financial Reporting Standards
IFRIC	International Financial Reporting Standards Interpretations Committee
IRR	Internal rate of return
MASB	Malaysian Accounting Standards Board
MFAS	Malaysian Financial Accounting Standards
NACE	Nomenclature générale des activités économiques dans les communautés européennes
NPV	Net present value (method)
NSV	Net standing value (method)
PV	Present value
PWC	PriceWaterhouseCoopers
USD	US-Dollar
WACC	Weighted average cost of capital

References to IAS 41

When referring to the standard without stating a certain year, this study refers to the current version of IAS 41, which comprises the amendment of 2009. In contrast, references to the original version of IAS 41 are indicated by the addition ‘2005’. Examples are (IAS 41.21) and IAS (41.21, 2005) respectively. Further, we choose to refer to the Basis of Conclusion of the amended standard from December 31, 2008 and refer to it as 2009 in order to illustrate that the amendment, which comes into effect as of January 1, 2009, is included. One example for a quotation is (IAS 41, BC 8, 2009).

Sample Companies

Company name	Referred to as
Altri SGPS S.A.	Altri
Asian Bamboo AG	Asian Bamboo
Bergs Timber AB	Bergs Timber
Bergvik Skog AB	Bergvik Skog
Celulosa Arauco y Constitución S.A.	Arauco
Empresas CMPC S.A.	CMPC
Grupo Empresarial Ence S.A.	Empresarial Ence
Gunns Ltd.	Gunns Ltd.
Holmen Skog AB	Holmen
Lecta S.A.	Lecta
Masonite (Africa) Ltd.	Masonite
Metsäliitto Osuuskunta	Metsä Group (re-named in 2009)
Mondi Group	Mondi
M-Real OYJ	M-Real
Norske Skogsindustrier ASA	Norske Skog
Portucel Empresa Produtora de Pasta e Papel S.A.	Portucel Empresa
Precious Woods Holdings AG	Precious Woods
Rougier S.A.	Rougier
South African Forestry Company Ltd. (Safcol)	Safcol
Samling Global Ltd.	Samling Global
Sappi Ltd.	Sappi
Svenska Cellulosa AB SCA	SCA
Smurfit Kappa Group PLC	Smurfit Kappa
Södra Timber AB	Södra
Stora Enso OYJ	Stora Enso
Sveaskog AB	Sveaskog
Tornator OY	Tornator
UPM-Kymmene OYJ	UPM-Kymmene
Willmott Forests Ltd.	Willmott Forests
York Timber Holdings Ltd.	York Timber

1. Introduction

International Accounting Standard (IAS) 41 'Agriculture' introduced fair value accounting (FVA) to biological assets for reporting periods beginning on or after 1 January 2003. This entailed a major change from previous accounting practices and presented a challenge for preparers. In the case of forest companies, especially the valuation of standing trees requires substantial judgment. The standard's emphasis on market-based values raised questions and concerns among forest-owning companies worldwide as markets for standing trees are limited and prices cannot be derived easily. The option to obtain fair values by discounting expected net cash flows at a current market rate also involves difficulties due to the large amount of assumptions that have to be made. It is interesting to examine how the forest-owning companies have dealt with these challenges throughout the last years. However, previous research does not focus on the preparers' learning processes and the development of accounting practices over time. Thus, this study will not only compare different accounting practices in order to understand the rationales behind accounting choices, but also concentrate on changes made by the individual companies over several reporting periods.

Ambiguous application of accounting methods might not only be due to a standard's lack of practicality. The corporate domicile or a company's listing status might also add to diverse choices of accounting practice (e.g. Street & Gray, 2002). Companies in certain countries are more reluctant to apply fair value accounting to their biological assets than others. Herbohn and Elad (2011) find that the degree of acceptance is, inter alia, determined by the resemblance to previously applied accounting methods. Further, enforcing mechanisms in the reporting jurisdiction shape the reporting quality for the same standards (e.g. Ball, Robin, & Wu, 2003). Taking these findings into account, the present study aims at the identification of patterns that might help to increase transparency regarding the assumptions made. As many conditions, such as the wood species, the location, soil conditions and the end-use of the wood, shape the characteristics of forests as an asset class, the valuation might appear arbitrary. The identification of similarities and differences among companies and clustering the information provided might therefore help to interpret the disclosures made by the forest owners.

After its issuance in 2003, the 'Agriculture' standard IAS 41 attracted further attention in 2009, when it was amended. In its original version, the standard prohibited to take 'additional biological transformation' into account when measuring the fair value of biological assets. This implied that the valuation of standing trees would have to be conducted without including growth assumptions. Considering the difficulties in deriving a market price, many companies opted for a net present value (NPV) calculation. However, questions and diverse interpretations arose on how to conduct a discounted cash flow (DCF) calculation without considering the future growth of immature trees. Some preparers felt that they were forced to use a different model to derive fair value, by e.g. referencing to a scrap market for the immature forest (IASB, 2007a). In order to end insecurities and avoid different interpretations, IAS 41 was amended in 2009 to allow the consideration of 'additional

biological transformation', when evaluating biological assets. In this context, Norman (2012) finds that vague formulations in accounting standards or the lack of regulations for special cases might lead to interpretation and application issues and cause preparers to develop an own best practice. The aim of the present study is to find whether the forest companies followed the standard before the change or behaved in line with Norman's findings and defined their own interpretations of the standard. Previous research already found that DCF models are widely in use to evaluate immature forests, but lack the examination the amendment had on the companies' financial statements. Our research adds to former studies here. The identification of an industry agreement among Swedish forest owners, inter alia, leads the authors to the assumption that an established best practice caused by a vague formulation induced the standard setters to review and amend IAS 41.

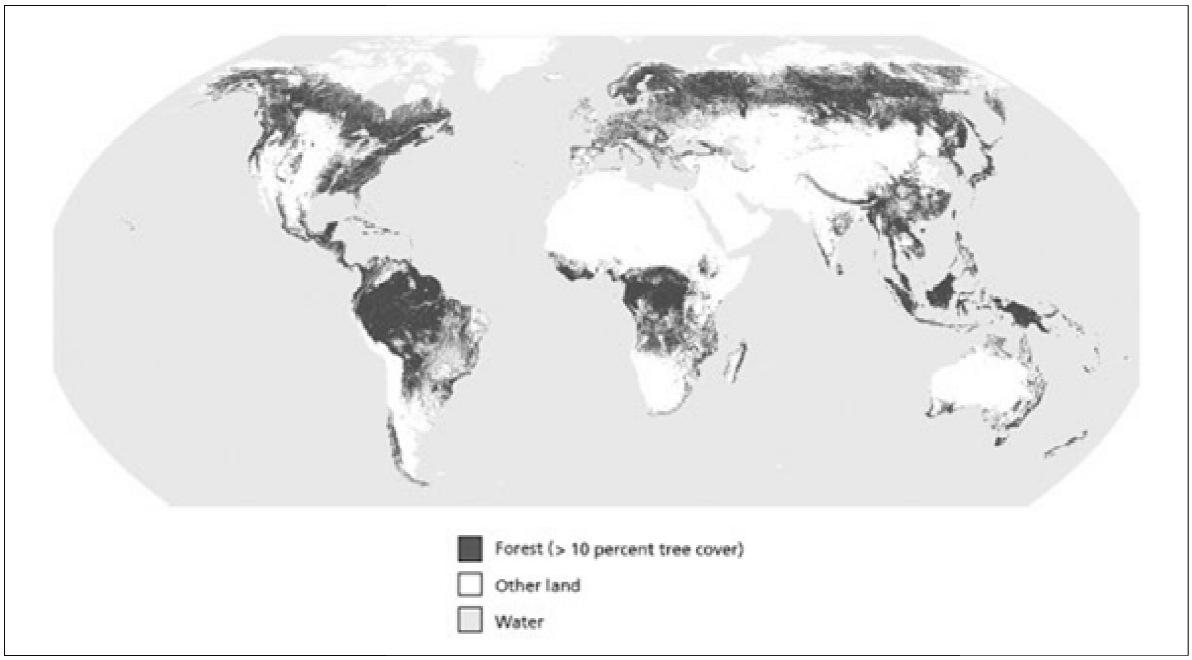
Not in the focus of this study, but still interesting is whether the discussion on climate change and the production of biomass as an alternative energy source will gain in importance for the companies and also enter their financial statements. Research could reveal, whether the companies already prepare the reader for future adjustments, despite lacking guidance by the standard. In addition, accounting practices for concessions and leases related to forestry appear to be a topic with little previous research. In particular, studies on the quality of disclosures related to these assets provide opportunities for future studies.

The present paper is structured as follows: The first part provides the reader with background information regarding the world's forests and prevalent accounting practices in this area. A thorough description of IAS 41 and its amendment follows before previous research is presented. Literature in the fields of accounting policy choice, compliance with accounting standards, studies on IAS 41 and fair values in agriculture has been reviewed and related to this study. The purpose summarizes the gaps we could identify and intend to address in this study by formulating four study questions. The sixth chapter discusses the methods used and their implications for the results, followed by an account of the empirical data collected in chapter seven. In the analysis, the empirical data is structured into patterns and examined against previous findings. The conclusion summarizes our findings and provides answers to our study questions.

2. The world's forests

2.1. Extent and geographical dispersion

More than 31% or four billion hectares of the world's total land area are covered by forests. Russia, Brazil, Canada, the United States of America and China together account for more than half of the total forest area and are the forest-richest countries in the world. Europe (including Russia) contains the largest area of forests compared to other regions and makes up 25% or one billion hectares of the global forest area (FAO, 2010a). While Russia dominates the forest area in Europe, countries such as



Finland, where more than 73% of the total land area is covered by forest, Sweden, Norway and Portugal also make a significant contribution. After Europe, Latin America and the Caribbean as well as North America each add about 20% to the total forest area (FAO, 2010a). Illustration A gives an overview of the geographical dispersion of the world's forests. As diverse as the geographical dispersion, as different are the wood species and their characteristics. Whereas in the Nordic region spruce, pine and birch dominate the picture, in the southern hemisphere species such as mahogany, bamboo, eucalyptus or teak are prevailing[1].

2.2. Designated functions

According to the Food and Agriculture Organization of the United Nations (FAO), the purposes forests are managed for are manifold. The five main forest functions are production, protection, conservation, social services and multiple uses. Production is the primary function of forests located in Europe (52% of its forest area), while the values for North and South America with only 14% of the

[1] The list does not distinguish between natural and planted forests.

area designated for production are significantly lower (FAO, 2010b). Media and communication materials, packaging, personal care products (tissue paper and related products), construction including home decoration, and furniture are the major end uses of forest products. Solid wood products are mainly used for construction in most countries and regions. Timber frame construction, for example, accounts for over 90% of house construction in North America, Australia and the Nordic countries (FAO, 2011; Palmer, 2000).

2.3. The valuation of productive forest holdings worldwide

The accounting for forests differs with regards to the location and the respective prevailing accounting system. In many countries (e.g. Russia, United States) cost accounting is dominant, whereas in other countries (e.g. Brazil), fair value accounting has been common practice for several years (also before IFRS) (Ernst&Young, 2012). With the adoption of IAS 41 'Agriculture' and the global transition to International Financial Reporting Standards (IFRS), the valuation of biological assets globally moves towards fair values. Until today, about 120 countries worldwide have required or permitted the use of IFRSs and more countries are about to converge to IFRSs in the near future (IASB, 2012). Transition dates, however, vary for the different economies and thus differing accounting practices for biological assets can still be found. While IAS 41 is required for listed companies in the European Union since 2005, 2012 will be the first year of full convergence for Malaysian listed companies for example. With regards to this study, the following transition dates are of major importance; Table A provides an overview.

Country	**Status for listed companies as of May 2012**
Australia	Required for all private sector reporting entities and as the basis for public sector reporting since 2005
Chile	Required for major listed (open) companies since 2009
European Union	All member states of the EU are required to use IFRSs as adopted by the EU for listed companies and consolidated accounts since 2005
Malaysia	Required from 2012 (but Malaysian Financial Accounting Standards (MFAS) are aligned with IFRS since 2005 and identical since 2007)
South Africa	Required for listed entities since 2005

Table A - Dates of transition to IFRS (adopted from IASB, 2012; MASB, 2008; Deloitte, 2012)

3. IAS 41 'Agriculture'

The 'Agriculture' standard IAS 41 determines the recognition of biological assets, which comprise living animals and plants, agricultural produce at the point of harvest, as well as agricultural government grants. The valuation of land related to agricultural activity, such as bare forestland, is discussed in IAS 16 'Property, Plant and Equipment' and IAS 40 'Investment Property'. Agricultural produce such as wool, crops, and picked fruits after the point of harvest is recognized in accordance with IAS 2 'Inventory'. The accounting for intangible assets related to agricultural activity follows IAS 38 'Intangible Assets'.

3.1. Current version of IAS 41

Biological assets and agricultural produce at the point of harvest shall be recognized when the entity controls the assets as a result of past events, when it is probable that future economic benefits associated with the asset will flow to the entity, and when the fair value or historical cost of the asset can be measured reliably (IAS 41.10). Upon initial recognition and on the balance sheet date, biological assets and agricultural produce at the point of harvest shall be recognized at fair value less costs to sell (IAS 41.12 and 41.13). In order to determine their fair value, biological assets may be categorized according to their age, quality, size, etc. (IAS 41.15). Descriptions of the different groups of an entity's biological assets shall be disclosed; more specifically, the entity is advised to provide information on maturity, intended use, and other details that allow the reader to judge the timing of future cash flows.

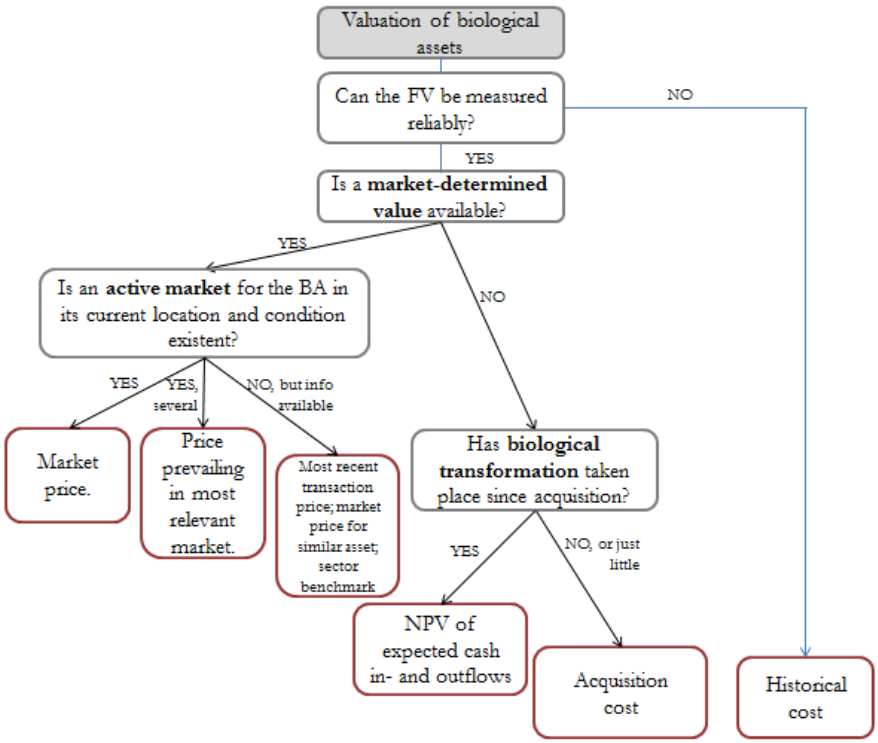


Illustration B - Fair Value hierarchy of IAS 41

Illustration B summarizes the hierarchy of the determination of the value of biological assets and agricultural produce at the point of harvest. The fair value hierarchy can be described as follows:

Firstly, quoted market prices qualify as fair value of biological assets and agricultural produce if an active market exists for the asset in its current condition and location. Prices determined for future contracts shall not be taken into account for the assessment of the fair value (IAS 41.16). If several markets exist, the quoted price of the most relevant market has to be used (IAS 41.17). Secondly, in absence of active markets, IAS 41 provides the preparer with the following options in order to determine the fair value with the help of market prices: (i) 'the most recent market transaction price, provided that there has not been a significant change in economic circumstances between the date of that transaction and the end of the reporting period', (ii) 'market prices for similar assets with adjustment to reflect differences', (iii) 'sector benchmarks such as the value of an orchard expressed per export tray, bushel, or hectare and the value of cattle expressed per kilogram of meat' (IAS 41.18). In some cases, market-determined prices are not available for biological assets in their current condition and location (e.g. for immature trees). Thus, the standard provides a third option for the assessment of the fair value: The entities may determine the present value of expected net cash flows to evaluate their biological assets. However, according to IAS 41.22, cash-flows resulting from tax payments, reforestation or financing activities shall not be included in the calculations. In the model, a current market determined discount rate shall be applied. The preparers are supposed to disclose detailed information on chosen input variables such as growth cycles, definition of prices and costs or tax rates. Fourthly, in special cases, i.e. when trees have been planted immediately prior to the balance sheet date, biological transformation[2] is considered to have such a small impact on the value of the asset that it is negligible. Hence, the fair value of the biological asset is expected to approximate cost. The value of biological assets can also be determined by cost when the fair value cannot be measured reliably by the other valuation methods as stated above. The value upon initial recognition equals acquisition costs minus accumulated impairment losses and depreciation. The latter values shall be determined in line with IAS 2 'Inventories', IAS 16 'Property, plant and equipment' and IAS 36 'Impairment of assets'. When choosing to apply the cost method over several periods, an entity has to disclose descriptions of the biological asset, reasons for the absence of a reliably measurable fair value, the opening and ending gross carrying amounts of the asset, as well as the depreciation method and rates used. This valuation model may then be used until the fair value of the biological asset becomes reliably measurable (IAS 41.30). From that point in time, the regulations for the determination of the fair value apply as described above. Due to their nature, some biological assets might be physically attached to land. Where active markets exist for the combined but not the separate

[2] Biological transformation comprises the processes of growth, degeneration, production, and procreation that cause qualitative or quantitative changes in a biological asset (IAS 41).

assets, the fair value of the asset package may be used to determine the fair value of the biological asset itself (IAS 41.25).

Gains and losses arising due to changes in the fair value less cost to sell or upon initial recognition, shall be recognized in the operating income of the reporting period (IAS 41.26 to 41.29). Details to the background of these result-relevant entries, i.e. unit price changes or physical changes, are preferably disclosed.

3.2. Amendments to IAS 41

Since the standard was issued in 2001, IAS 41 has been amended to overcome shortcomings in regulations and clear language; the International Accounting Standards Board (IASB) had received very controversial feedback on the agricultural standard by auditors, prepares and other experts (IASB, 2007a). The IASB's decision making process followed the regular IFRS improvement process:

Annual Improvement Process, January 2007

In January 2007 the International Financial Reporting Standards Interpretations Committee (IFRIC) asked the IASB staff to recommend several amendments to IAS 41 to the Board. The proposed changes were part of the Annual Improvement Process in February 2007. The Committee stated that the unclear wording in the standard created divergence in accounting practice. This would in turn prevent readers of financial statements to interpret the standard in a meaningful way (IASB, 2007a). Most difficulties arose with the interpretation of IAS 41.21. The original wording has been as follows: 'The objective of a calculation of the present value (PV) of expected net cash flows is to determine the fair value of a biological asset in its present location and condition. An entity considers this in determining an appropriate discount rate to be used and in estimating expected net cash flows. The present condition of a biological asset excludes any increases in value **from additional biological transformation and future activities** of the entity, such as those related to enhancing the future biological transformation, harvesting, and selling'. The IFRIC argued that the last sentence could be interpreted in a way that changes in the fair value of biological assets due to growth would not be allowed to be taken into account when using the DCF model for valuation: 'Some preparers are reading the current wording of the standard as prohibiting them from taking into account cash flows that are expected to be generated from mature assets when measuring the fair value of immature assets' (IASB, 2007a). The proposal comprised changes in the definition of biological transformation as well as changes to paragraph IAS 41.21. The IFRIC furthermore felt that the notion of biological transformation should comprise the actions of harvesting or killing. The proposal for the new definition was formulated as follows: 'Biological transformation comprises the processes of growth, degeneration, production, procreation and *harvesting or killing* that cause qualitative or quantitative changes in a biological asset' (IASB, 2007b).

Exposure Draft, October 2007

The Exposure Draft as issued by the Board in October 2007 reported diversity in practice and acknowledged that not taking additional biological transformation into account might lead to carrying amounts that do not mirror the fair value of the asset. Thus, the Board proposed to 'remove the perceived prohibition on an entity taking into account the cash flows resulting from *additional biological transformation'* (IASB, 2007b) instead of changing the definition of *biological transformation*. An additional request of change in paragraph 17 was made by the IFRIC within the Annual Improvements Process 2007. The accretion of 'in its current location and condition' to biological assets and agricultural produce should clarify that the existence of scrap markets for harvested or killed biological assets does not necessarily imply the existence of an active market for the immature, growing biological asset (IASB, 2007a).

Amendments, May 2008

As a result, all amendments accepted throughout the Annual Improvement Process and the Exposure Draft were to be applied from January 2009. The changes to IAS 41 regarding the discount rate and additional biological transformation had to be applied prospectively. The amendments to IAS 41 can be divided into two groups:

I. Amendments that result in accounting changes for presentation, recognition or measurement purposes (Deloitte, 2008)
II. Amendments expected to have no or minimal effect on accounting but are necessary to align the wording of IFRSs (Deloitte, 2008)

The table in appendix 10.1 'Amendments to IAS 41' illustrates which group the respective amendments belong to. Most important to this paper's study questions is the amendment to allow for the inclusion of cash flows arising from additional biological transformation (i.e. growth) in the calculation of the NPV of standing trees in the absence of market-related prices (IAS 41.BC 8, 2009). The basis of conclusion in the new standard (IAS 41.BC 8, 2009) is the same as the one given in the Exposure Draft of October 2007. Also, the proposal to amend paragraph IAS 41.17 by the accretion 'in its current location and condition' was realized in the 2009 version of IAS 41. In contrast to that, the Board did not follow the proposal to include the notion of harvest in the definition of biological transformation. Still, it agreed with some respondents' concerns that harvest is rather a human action than a biological transformation (IAS 41.BC 9, 2009). Hence, the standard in its current version refers to both biological transformation and harvest if applicable in order to illustrate the change in the condition of the biological asset (IAS 41.BC 9, 2009). Furthermore, as part of the alignment to different accounting standards, the Board decided that in case of IAS 41 the expressions 'point-of-sale costs' and 'costs to sell' would be interchangeable. Thus, the usage of the notion 'costs to sell' was chosen to ensure alignment with the wording of IFRS 5 and IAS 36 while not altering the meaning

(IAS 41.BC 3 and 4, 2009). Another minor change was the replacement of 'logs' by 'felled trees'. Although not suggested by the IFRIC as part of the Annual Improvements Process in 2007, the Board decided to change the requirements of the discount rate in the DCF model. Following the logic of fair value measurement, IAS 41 now allows the entity to choose a current market-based discount rate, thereby referring to either a pre- or after-tax rate (IAS 41, BC 5 to 7, 2009). The decision is based on the idea that the value assessment of assets is fairest when it takes realistic characteristics for the buying decision of market participants into account. These attributes also comprise expected tax payments, which shall be mirrored accordingly by the choice of an appropriate discount rate in the DCF model of the biological assets since 2009. This amendment stands in contrast to explicitly dictating the use of the 'pre-tax discount rate' as in earlier versions of IAS 41.

4. Review of previous literature

This section looks at previous research in the fields of accounting policy choice and compliance, biological assets and IAS 41 as well as fair values in agriculture.

4.1. Accounting policy choice

Previous literature identifies at least six different views on how managers choose accounting policy. Ball and Foster (1982) categorize them in the following manner:

1) *Accounting Model View:* Management choices are based on accounting model notions such as matching costs and revenues.
2) *Economic Reality/Truth View:* Accounting policy should be chosen in a way that it reflects economic conditions and shows true earnings measures.
3) *Fair Presentation/Comparability View:* Important for the choice of an adequate accounting policy is comparability over time and among companies.
4) *Economic Consequences to the Firm's Stockholders View:* The accounting policy choice benefits the companies' shareholders.
5) *Economic Consequences to Management View:* Management chooses accounting methods in a way that maximizes its utility or welfare.
6) *Regulatory Compliance View:* When a new accounting standard is adopted, management decides whether to comply with it or not.

Research has been influenced by these views and produced findings that help to understand which determinants foster the choice of a certain accounting method. From the standard setters' point of view, theory no. 6 and research in this field are of special interest as insights on the most effective design of accounting standards can be gained.

4.1.1. Compliance with accounting standards

The choice of whether to comply with accounting standards is, among others, determined by reporting incentives (e.g. Burgstahler, Hail, & Leuz, 2006; Watts & Zimmermann, 1986). It can be assumed that management considers both costs and benefits that are related to compliance and also takes

alternatives, such as evasion, a qualified audit report or a private listing, into account (Ball & Foster, 1982). Benston (1980) identifies four sources of compliance costs that impact, at least, the degree of compliance:

- direct cost of producing the information
- direct cost of auditing the information
- indirect cost due to information reaching the competition
- indirect cost because the requirement is not the best means of informing investors and/or investors have to learn about the standards in order to understand what to disregard

Furthermore, previous research in this field of study found that the level of compliance is positively affected by the size of the audit firm and a listing outside the home region. Compliance also varies among countries and is dependent on the respective industry (e.g. Street & Gray, 2002). Nichols and Street (2007) confirm an association between compliance and industry characteristics, when examining the impact of changes in IAS 14 'Segment reporting'. They find that the level of competition in an industry correlates negatively with the degree of compliance. Lemke and Page (1992) further found that tax-effects play a major role when examining compliance with standards that provide income decreasing accounting alternatives.

4.1.2. Compliance and IFRS

In order to increase comparability and to overcome compliance issues, the international accounting debate has mainly focused on establishing high quality accounting standards, which have been regarded as the primary source for high quality accounting (e.g. Levitt, 1998). Recent studies however expressed concerns regarding the role that enforcement mechanisms might play in the achievement of high compliance and thus comparability across jurisdictions that adopt IFRS (e.g. Ball, Robin, & Wu, 2003; Burgstahler, Hail, & Leuz, 2006; Jeanjean & Stolowy, 2008; Nobes C., 2006b; Schipper, 2005; Tsalavoutas, 2011). Ball, Robin and Wu (2003) and Jeanjean and Stolowy (2008) argue, for example, that the sole focus on standards is incomplete when aiming at the creation of a common business language. Ball et al. find that auditor and manager incentives influence the choice of accounting methods when studying financial reporting quality in four East Asian countries. According to this study, both market and political forces in the reporting jurisdiction shape the accounting policy choice for preparers (cf. Burgstahler, Hail, & Leuz, 2006). In a later study, Jeanjean and Stolowy (2008) argue that 'management incentives and national institutional factors play an important role in framing financial reporting characteristics, probably more important than accounting standards alone' (p. 493). By testing the effect of mandatory IFRS adoption on earnings management, Jeanjean and Stolowy do not find any positive effect on earnings quality and conclude that sharing rules is not sufficient in itself to harmonize and improve reporting quality.

Norman (2012) looks at compliance from a business ethics perspective and considers the determinants that cause companies to apply obligations which go even beyond compliance. This means that

companies do not take advantage of weaknesses in the accounting standards but aim to act in accordance with the standard setters' intentions despite a lack of regulation. He claims that principles-based regulations, such as IFRS, should also serve as means to establish beyond-compliance norms. Norman furthermore argues that the stakeholder theory is not sufficient in its own to ground beyond-compliance behavior. Top-level managers often underlie competing responsibilities and rights with respect to the various stakeholders of a company, an argument which is in line with agency theory. Thus, markets require better principles-based guidance that prevents firms from opportunistic behavior. Norman concludes that 'business ethics [will serve] as self-regulation' if the companies operating in a specific industry 'find a way to operate as if [higher standards] were the law' (Norman, 2012, p. 7), i.e. by formulating a voluntary code of conduct.

4.2. Studies on IAS 41

4.2.1. Availability and focus of studies

A large proportion of previous research was conducted on the first-time adoption of IAS 41. Part of it discusses the possible implementation of IAS 41 in specific countries, such as the Latvian case study by Grege-Staltmane (2010). Even more recent is the study on a theoretical step towards the agriculture standard in Romania (Feleaga, Feleaga, & Raileanu, 2012), where international companies and smaller private forest-holdings play an important role in the local industry. While authors such as Grege-Staltmane (2010) and Feleaga et al. (2012) are interested in one specific country, larger studies present findings that were researched in or are valid for larger regions (PWC, 2009; Herbohn, 2006; Elad, 2004; PWC, 2011).

Another distinction between studies can be made with respect to their timing. A first group discusses the theoretical impact of IAS 41 before its implementation, such as the one performed by Herbohn and Herbohn (2006). The Australian experience with AASB 1037, a standard which is similar to IAS 41 and was implemented in 2001, serves as the study object. The authors draw conclusions from the accounting practice in Australia and apply these on the expected impact of IAS 41 on the forest industry in the EU. A second group of this research stream focuses on positive outcomes and challenges as experienced shortly after the first-time adoption of IFRS including IAS 41. Reactions, in general and specifically for IAS 41, on the change from historical cost to fair value accounting are for example studied by Nobes and Schwenke (2006) or Herbohn and Elad (2011) respectively. In contrast to solely focusing on the forest industry, a large number of studies examined the impact of IAS 41 on other parts or the whole agricultural sector, for example Lefter and Roman (2007), Elad (2004), Argilés and Slof (2001) as well as Elad and Herbohn (2011). However, while some studies discuss the harmonization progress of accounting practice due to IFRS, others examine the improvements and drawbacks of the new stipulations.

4.2.2. Findings regarding accounting practices (for standing trees) under IAS 41

Differences across countries such as previous accounting systems, enforcing jurisdictions or the legal environment play important roles in the choice of the measurement method under IAS 41. Herbohn conducted a number of studies concerning the valuation of standing trees, measurement and recognition of changes in the value of the assets, as well as disclosure practices (Herbohn, 2006; Herbohn & Herbohn, 2006) in Australia, France and the UK: While francophone countries, which reported under historical cost accounting (HCA) until 2005, are rather reluctant to apply fair value accounting (FVA), Australian companies, which are experienced in FVA, are more open towards the new fair value hierarchy of IAS 41 (Herbohn & Elad, 2011). Nobes and Schwenke (2006) and Nobes (2006a) support the findings of Herbohn and Elad by reporting systematic differences in the reaction of countries to IFRS. Also, the authors agree that the level of compliance with IAS 41 is higher in Australia than in France. As a result of the application of FVA, Australian companies experienced an increase in the volatility of their income statements of 27% (Herbohn, 2006). The UK and Australia also served as study objects for Cairns et al. (2001). When comparing the situation before the introduction of IFRS and afterwards, they experienced a decrease in the comparability of financial information. This might mainly be due to the preference for NPV valuations (PWC, 2009; Penttinen & Rantala, 2008), which is the third stage of the fair value hierarchy and highly dependent on various assumptions and estimates. A rather general observation is that IAS 41 is less appropriate for biological assets with short production cycles, but favors assets with long growth periods such as forests (Herbohn & Elad, 2011). Still, in case of forest assets the comparability for example depends inter alia, on uniform definitions of maturity ages and the choice of log prices according to Grege-Staltmane (2010).

Obviously, accounting practices under IFRS differ among companies, underlie regional differences and are challenging to understand for readers that do not have expertise in valuation. Thus, our research will focus on the identification of patterns in accounting practices worldwide. We aim at finding similarities in the choice of growth cycles, discount rates or market prices based on certain characteristics of the biological assets. Identifying certain systematic choices could help investors to judge whether the presented disclosures are reasonable and further serve as guidance for less experienced companies.

4.3. The fair value discussion

The fair value approach is a frequently discussed topic. Here we will only present the most important arguments from a more general perspective and with respect to the recognition and measurement of standing trees. Firstly, the subjectivity of assumptions and estimates underlying fair value models is often accused of causing a higher risk for manipulations and earnings management (Herbohn & Herbohn, 2006; Dowling & Godfrey, 2001; Penttinen & Rantala, 2008). Secondly, increases in the volatility of the income statements as well as the recognition of unrealized gains and losses due to fair

value changes are perceived as negative effects (Herbohn & Herbohn, 2006; Penttinen & Rantala, 2008) compared to historical cost accounting, whose application was stipulated by previous standards. Thirdly, experts are concerned that the reporting quality of earnings within the agricultural sector will differ due to the application of different fair value measures in IAS 41 (Herbohn & Elad, 2011). Bingsby (2004) is the most critical author by raising the concern that companies are likely to choose the fair value that suits their entity best. Fourthly, interview-based studies on accounting practice under IAS 41 reveal negative aspects such as additional work and the difficulties to establish well-functioning models (Andersson, Berglund, & Ejerlund, 2005). Theoretically, the benefits of a true and fair view can be outweighed by the cost of the valuation especially since many companies rely on the help of external experts for the establishment of models and felling plans (Herbohn & Elad, 2011).

Despite the critics, supporters of the recognition and measurement in IAS 41 can be found, too. In contrast to the concerns about the comparability as described above, Barlev and Haddad (2003) experience the detailed disclosure requirements of the new standard as an important step towards more comparability and higher transparency. Cairns et al. (2006) verify that the comparability between companies under IAS 41 is improved, while Argilés et al. (2009) even go so far to claim that fair values under IAS 41 provide the reader with more reliable information than historical cost accounting.

The opinions on fair value accounting differ; even with respect to the accounting for biological assets no consensus among researchers can be found. Based on real data of Finnish companies, Penttinen and Rantala (2008) are able to verify the fair values as they are accounted for by the companies. This gives a first hint that the valuation under IAS 41, despite the large number of assumptions and estimates, results in reliable figures. Our study aims at gaining insight in the choice of valuation methods as well as disclosed rationales for accounting choices and assumptions. Comparing the annual reports (AR) of various companies will allow us to draw conclusions on the quantity and quality of disclosures from a reader's perspective. Even though studies with similar study questions have been conducted already, we will differentiate our work from the other research by adding the dimension of time to our empirics and a focus on the amendment of IAS 41 in 2009 to our analysis. In our opinion, it is of interest whether companies moved closer together, even adapted a competitor's approach or do not show any development at all. Furthermore, we could not identify any studies that focus on the impact of the amendment of IAS 41 in 2009 on accounting practices.

5. Purpose

The review of previous literature identifies several gaps in earlier research. In addition to contributing to the discussions on accounting practices under the fair value accounting of IAS 41, the purpose of this paper is to investigate the impact of the amendment to the standard. In this context, we are interested in the question whether the standard moved closer to the prevailing accounting practice or whether companies adjusted their reporting according to the changes in 2009. Overall, this study aims at answering four related study questions:

Study Question I:	How do companies account for standing trees under IAS 41, in particular, which fair value measurement techniques do they apply?
Study Question II:	Has a development over time regarding the accounting for standing trees under IAS 41 taken place?
Study Question III:	Do companies show patterns in their choice of fair value measurement and underlying assumptions?
Study Question IV:	Which impact has the amendment of IAS 41 in 2009 on the accounting practices, i.e. did the standard setters approach the preparers or deviate from industry practice?

With respect to the accounting for standing trees under IAS 41, prior studies focused on certain points in time, i.e. before or after the first time adoption of the standard or a later date. We think that adding the dimension of time will reveal learning processes within companies or bring forward a development towards uniformity among companies. Thus, our contribution to previous research is the analysis of accounting practices for growing forests with regards to four different study questions. *Study question I* investigates, on a general basis, the variety of accounting methods as applied in the sample with special focus on fair value measurement techniques. *Study Question II* compares accounting choices within the individual companies over a certain period of time. The combination of the results is expected to lead to conclusions on learning processes within companies and a possible development towards uniformity. Further, we aim at identifying patterns in the respective accounting choices that help to understand the reasoning behind the practices (*Study Question III*). Moreover, previous literature indicates obstacles in the interpretation of IAS 41 in its original version without investigating the amendment. Therefore, we are interested in filling the gap in research by focusing on the impact of the amendment on prevailing accounting practices (*Study Question IV*). We attempt to draw conclusions on the interpretation of the standard before the amendment; the goal is to determine whether the standard was changed to conform to the prevailing practice or whether it was designated to proactively guide the preparers.

Overall, this study will pay close attention to the disclosure of explanations. Thereby, we will contribute to research by aiming at understanding the rationales of companies for certain accounting choices with respect to the valuation of standing trees under IAS 41.

6. Methodology

6.1. Empirical research design

When defining the methodology for a research question, the first step is to determine the most suitable form of research. Here, assumptions and estimates by management underlying the valuation of standing trees will be in focus. We choose empirical research over case studies and mathematical models due to several reasons: First of all, in case studies, the outcomes of interviews are often difficult to interpret, especially when investigating a large number of variables. Secondly, due to the sensitivity of accounting data, the interview partners might have incentives to be overly careful in their choice of words and the quantity of information provided. Thirdly, since we focus on a period of five years starting in 2005, the responsible employees might not be available for interviews anymore. Interviewing other persons bears the risk to not receive the most significant information. Fourthly, given the pre-set time frame of our work, empirical research allows the definition of a larger and geographically wider spread sample than in case studies. We presume to receive more data that provides a better basis and thus results in an analysis of higher quality. Moreover, a regression was not deemed to be an alternative since the present study aims at understanding rationales and identifying developments over time among a group of companies.

<u>Annual reports as source of information</u>

As annual reports serve as a basis for the decision making of investors and other external parties, we expect them to provide reliable information and present a good starting point for the comparison and judgment of the companies' accounting practices.

<u>Study period: Reporting periods 2005 to 2009</u>

Analyzing reported data over a five-year period provides the opportunity to follow the development of accounting practices over time. We consider these five years a relevant time frame to draw conclusions and to compare practices among companies (*Study Question III*). Furthermore, a five-year period allows observing learning processes within companies (*Study Question II*). This study will examine the financial statements of the sample companies published for the reporting periods 2005 to 2009. As a large proportion of the sample consists of European, South African and Australian companies, the transition to IFRS in 2005 provides a good starting point for the analysis. We further expect to be able to identify patterns in accounting choices during the first years after the transition to IAS 41 and thus think that a period encompassing the years from 2005 and 2009 will provide meaningful information. The amendment of IAS 41 was adopted in 2008 and became operative for

annual periods beginning on or after 1 January 2009. As this event is in special focus of this study (*Study Question IV*), the collection and interpretation of financial reports is undertaken up to and including the year 2009. We plan to draw conclusions on the entities' understanding and application of IAS 41 before and after the amendment by comparing the accounting practices as disclosed in the annual reports of 2008 and 2009.

Geographic coverage of the sample

A geographic limitation of this study is not desirable since it aims at drawing conclusions on the accounting practices for standing trees under IAS 41 in general. We are aware of the fact that European, South African and Australian companies will be overrepresented in the sample due to their transition to IFRS in the beginning of the study period. Still, other countries with commercial forestry activities, e.g. Malaysia (transition in 2012, but Malaysian accounting standards are identical to IFRS since 2007) or Chile (transition in 2009) also apply IFRS since a later point in time and are thus of interest to this study. Moreover, the comparison of accounting practices worldwide might reveal patterns which are existent due to geographic proximity.

Required characteristics for the sample companies

Following the focus of this study, forest ownership and hence the recognition of standing trees under IAS 41 is considered to be the most important sample criterion for companies. Furthermore, the transition to IFRS in the reporting year 2007 at the latest is seen as a necessity for the comparison over time, while the application since 2005 or earlier is preferred. Three companies in the sample do not converge to IFRS before 2009 but are included in the sample to find out whether later application of IAS 41 affects accounting practice positively. The study will furthermore focus on publicly listed companies. This decision is based on the rationale that those entities have financial information publicly available and are required to follow the standards whereas non-listed entities are not required to do so in every country. In addition, publicly listed companies are interested in attracting international investors and are thus expected to disclose sufficient information for this study's research. An additional limitation is set by the availability of annual reports in languages we are able to understand to a sufficient degree.

6.2. Sample selection

Before determining an appropriate research strategy for the sample selection, several approaches are tested on practicality and quality of search results. Extensive research on freely accessible websites, websites of interest groups and environmental institutions does not result in sufficient information for the establishment of an appropriate sample. Also, the websites of the most important stock exchanges worldwide have been checked to select a sample. However, a number of stock exchanges do not provide listing information available to the public. Furthermore, these first attempts show that it would not be possible to determine an appropriate sample of forest owning companies by the means given to

us without additional research conducted manually. The main obstacle is the lack of filter mechanisms for forest ownership or the application of IAS 41. Finally, the sample selection is successfully obtained by using the Orbis database, which provides the best opportunities for combining the specific search criteria as defined above in order to determine a broad sample of companies that are most likely to be owners of productive forest plantations. Moreover, the availability of information on more than 82.4 million active companies worldwide as provided by the Orbis database is considered an excellent research starting point.

6.3. Search criteria

As the very first search criterion, companies have to be active in order to ensure sufficient access to data and direct contact opportunities in case of unavailability of financial statements. Secondly, the list is limited to companies operating in the wood and cork, paper and pulp or sawmilling industry as those can be expected to grow their own raw material. The following NACE Rev. 2 codes have been chosen after verifying that the categorization would give the most relevant output[3]. To increase the probability of hitting all companies that own forests, the industry search criterion has been amplified by the Bureau van Dijk[4] category 'Major sectors: 4. Wood, cork, paper'. Furthermore, the list is filtered for publicly listed and very large companies. Finally, entities not applying IFRS are excluded from the sample.

NACE Rev. 2:

- 16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
  - 161 - Sawmilling and planning of wood
  - 162 - Manufacture of products of wood, cork, straw and plaiting materials
- 17 - Manufacture of paper and paper products
  - 171 - Manufacture of pulp, paper and paperboard
  - 172 - Manufacture of articles of paper and paperboard

Table B - NACE Rev.2 classifications used for sample determination

Narrowing down the sample

The automatic filters results in a sample of 443 companies. As a next step the sample selection continues manually in accordance with the previously determined criteria.

1. Ownership of productive forest land: An effort is made to obtain a list of companies that account for standing trees as biological assets under IFRS

[3] NACE stands for 'statistical classification of economic activities in the European Community' published by Eurostat, and provides high quality information on economic activities worldwide. In the context of a study on IFRS, which is mostly applied in the EU, the authors' considered the choice justifiable.

[4] The Bureau van Dijk (BvD) is the publisher of the Orbis database. While the Eurostat categories are more widely used the BvD codification is rather Orbis-specific and thus only used as extension to the NACE search.

2. Availability of annual reports: Financial statements for the years 2005 to 2009 are collected on the companies' websites. When the reports cannot be obtained online, the companies are contacted separately via e-mail. Entities that do not respond to the requests are excluded from the sample.
3. Language requirements: The preceding research method is also used to exclude companies with annual reports that are not published in German, English, Spanish, French or Swedish. While acknowledging that the language requirements lead to a limitation of the study, this choice on the other hand ensures sufficient technical expertise of the research team.

Increasing the sample size

Another 16 companies are added that could not be identified by the method described above. Based on a study on accounting in the forest industry conducted by PriceWaterhouseCoopers (PWC) in 2011, we decide to include the companies that are in accordance with most of the research criteria as described above. The broader sample allows for a better analysis of empirical results and increases the internationality of the sample. Furthermore, consulting the expertise of one of the four biggest auditing companies is deemed an appropriate means to double-check whether this study's sample covers some of the most prominent industry players.

In the end, the sample comprises a large number of publicly-listed and some privately-owned companies operating in the pulp, paper, wood, or cork industry; some of these companies are connected via their ownership structures. The 30 entities are located worldwide and most of them operate internationally. The list below provides an overview of the sample:

Number	Company name	Origin	Number	Company name	Origin
1	Gunns Ltd.	Australia	16	Norske Skog	Norway
2	Willmott Forests	Australia	17	Altri	Portugal
3	Arauco	Chile	18	Empresarial Ence	Portugal
4	CMPC	Chile	19	Portucel Empresa	Portugal
5	M-Real	Finland	20	Masonite	South Africa
6	Metsä Group	Finland	21	Sappi	South Africa
7	Stora Enso	Finland	22	Safcol	South Africa
8	Tornator	Finland	23	York Timber	South Africa
9	UPM-Kymmene	Finland	24	Bergs Timber	Sweden
10	Lecta	France	25	Bergvik Skog	Sweden
11	Rougier	France	26	Holmen	Sweden
12	Asian Bamboo	Germany	27	Södra	Sweden
13	Mondi	Great Britain	28	SCA	Sweden
14	Smurfit Kappa	Ireland	29	Sveaskog	Sweden
15	Samling Global	Malaysia	30	Precious Woods	Switzerland

Table C – Overview of the final company sample

6.4. Criteria for the empirics

Obviously, the description of the valuation methods is key to the research questions of this study. The collection of data thus comprises the disclosures on accounting practices per company for the years 2005 to 2009. The following criteria are applied:

- Valuation method
  - Which method has been chosen (Which stage of the FV hierarchy or historical cost)?
  - Why has this method been chosen?

- Input data for the valuation models
  - Discount rates (real or nominal values)
  - Prices and cost (historical, current, future)
  - Length of the growth cycle and growth assumptions
  - Reforestation cost

We pay close attention to whether valuation methods or input data are changed over time. However, the data collection is not limited to the criteria above; comments on the amendment of IAS 41 and other comments on important events having an impact on the valuation of standing trees are gathered, too. Furthermore, additional company data as described below is collected since it is deemed to be of significant importance to the analytical part of the present study. One or several of these criteria are suspected to support the identification of possible explanations why this study can or cannot identify patterns in the accounting practices for standing trees under IAS 41:

1. Origin of the company (AR 2009)
   - The origin of the company could have an impact on similarities/differences in accounting practices among companies due to specific legal requirements/earlier accounting regimes or other factors observable in the country of origin.
2. Year of first listing and adoption of IFRS
   - These criteria allow drawing conclusions on possible learning experiences at a certain point in time.
3. Size (2009), which is measured by
   - The size of the productive forest to make forestry activities and the importance of the company in the industry/on the specific markets comparable among each other.
   - The value of biological assets[5] in relation to the value of total assets as an indicator for the degree of impact of any changes in the measurement of biological assets on the financial statements; we suspect more incentives interpreting the standard in a more favorable way or even earnings management the higher the ratio for a company.

[5] The value of biological assets was corrected by any value not related to standing forests.

4. Location of operations (AR 2009)
    - Companies operating in several countries often have to meet the disclosure requirements of different investors or stock exchanges. Thus, multi-nationality could explain certain kinds of disclosure behavior.
5. Location of the main forest (AR 2009)
    - The location of the main forest should influence the input data for the respective valuation methods. Following this logic, the study examines whether companies that grow forests in the same areas actually use similar growth assumptions/market prices/inflation rates/expected life times (with respect to the wood species).
6. Auditor (AR 2005 to 2009)
    - To examine whether similarities in accounting practices among companies can be put in relation to the auditors employed.

6.5. Quality of sources

Sources and quotations of high quality support this study. In two cases, we choose to refer to the content of interviews that have been conducted by students (Andersson, Berglund, & Ejerlund, 2005; Flamm, Grünewald, & Olsson, 2006). These interviews with top-managers of Swedish forestry companies provide a valuable explanation for the observation of several patterns within our sample. We are aware that students' papers have to be treated with more care than papers that have been published in accounting journals. Additionally, Penttinen and Rantala, authors of several often-cited papers that were published for example on behalf of the Finnish Forestry Institute, also opted to cite the students' theses (2008). Therefore, we decide to also refer to these sources for the content of the interviews.

7. Empirics

Below follows a depiction of the findings on the accounting for standing trees under IAS 41, which were conducted for the 30 sample companies over the reporting periods from 2005 to 2009. (Please see also appendix 10.8. 'Empirical data'.) As a start, we look at the implementation of IAS 41 and whether early adoption is observable. The second part, 'valuation methods', describes the categorization of trees for valuation purposes, the accounting practices applied including the distribution of historical cost and fair value accounting. Also, this part comprises the study items disclosure quality and outstanding accounting practices including the accounting for harvest concessions and forest leases. Due to the focus of this study on the part of the amendment (IAS 41.21) that removes the (perceived) prohibition to take additional biological transformation into account (*Study Question IV*), research results on the assumptions and comments on this part of the amendment are introduced as a next step. Subsequently, details on important input variables to the DCF model follow. The investigated items are discount rates, timber prices, forestry costs, harvesting cycles and reforestation cost. The chapter finishes off with a description of the distribution of audit firms among the companies in the sample.

7.1. Early application of IAS 41

Until today, about 120 countries worldwide have required or permitted the use of IFRSs and more countries are about to converge to IFRS in the near future (IASB, 2012). Transition dates thus differ internationally. For the companies in our sample this means that the European companies started to apply IFRS in 2005 already, whereas, for example, full convergence in Malaysia has not occurred until 2012. Table D below gives an overview of the transition dates for the countries covered in our study.

Country	**Status for listed companies as of May 2012**
Australia	Required for all private sector reporting entities and as the basis for public sector reporting since 2005
Chile	Required for major listed (open) companies since 2009
European Union	All member states of the EU are required to use IFRSs as adopted by the EU for listed companies and consolidated accounts since 2005
Malaysia	Required from 2012 (but MASB Standards are aligned with IFRS since 2005 and identical since 2007)
South Africa	Required for listed entities since 2005

Table D - Dates of transition to IFRS (adopted from IASB, 2012; MASB, 2008; Deloitte, 2012)

IAS 41 was issued in February 2001 and became operative for annual financial statements covering periods beginning on or after 1 January 2003 (IAS 41.58). As fair value valuation was introduced for the first time for biological assets, earlier application of the standard was encouraged by the IASC. With regards to the 30 companies in our sample, we find only one company that adopts IAS 41 before 2003. Precious Woods in Switzerland applies IAS 41 from fiscal year 2000 onwards based on the

knowledge available at that time. The company argues that historical costs never really reflected a fair valuation and that it did not permit to accurately assess the company's performance and profitability (Precious Woods, 2000 p. 13). The Metsä Group and UPM-Kymmene apply IAS 41 from 2004 onwards, which corresponds to their general transformation date to IFRS and precedes the required transition in 2005. Also, Samling Global in Malaysia adopts IAS 41 when converting their financial statements completely to IFRS in 2007. Hence, it is ahead of the required full convergence in 2012. Surprisingly, Stora Enso, who has been applying IFRS (back then IAS) already in 1999[6], does not adopt IAS 41 early, but converts in 2003, when the standard becomes operative and is required. For all other companies the required transition date to IFRS or the date they get listed match their first time adoption of IAS 41.

7.2. Valuation methods

The determination of a measurement method for standing trees is not easy to obtain in all cases, as choices regarding the measurement method and further assumptions have to be made. Furthermore, biological assets are often not homogeneous from a general perspective due to different environmental conditions or different growth rates of the wood species. Thus, IAS 41 provides the opportunity to classify the assets into different groups with homogeneous characteristics (IAS 41.15).

7.2.1. Categorization of trees

Taking advantage of the opportunity provided by IAS 41.15, a number of companies report a categorization of their trees. Observations comprise the classes of young seedlings, immature and mature trees or variances of these. The valuation of the stands is then conducted based on the growth potential and marketability of the respective classes. Out of the 30 sample companies 19 companies report one valuation method (thus, one category), 10 report 2 categories (immature and mature trees; young seedlings and others/stands/forest/immature trees), and 2 report 3 categories (young seedlings, immature and mature trees; young seedlings, other plantations and native forest)[7]. In 2009, the disclosures of Norske Skog and Stora Enso describe the use of different valuation methods but do not allow to observe clear categorization activities. The table in appendix 10.2. 'Categorization of trees' gives an overview of the categories reported by the companies.

7.2.2. Accounting practices

The accounting practices for standing trees under IAS 41 of the sample companies as described in their annual reports for the reporting periods from 2005 to 2009 comprise historical cost accounting as well as fair value accounting.

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[6] The oldest available annual report for Stora Enso is from 1999.

[7] Tornator , Stora Enso and Masonite are counted twice due to the fact that both of them increase their numbers of categories in the observation period.

Historical cost accounting

We observe two different rationales for the choice of historical cost accounting over the three fair value options as given in IAS 41; either the fair value of the plantations cannot be determined due to the lack of market prices (i.e.: Empresarial Ence, 2008, p.94f), or else, the high number of assumptions which have to be made for the computation of a fair value would not result in a reliable value (i.e.: Altri, 2008, p.7). In general, historical costs are acquisition costs less any accumulated depreciation and any accumulated impairment losses. Here, deviations from the general definition cannot be observed. While Empresarial Ence and Altri apply historical cost accounting (HCA) for all plantations, Precious Woods only chooses this practice for its Brazilian forests. Norske Skog's disclosure in 2009 with respect to the valuation is very similar to the wording in IAS 41[8] without giving further information on the accounting procedures. HCA under IAS 41 is only allowed in cases when no or only little biological transformation has taken place or when fair values cannot be determined reliably. Thus, 5 companies recognize young seedlings or newly acquired plantations at acquisition cost; these are 3 out of the 4 Finnish companies (Stora Enso, 2007-2009; UPM-Kymmene 2005-2009; Tornator 2008-2009) as well as Gunns Ltd. (2006-2009) and York Timber (2007-2009). Generally, acquisition costs comprise the price of the seedlings plus cost for planting and the use of fertilizers.

Fair value accounting

All stages of the fair value hierarchy of IAS 41 are observable among the sample companies. Firstly, the Net Standing Value (NSV) method, which requires market prices (stage I) and market prices of similar transactions (stage II) as necessary inputs variables can be identified: This valuation technique derives a value for trees by multiplying the estimated wood volumes by any kind of market price. Secondly, the net present value of expected future cash flows (stage III) of the assets as derived by the Discounted Cash Flow (DCF) model is observed: This is the most common measurement tool. The cash flows used as input for the DCF models are described as net proceeds to be obtained from the sale of wood, future cash flows from growing forests, anticipated future cash flows from the biological asset, expected future cash flows from the asset and cash flows of continued operations.

7.2.3. Valuation models in use

The distribution of the valuation models changes over the years. This is on the one hand due to the number of companies adopting IAS 41 in later years and on the other hand due to the change of accounting practices of some companies. The companies' choices to change the number of classifications for the evaluation (young seedling, immature, mature) has an additional impact on the empirics.

[8] The entity applies HCA in cases where fair value (FV) cannot be reliably measured.

Throughout the five years of observation, historical cost accounting was chosen by Altri and Empresarial Ence as a method to determine the value of their plantations. The total number of companies applying historical cost instead of fair values, or acquisition cost for young seedlings and immature trees increases from 4 in 2005 to 12 in 2009. Interestingly, none of the sample companies applies the NSV method as the only valuation technique; Smurfit Kappa applies the model when market prices are available. Still, the number of companies that report the use of the NSV method for at least one of their categories (mainly mature trees) doubles until 2009.

Valuation applied	**Number of companies**	**Out of these…**
Historical cost	4	
As single model		2
For one of several categories		4
Net Standing Value method	2	
As single model		-
For one of several categories		2
DCF	14	
As single model		8
For one category		6
No clear identification possible	1	

Table E – Valuation models as disclosed in the AR 2005

In 2005, 8 out of 14 companies base the valuation of their plantations solely on the DCF model while 6 apply it as one of their categories. In 2009 the DCF model serves as the only valuation method for 13 out of 30 (43%) companies while another 13 enterprises (43%) use it for one kind of standing trees.

Valuation applied	**Number of companies**	**Out of these…**
Historical cost	13	
As single model		3
For one of several categories		10
Net Standing Value method	4	
As single model		-
For one of several categories		4
DCF	26	
As single model		13
For one category		13
No clear identification possible	1	

Table F – Valuation models as disclosed in the AR 2009

The disclosure of one company attracts our attention in a negative way. Due to the lack of appropriate information, the valuation technique of Norske Skog cannot be identified for the years from 2005 to 2008. The statement in 2009 simply copies the stipulations of the standard[9].

Development over time

Many companies are consistent in their accounting practices for standing trees over time whereas others show certain differences; most adjustments occur in 2007 and 2009. At first, Stora Enso only reports a NPV valuation. From 2007 onwards it clearly differentiates between young seedlings, which are recognized at acquisition cost, and standing trees, being evaluated by the DCF model. However, in 2009 the wording of the disclosure changes and becomes more similar to the stipulation of the standard; acquisition costs are from now on not limited to young seedlings anymore but apply to all assets where little or no biological transformation has taken place. Thus, the clear classification disappears. A similar weakening of valuation classes is observed for Masonite, where since 2007 immature trees are not measured in any case by the NPV method anymore. Instead the higher amount of acquisition cost and NPV is recognized. Another change in 2007 occurs after suffering big losses due to fire a in the plantations held by York Timber. The reporting period as well as the valuation for standing tees changes for this company. In the financial statements published after the fire, the age limit for the marketability of immature trees has decreased from ten to four years. The financial statements for 2008 do not provide a rationale for this choice. Despite the enforcement of the amendment in 2009, we observe only smaller modifications of accounting practice, none being perceived as notable as the changes in 2007. While one company alters the assumptions underlying their DCF model in order 'to obtain a more accurate valuation' (Safcol, AR 2009, p. 66), no changes occur to the valuation policy. Still, as a result the fair value of the biological assets decreases by 2%. For Norske Skog neither the quality nor the quantity of the disclosure increases over time, simply the description of the valuation method is changed[10].

7.2.4. Disclosure quality

The amount and quality of information disclosed is in most cases satisfying. Several companies describe the accounting for biological assets in detail, enclose sensitivity analyses for the input variables of the DCF models and describe the assumptions leading to the input data. However, in some cases the wording is too close to the wording of the standard and does not provide the reader with relevant information. Norske Skog is the company disclosing by far the least amount of text and information. In comparison to the others, also Lecta, M-Real, Metsä Group and Smurfit Kappa disclose only little information. In general, the Swedish companies and Asian Bamboo provide very

[9] Norske Skog recognizes their forests at estimated selling price (2005-2008), in 2009 the biological assets are measured at fair value or, if not possible, at historical cost. Still, the descriptions do not allow an identification of the valuation model used in cases where fair value accounting is chosen.

[10] Recognition firstly happens at selling price, then at FV or, when not possible to be determined, at historical cost.

detailed texts. The disclosure quality and quantity of the sample companies continuously stay on the same level over the five year period in most cases. Two major exceptions are Bergs Timber and Empresarial Ence. The latter one steadily decreases the disclosures regarding capitalized interests as generated by producing wood instead of buying timber over time[11]. In contrast, Bergs Timber's disclosure in 2006 has experienced a major improvement compared to the information provided in the 2005 financial statements.

7.2.5. Outstanding accounting practices including concessions and leases

Our research furthermore identifies outstanding procedures for the valuation of standing trees. These observations do not only comprise general outstanding accounting practices but also the dissimilar accounting practices for timber concessions and forest leases.

General observations

Precious Woods, Empresarial Ence and Gunns Ltd show characteristics that could not be found in the practices of other companies among the sample. Firstly, there is Precious Woods, who applies a special valuation model during the first four years of this study. Instead of categorizing their plantations into young seedlings, immature and mature trees as it is common practice, the company defines 5 different growth profiles. For each of these, an individual DCF model is built. Additionally, 5 unique internal rates of return serve as discount rates for the respective profiles. The respective NPVs add up to the fair value of the plantations as reported in the financial statements. In 2009, the model is changed and the categorization is henceforth based on diameters instead of growth profiles. Also, the internal rates of return are replaced by current market determined discount rates. Additionally, the value of forests consisting of native species is considered to be too low for recognition. Therefore, the value of the biological assets as stated in the balance sheet 2009 is only based on the cash flows of teak, pochote and mahogany plantations. Secondly, we find that Empresarial Ence generates income from its plantations in form of interest. This revenue is capitalized and recognized in the line 'Group work on non-current assets' of the income statement. The calculation is as follows: For plantations where the expected costs of wood are smaller than the fair value of wood available in the market, a variable percentage of the book value of the land is recorded as profit. From 2007 to 2009 Empresarial Ence generates between € 3.7m and € 5.9m annually through this approach. Thirdly, Gunns Ltd is the only company distinguishing between plantations (young seedlings, immature trees) and native forests. While the newly planted trees are recognized at acquisition cost, immature trees underlie the DCF valuation once their value exceeds the acquisition cost. Native forests are only evaluated by a DCF model.

[11]Please refer to 'Outstanding accounting practices' below for more details.

Concessions and leases

Companies can conduct forestry operations without owning trees. Concessions provide the holder with the right to harvest a counterparty's forests. Thus, concession licenses are intangible rights and need to be accounted for in accordance with IAS 38 'Intangible Assets'. The lease of biological assets is a second possibility to cut wood when not owning forest land and stands. These agreements follow the stipulations of IAS 41 'Agriculture' in combination with IAS 17 'Leases'.

Concession licenses for the harvest and, in rare cases, also the plantation of forests are reported by 4 companies. Among the sample, the entities show both similarities and differences in the accounting practices for the respective rights. In 2007, previous possession rights as obtained by Precious Woods in the Brazilian Pará region are converted to concession licenses due to governmental actions. These are then recognized as intangible assets. Their value in use is derived by discounting cash flow projections over the expected remaining useful life, which equals the duration of the concession license. Furthermore, a terminal value in the DCF calculations accounts for the fact that the concession period does not equal the growth cycle of the trees. However, the accounting choices of Samling Global and Rougier regarding their timber concessions differ from Precious Woods'. Both companies apply IAS 38 and recognize the licenses at cost less accumulated impairment losses and accumulated amortization. The latter value is derived by straight-line depreciation over the remaining terms of the concession. Additionally, Samling Global accounts for royalty payments, which are paid based on the harvest volume, as cost of sales in the income statements of the respective period. In contrast, Holmen recognizes the felling rights as part of inventory from 2005 to 2009. Inventory is measured as the lower of the acquisition value and the production cost. However, Holmen does not disclose any rationale for their choice. The company only states that the felling rights are acquired in order to secure the company's raw material supply.

The lease of biological assets is quite common in the wood, paper and cork industries due to lower capital lockup. However, this study identifies only 2 companies that disclose a sufficient amount of information on their lease agreements that allows for making any inferences. Australian Willmott Forests applies the concept 'Growers under management' to relieve its debtors from interest payments on outstanding loans: Willmott Forests stipulates the management of the counterparties' plantations and receives future proceeds net of costs as generated by the sale of wood after the harvest. The value of these plantations is included in the value of Willmott Forests' biological assets and derived by the same accounting practices as wholly owned forests in accordance with IAS 41. The Metsä Group obtains long-term forest lease agreements in Russia and Latvia which are not accounted for at all. The disclosure states 'The agreements have not been recognized in the balance sheet, because their price or fixed price determination basis is not defined in the agreements.' (Metsä Group, 2009, p.73).

7.3. Additional biological transformation

IAS 41 was reviewed and amended in 2009 to remove the prohibition on taking 'additional biological transformation' into consideration when calculating the fair value of biological assets using discounted cash flows. Furthermore, the companies are now allowed to choose between a pre- or post-tax discount rate. These amendments were to be applied prospectively from 1 January 2009 onwards and especially the amendment on 'additional biological transformation' should affect the companies applying IAS 41.

Additional biological transformation

IAS 41.21 used to stipulate 'the objective of a calculation of the present value of expected net cash flows is to determine the fair value of a biological asset in its present location and condition', including the limitation that 'the present condition of a biological asset excludes any increases in fair value from additional biological transformation and future activities of the entity, such as those related to enhancing the future biological transformation, harvesting and selling' (IAS 41.21, 2005). The standard furthermore defines biological transformation as change of the asset through growth (IAS 41.7a). However, growth is one of the parameters being essential for the feasibility of the valuation of standing trees with the help of the third stage of the fair value hierarchy under IAS 41 (NPV method, DCF model). In line with our study question, we will in the following examine the accounting practice with respect to comments on growth in the disclosures of the sample companies. We aim at drawing conclusions on the companies' interpretation of the standard before 2009.

Among the sample, expressions such as 'present value of future proceeds', 'estimated selling price' (of the mature trees), 'including growth potential', 'growth assumption' and 'felling plans to assess growth and harvest potential' are found. These expressions are interpreted as proof that the companies account for increases in the fair value of their stands from additional biological transformation. While most companies simply state that their DCF models are based on growth assumptions in a descriptive way, only SCA, Asian Bamboo and Sveaskog provide the reader with explicit quantitative information within the notes of their annual reports. Overall, all companies except Bergs Timber and Masonite are consistent in their choice to comment on growth or not over the whole study period; no changes in the individual accounting procedures occur over time. Both Bergs Timber and Masonite do not comment on their growth assumptions in the first year but do so in 2006; afterwards being consistent in their disclosures. The percentage of companies not commenting on growth decreases from 38% in 2005 to 26% in 2009. Even the comparison of the observations in the critical period 2008/2009, when the amendment was introduced, does not bring any visible changes in accounting practices forward.

The companies' assessment of the amendment

Further insights to the study questions are gained when examining the annual reports for 2008 and 2009 and looking for comments or assessments to the amendment. We find that no company considers the amendment to have a substantial impact on their financial statements and acts upon it. In particular, 26 companies are of interest as 3 companies do not apply IFRS before 2009 and Rougier applies IAS 41 only indirectly with regards to concessions and thus is also excluded.

14 companies neither mention the change in IAS 41 in the annual reports for 2008 nor in the reports for 2009, even though all of those include the section 'Changes in accounting policies' in their financial statements. 4 companies note in 2008 that there has been a change to IAS 41 whose effect has to be assessed and 3 of them do not make any further comment in 2009, whereas one company states that the amendment does not have any impact on the group. 7 companies disclose in 2008, 2009 or in both years that the amendment is not relevant to their group's financial statements (e.g. M-Real in 2008) or that it 'does not have any material impact on the consolidated financial statements' (e.g. Metsä Group in 2009). SCA attracts particular attention as they consider the improvement made to have major significance for the Group in 2008, but neither act upon it in the subsequent year, nor comment further on the change.

7.4. Discount rates

Applying historical cost accounting to their biological assets, Altri and Empresarial Ence do not need to specify discount rates for their valuation models. Additionally, Rougier, who obtains concessions for the harvest of trees, and Norske Skog, who evaluates their biological assets at estimated selling price, are also not considered in this chapter. As a result, the empirics cover the choices and disclosure habits for the discount rates of the remaining 26 companies of the sample. Please refer to appendix 10.8. 'Empirical data' for a list of the sample with detailed information on valuation models and discount rates.

General Observations

Research on the discount rate used by the companies in the two valuation models DCF model and NSV method, delivered a variety of different choices. Our empirical work focuses on three characteristics: The description or specification (i.e. weighted average cost of capital (WACC), cost of capital), the tax status (post- or pre-tax) and the value or level (i.e. 7.00 %) of the discount rate. Appendix 10.3 'Discount rates' illustrates the observed variances.

2005

In 2005, 6 out of the 14 sample companies applying DCF at that time do not specify the sort of discount rate used. Out of these 6, 2 companies (UPM-Kymmene, Willmott Forests) at least state a value. 9 companies disclose a specification of the discount rate.

4 of these use different types of WACC (Bergs Timber, SCA, Sveaskog, Gunns Ltd.) and 2 apply 'long-term cost of capital for forestry operations'. Considering the operations of the latter ones (Bergvik Skog, Holmen) these interest rates are deemed to equal a WACC of the business unit as applied by Bergs Timber. In 2005, all 5 Swedish companies[12] of our sample use the WACC as discount rate. Precious Woods defines 5 different growth profiles of its growing trees according to their annual surplus in diameter. For each of the profiles an internal rate of return is defined and applied as discount rate. In the same year one other company acts similarly and utilizes the group's expected rate of return as discount rate for their DCF model.

Discount rate	Number of companies	Out of these…
No specification	6	
No specification, but value		2
Disclose a specification	9	
Variances of WACC		4
Cost of capital		2
Variances of IRR		2
Other		1

Table G - Discount rates as disclosed in the AR 2005

In 2005 the values reported vary between 5.50 % (Portucel Empresa, Portugal), and 12.50% (Willmott Forests, Australia). All Swedish companies report discount rates of 6.25% or 6.26% (Bergs Timber) with 4 of these being a pre-tax and only one an after-tax (Bergvik Skog) rate.

Value	Post- or pre-tax	Company	Origin	Location of main forest
5.50%	/	Portucel Empresa	Portugal	Iberian Peninsula
6.25%	pre-tax	SCA	Sweden	Sweden
		Sveaskog	Sweden	Sweden
		Holmen	Sweden	Sweden
6.25%	post-tax	Bergvik Skog	Sweden	Sweden, (Latvia)
6.26%	pre-tax	Bergs Timber	Sweden	Sweden
7.00%	/	UPM-Kymmene	Finland	Finland, (Uruguay)
12.50%	Pre-tax	Willmott Forests	Australia	Australia

Table H - Values of discount rates as disclosed in the AR 2005

<u>2009</u>

Four years later, in 2009, all 30 companies have adopted IAS 41 (or got listed) with the same 4 entities still not being considered in this part. Of the remaining 26 entities one half does not disclose a description of the discount rate whereas the other half does. These specifications now comprise two additional kinds of discount rates. Firstly, 4 companies (Gunns Ltd., Asian Bamboo, Mondi, Safcol) simply copy the wording of the accounting standard, which stipulates the use of a 'current market determined discount rate' with only 3 of them (Precious Woods, Gunns Ltd., Asian Bamboo) adding

[12] Stand of 2005; the sixth company (Södra) does not adopt IAS 41 before 2009.

the value of the discount rate. Secondly, Finnish Tornator uses their cost of equity to calculate the present value of its stands. According to the annual report of 2009 the enterprise derives its discount rate for the valuation model as follows: 'the two-year sliding average of the Finnish government's 10-year interest rate is used as the risk-free interest component. A fluctuation range of +/-50 basis points is used for the equity risk premium of the discount rate' (Tornator, 2009, p.24). The latter part of the sentence means that the equity risk premium only changes if the interest rate exceeds the fluctuation range of 50 basis points in any direction.

Discount rate	Number of companies	Out of these…
No specification	13	
Disclose value		5
No value		8
Disclose a specification	13	
Variances of WACC		5
Cost of capital		1
Cost of equity		1
Variances of IRR		2
Current market determined DR		5
Disclose value		3
No value		2

Table I - Discount rates as disclosed in the AR 2009

Even though they do not describe the specification of their discount rates, Precious Woods, UPM-Kymmene, Södra, CMPC and Arauco disclose the values of their discount rates. Besides Precious Woods, all companies even provide specific discount rates for the countries they own or manage forests in. In 2009 most discount rates vary within the range of 5.50% and 12.00%. However, Asian Bamboo reports an outlier pre-tax discount rate of 27.00%. Within the group of the Swedish forest owners, Holmen, in addition to Bergvik Skog, now reports a post-tax discount rate, too. The value is adjusted and lower than in 2005, namely 5.50%. The other Swedish companies use the same discount rates as described for the first year of the observation period.

Value	Post-/pre-tax	Company	Origin	Location of main forest
5.50%	/	Portucel Empresa	Portugal	Iberian Peninsula
	/	Masonite	South Africa	South Africa
	post-tax	Södra	Sweden	Sweden, the Baltics
6.22%	/	Smurfit Kappa	Ireland	Colombia, Venezuela
6.25%	pre-tax	SCA	Sweden	Sweden
		Sveaskog	Sweden	
		Holmen	Sweden	Sweden
6.25%	post-tax	Bergvik Skog	Sweden	Sweden, (Latvia)
6.26%	pre-tax	Bergs Timber	Sweden	Sweden
7.25%	pre-tax	Samling Global	Finland	Spec.: New Zealand
7.50%	pre-tax	UPM-Kymmene	Finland	Spec.: Finland
8.00%	/	Arauco & CMPC	Chile	Spec.: Chile

9.00%	(real) /	Gunns Ltd.	Australia	Australia
10.00%	pre-tax	Samling Global	Finland	Spec.: China
	pre-tax	UPM-Kymmene	Finland	Spec.: Uruguay
	/	Arauco & CMPC	Chile	Spec.: Brazil
10.20%	pre-tax	Samling Global	Finland	Spec.: Malaysia
11.00%	pre-tax	Precious Woods	Switzerland	Brazil, Gabon
12.00%	/	Arauco & CMPC	Chile	Spec.: Argentina

Table J - Values of discount rates as disclosed in the AR 2009

In total, only 6 out of 26 companies (UPM-Kymmene, Mondi, Samling Global, Södra, Arauco, CMPC) report country-specific discount rates. Both CMPC and Arauco are originated in Chile and grow or manage forests in Argentina, Brazil and Chile. The discount rates for the valuation of stands growing in the respective countries are identical[13]. In contrast, Samling Global even uses unlike ways to derive the discount rates for their growing forests in New Zealand, Malaysia and China. The interest rate for New Zealand is defined by a rather complex approach; Samling Global takes into account the four factors: WACC, other published discount rates, the company's own opinion on the other forest owners' practices and finally, the biggest weight is given to the implied rates of transactions based on forest trades. The other approaches are simpler: Due to the absence of forest trade transactions in Malaysia, solely the WACC serves as discount rate for the valuation of local forests. In China, the present value of stands is based on the average discount rate used for plantation assets in the Asia-Pacific Region.

Development over time

A general observation with respect to the disclosure behavior for discount rate is that the relative percentage of companies disclosing specifications on pre- and post-tax rates, description and values increases over the period 2005 to 2009.

On a company level Precious Woods, UPM-Kymmene, Samling Global, Holmen, Gunns Ltd., Asian Bamboo, Mondi, and Smurfit Kappa show some changes in their choice of discount rates or disclosure behavior over the observed five-year period. Precious Woods changes its model in 2009 and switches from internal rates of return (IRRs) to a current market determined discount rate. In this last year of the study period, the company discloses a value, namely 11.00% pre-tax. For UPM-Kymmene some minor changes are observable in 2009: While not disclosing any tax-specifications in previous years, the discount rate is then, similar to Precious Woods' practice, defined to be pre-tax. Also, the value used for the newly acquired Uruguayan forests is reported in addition to the one used for the Finnish forests. Similarly, Samling Global changes from no specification in previous years to reporting the usage of a pre-tax rate in 2009. However, Samling Global does not provide the reader with values in any of the observed years. One Australian company (Gunns Ltd.) changes the level of their discount

[13] Chile 8.00%, Argentina 12.00%, Brazil 10.00%

rate due to the advice of an external expert. It moreover states that the adjustment results in an increase of after tax profit of several million Australian Dollars (AUD). Only one company, Mondi, chooses to switch from a previously pre-tax rate to a post-tax discount rate after the amendment came into effect in 2009.

7.5. Timber prices and forestry costs

As a further input to the valuation model, timber price assumptions and the costs incurred during the growing phase are highly sensitive and directly influence the fair value of the biological assets. The companies in our sample do not agree on one way to determine prices and costs. We find different combinations of the following input data:

- Prices conducted by an external evaluator/ internal evaluation
- Historical/current/future prices and costs
- Inflation-adjusted/not inflation-adjusted values

Most important is the fact that some companies assume constant market prices, while others base their assumptions on historical data or future prospects. Future prices are either derived from long-term contracts or based on estimates made by management. For our purposes the category 'future prices' is sufficient for both methodologies. Generally, we observe that the way to determine both prices and costs is consistent, i.e. companies that take a historical average for timber prices also base their cost assumptions on historical data.

In 2005, 10 companies disclose information on how they determine the timber prices they are discounting and the costs that arise during the growing phase. 8 companies rely on internal evaluations, whereas 2 companies explicitly state that they are contracting external forestry experts. We find that companies with forests in the Nordic countries (Sweden and Finland) mostly (5 out of 7) apply future prices based on management estimates, whereas companies with forest holdings in the southern hemisphere (Australia, Brazil, Nicaragua, Costa Rica) or even Southern Europe (Portugal) do not adjust their price assumptions and apply current market prices. Sveaskog (Sweden) is the only company to apply historical data for prices and costs. Statements with regards to inflation adjustment can only be found with 5 out of the 10 companies. We cannot observe any pattern that relates the application of historic, current or future prices to an adjustment for inflation. 2 companies do not adjust the prices for inflation; 3 companies assume long-term inflation rates between 2.00% (Holmen, Sveaskog) and 3.15% (Willmott Forests). The rest of the companies does not disclose any information with regards to inflation adjustments. See appendix 10.5. 'Timber prices and forestry costs' for more details.

In 2009, 22 companies can be examined with regards to prices and costs. Again, we observe that the majority of the companies rely on internal evaluation (19 companies) and only 3 companies consult external experts. Furthermore, for the wider sample in 2009 we find the observation confirmed that

particularly companies with forest holdings in the Nordic region apply prices that take into account future development based on estimates (8 out of 11). Unadjusted current market prices are used by 8 companies with forest holdings in the southern hemisphere and southern parts of Europe and by only one Finnish company (Stora Enso). Bergs Timber AB and Sveaskog apply historical data: Whereas Bergs Timber does not further specify the data used, Sveaskog describes a system based on a historical 7-year average price that will be extended to a rolling historical 10-year average price in the future. And still in 2009, most companies (11) do not disclose any information that allows us to make any inferences with regards to inflation adjustments. However, 4 companies state that they do not consider inflationary effects, whereas 7 companies apply an inflation rate between 2.00% and 3.20%. 4 out of these companies are located in Sweden and 3 of these assume an inflation rate of 2.00%. Sveaskog, however, considers the long-term development of the inflation rate and does not state a specific value. Australian-based Willmott Forests discloses 3.20% to account for inflation in 2009, Asian Bamboo discloses 3.00% and Precious Woods applies 2.50% as an average rate of inflation for the US-Dollar (USD) economic zone over the past ten years, because their main forest holding teak is traded in USD.

One small change is observable for the companies in the sample between 2005 and 2009. Sappi switches from future prices to unadjusted current market prices in 2007 and Precious Woods starts to adjust for inflation by 2.50% in 2009, but continues to apply current market prices as basis for its valuation. York Timber only mentions in the annual report of 2006 that 'market value is determined by reference to the Komatiland long term contract prices and the SA Lumber Index' (S.58).

7.6. Harvesting cycle

15 companies (2009) in our sample provide information with regards to the harvesting cycle of their forests. The harvesting cycle is key to calculate the net present value of the standing forest and represents the heart of the harvest plans. Harvest plans include information on planned volumes to be thinned and felled. They are based on assumptions on growth rates, which in turn are dependent on soil conditions and forest species. Most companies do not provide detailed information regarding their harvest plans, but at least disclose the rotation period or harvesting cycle. The companies, however, differ in the way to disclose the information. The disclosures comprised the following descriptions with respect to their harvest plans and growth cycles:

- Average number of years for
    - Different types of wood
    - Different locations
    - Different types of wood in different locations
- Range of years for different types of wood in different locations
- Specific number of years for
    - Each location
    - Each type of wood
    - Each location and each type of wood

- Number of years that corresponds to the expiration date of the land lease rights

In 2005 9 companies disclose one or more numbers corresponding to the harvesting cycle of their forests. 4 Swedish companies and one company in South Africa calculate an average number of years for the rotation period of their forests (different types of wood) in one location (Sweden and South Africa respectively). The numbers vary between 85 and 100 years for the Swedish companies and amount to 7 years for the company based in South Africa. Sappi, Precious Woods and Sveaskog show a range of years for different types of wood in different locations. Again the range (80-110 years) for the Swedish company (Sveaskog) exceeds the ranges for Precious Woods (26-30 years) and Sappi (8-18 years). Willmott Forests in Australia discloses a single number for one type of wood in one location.

Due to new listings or later transition to IFRS, in 2009 we can examine data for 15 companies and identify three more categories from the list above. Arauco and CMPC, both Chilean companies, provide very detailed information by stating a specific number of years for each type of wood in each location. Tornator, Södra and York Timber fit into the first category and provide average values for different types of wood in different locations. Asian Bamboo follows a different approach and equals the harvesting cycle for their forests with the expiration date of the land lease rights. We find that 3 companies changed the way of disclosing information related to the harvesting cycle between 2005 and 2009. Precious Woods, from 2009 onwards, also discloses specific information for each type of wood, disregarding the location though. Sveaskog widens its range from 80-110 years to 60-120 years in 2007 and Bergvik Skog adds plantations in Latvia and thus discloses average numbers for the different geographies from 2009 onwards.

7.7. Reforestation cost

The 6 Swedish companies in the sample state that they include cost for reforestation in form of cash outflows in the valuation of their standing forests. Replanting forests within three years after harvest is a legal requirement by the Swedish Forestry Act (Skogsstyrelsen, 2011). Bergvik Skog explains in their annual report 2006 (p. 61): 'Costs for the replanting of felled areas are included in the cash flow calculation, since reforestation is a legal requirement and these costs are thus regarded as a part of the felling cost.' Please refer to appendix 10.6. 'Reforestation cost' for more explanatory statements. This finding is discussed in chapter 8.7.

7.8. Auditor

With regards to the auditors in charge, we distinguish between the *Big 4* companies[14] and *Non-Big 4* companies. We pick three observation dates (2005, 2007 and 2009) to analyze which auditors are in

[14] Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers

charge and whether there are changes or shifts towards one company in particular during the observed period.

In 2005, only 20 companies in our sample are eligible; 4 companies are not yet listed; 3 companies do not apply IFRS yet and for 3 more companies the annual report is not accessible for the respective year. Out of the 20 companies, 19 are audited by a *Big 4* company and only one company has a *Non-Big 4* accounting firm as its auditor. In 2007, we find 24 companies in the *Big 4* group and 2 companies in the *Non-Big 4* group. For 4 companies there is still no data available. Between 2005 and 2007, 2 companies change their auditors inside of the *Big 4* group. At our last observation date, all companies are eligible and 28 can be categorized into the *Big 4* group, while 2 are to be allocated to the *Non-Big 4* group. Until 2009, one more company changes the auditor inside of the *Big 4* group. Table K shows the distribution into the two categories and gives an overview with regards to the auditors used in the *Big 4* category.

	2005	**2007**	**2009**
Non-Big 4 companies	1	2	2
Big 4 companies	19	24	28
Deloitte	4	5	6
Ernst & Young	3	4	4
KPMG	6	5[15]	6
PWC	5	10	12
Total	20	26	30

Table K - Distribution of auditors over time

Considering the particular accounting firms, we find that PWC is represented more frequently than the other Big 4 companies with 12 companies in 7 different countries being audited by them in 2009. Further, PWC is especially dominant in Finland: 4 out of 5 Finnish companies rely on them as an auditor (see table L).

	2005	**2007**	**2009**
Non-Big 4 companies	Australia	Australia, Germany	Australia, Germany
Big 4 companies			
Deloitte	Norway, Portugal, Spain, South Africa	Portugal, Spain, South Africa	Portugal, Spain, South Africa
Ernst & Young	France, Sweden	France, Sweden	France, Sweden
KPMG	Australia, South Africa, Sweden	Australia, Malaysia, Sweden	Australia, Malaysia, South Africa, Sweden
PWC	Finland, Portugal, Sweden, Switzerland	Finland, Ireland, Norway, Portugal, Sweden, Switzerland	Chile, Finland, Ireland, Norway, Portugal, Sweden, Switzerland

Table L - Distribution of auditors over time, country-specific

[15] In 2007, there is no AR for York Timber available. Thus the number does not include this company. As York Timber was audited by KPMG in 2006 and 2008, it can be assumed however that KPMG also audited the company in 2007.

8. Analysis

The nature of our findings and interpretations requires the analysis to be organized differently compared to the chapter on empirical observations at two positions. Firstly, the analysis to the amendment of IAS 41 (*Study Question IV*) combines several aspects of our research and can be found in chapter 8.3. Secondly, the previously in chapter 7.7 described reforestation costs will be examined in the context of an industry agreement in chapter 8.7. The remaining structure of chapter eight mirrors the organization of the seventh chapter.

8.1. Early application of IAS 41

As we observed, most companies in our sample start to converge to IFRS when it is required by law in 2005 for the European, Australian and South African companies and later on for Chile (2009) and Malaysia (full convergence in 2012). Early adoption of IAS 41, as it is recommended by the IASC, thus is not an obvious option for most examined companies. Stora Enso and Precious Woods, however, apply IFRS (back then IAS) already in 1999 and 2000 respectively and are free to choose to early adopt or not to apply IAS 41 before it is required. While Precious Woods introduces fair value valuation for their tree plantations in 2000 already, Stora Enso is more reluctant and chooses to apply IAS 41 from 2003 onwards. In their annual report from 2000, Precious Woods states that they have faced the problem of making a fair valuation of tree plantations which mature over many years a couple of times in the past. The new standard seems to be a welcome improvement to the company as, according to them, basing the valuation of growing trees on the historical cost method does not reflect their main objective, the stewardship of forests maturing over many years, accurately in the accounting process. The Nordic companies are more skeptical when it comes to the application of fair values for standing trees: Stora Enso's choice not to adopt IAS 41 early is in line with a statement made by Björn Olhans from Sveaskog, who says that the large companies in Finland and Sweden feel that IAS 41 supports subjective judgments instead of a fairer view (Andersson, Berglund, & Ejerlund, 2005, p. 29). Furthermore, we assume that due to an unclear formulation in the standard before the amendment came into effect in 2009, some companies felt unsure and avoided an early adoption. Sveaskog, for example, mentions in its annual report from 2005 that application instructions for IAS 41 are missing and that IFRSs are still in a transition phase (Sveaskog, 2005, p.92). Our interpretation is that the companies expected some clarification in the standard before they decided to apply it. They thus waited until the adoption was required by law. Unfortunately, the observations and interpretations we make for Precious Woods and Stora Enso cannot be generalized as the number of events in our sample is too small.

8.2. Valuation methods

Many companies choose to categorize their trees in different classes according to their maturity. Thus, they are able to apply different valuation techniques for the growing stands. It is clearly observable

that with increasing maturity fair value measurement becomes more important. The older the trees are, the further upwards the fair value hierarchy of IAS 41 is climbed.

8.2.1. Accounting practices

The empirics do not reveal any surprising results; the number of companies that apply historical cost accounting to their entire forest holdings appears to be small. After all, historical cost accounting represents the last of four eligible valuation methods under IAS 41. In our sample, only two companies recognize their biological assets at historical cost. In contrast to this, the recognition of newly planted trees at acquisition cost is widely spread. This practice is perfectly in line with IAS 41, which offers this option in cases where little or no biological transformation has taken place. Some financial statements provide evidence that a DCF model for very young plants usually leads to negative values due to high acquisition costs that are not offset by the low value of the net proceeds at harvest, which are in the beginning discounted over a very long period of time (especially in the Nordic region). Research on the 30 sample companies could not answer the question whether all companies recognize newly planted trees or young seedlings at cost.

In the context of fair value accounting our study shows a high dependence on the NPV valuation; the DCF model is the most commonly applied tool, whereas valuation methods that are based on market prices are barely applied. Previous research claims that fair value adds volatility to the income statement[16]. Furthermore, the high number of assumptions and estimates in NPV calculations has been discussed. Thus, we conclude that the widespread use of DCF models might be due to the possibility to control the valuation in the financial statements to a certain degree by adjusting the input variables. This is one possible explanation. However, none of the companies encloses rationales for their choice besides a lack of market prices. Furthermore, compliance with the standard would not allow for any other reasoning since IAS 41 provides a clear hierarchy for the measurement, which only allows using the NPV method if market prices are not available.

The large number of companies applying the DCF model and thus, choosing the third out of four measurement options, raises some concerns. The study does not aim at discussing whether there are no market prices available for standing trees in a certain location. However, a study conducted by Gunnevik et al. (2008) proves that a valuation with a different kind of market prices would be possible in many cases. The authors developed two new methods: Firstly, the Immediate Harvesting Method pretends that all standing trees were felled immediately and then sold off on the pulpwood and saw logs market at current transaction prices. Secondly, the Decomposed Real Estate Method utilizes market prices for the combined asset to reach the fair value of the standing forest after deducting the value of the land property. Both approaches would reach a higher level in the hierarchy of IAS 41 than the present value of future cash flows. Considering the distribution of valuation models that we

[16] Please refer to chapter 4 'Review of previous literature'

observed in combination with the study, we conclude that the accounting for standing trees under IAS 41 shows potential for improvement in practice.

Development over time

Over time, we observe an increase in the number of categories used for valuation purposes, which means a stronger exploitation of the measurement hierarchy of IAS 41 in 2009 compared to 2005. Also, rather individual accounting practices such as the classification by diameters and the use of the IRR as discount rate disappear completely throughout the study period. In general, companies seem to observe the competitors' accounting practices and disclosures, which results in rather similar practices. York Timber, for example, takes the opportunity to redefine its measurement practice after changing from being a manufacturing to a completely vertically integrated forestry company with large own forest plantations (York Timber, 2008, p. 13). The age limit for the marketability of trees is reduced from ten to four years, which is an approximation to other companies' accounting practice. However, further discussion will show that the high number of assumptions and estimates does still not provide for comparability among companies despite their convergence in the classification of trees.

8.2.2. Disclosure quality

The development of disclosure quality is not very significant since it is on a decent level since the year 2005. Two companies, Bergs Timber and Masonite, have been cautious in the provision of disclosures in the first year of applying IFRS. However, both improved tremendously in 2006. The three companies that apply IFRS from 2009 show very detailed disclosures and provide a lot of information (e.g. CMPC and Arauco disclose country-specific harvest cycles and discount rates). These companies seem to benefit from the experiences other industry players had already made at that point in time. Often, more information than required is given such as sensitivity analyses and rationales for certain accounting decisions. A wording of disclosures which is too close to the standard is perceived negatively. This results in the inability of the reader to interpret the information in a meaningful way. For example, the dilution of classification definitions as observed for Stora Enso and Masonite hinder the reader's judgment of the valuation conducted. Moreover, expressions such as 'current market determined discount rate' or 'cost to sell' are in line with IAS 41 but do not allow the reader to gain insight in the companies' own definition or determination of these variables. Especially the description 'current market determined discount rate' gains in importance over the years (a more detailed discussion of the variable follows below). The multinationality of operations also affects the relevancy of information. The empirical data show that often only parts of the disclosures are country-specific, even though most companies produce and sell in very diverse markets. The provided average values and general statements, however, do not increase understandability. All in all, companies seem to be more careful in their definitions and explanations compared to the beginning of the study period, which often results in less relevant information for the reader.

8.2.3. Outstanding accounting practices including concessions and leases

As described above, the number of outstanding accounting practices for biological assets diminishes over time. However, the accounting practices for concessions and leases are relatively persistent. The present study identifies rather diverse accounting practices for concessions. The companies measure their intangible assets at fair value, at historical cost or at the lower of acquisition cost and production value. The accounting for the values is either conducted in the balance sheet items 'intangible assets' or 'inventory'; one company does not disclose the information at all. Due to the limited amount of information, we cannot identify whether any of the companies performed the accounting for their concessions in accordance with the accounting standards. In general, IAS 41 currently provides only a reference to IAS 38 'Intangible assets' as sole instruction for the accounting of intangible rights related to biological assets. Taking into account that some companies such as Rougier secure their wood supply through planting and harvest concession rights instead of owning the forests, clear guidance is of importance.

Empirical observations with regards to forest leases could only be made on a very small amount of disclosures of low quality. This does not allow for any generalizations to be made. Still, we can deduce that the quality of disclosures in the context of concession licenses and forest leases has to improve. Hence, despite facing a small number of events in our sample, we would still like to raise the concern that IAS 41 seems to require some improvement in the guidance on how to account for timber concessions and forest leases.

8.3. Growth assumptions as prerequisites for the NPV valuation of immature forests

When analyzing whether the companies have been interpreting the previous version of IAS 41.21 as prohibition to take additional biological transformation in form of growth into account, one has to investigate three variables: NPV valuation, the assumption of growth (additional biological transformation) as input to the NPV valuation and the assessment of the amendment to IAS 41.21 by the companies.

<u>NPV valuation</u>

As a first criterion, it has to be examined whether the companies use the NPV method to evaluate their stands. When applying the DCF model to derive a value for immature standing trees, one major cash inflow is the selling price of the tree at the end of its growth cycle. Obviously, market prices are only available to a limited degree, which in turn requires the application of the DCF model. Thus, the only available market price, the one for mature trees, is used as the selling price for the future cash inflow for the immature trees. This given, the company implicitly assumes a growth potential for their trees by choosing the DCF model. The growth potential is furthermore indirectly expressed by the length of the growth cycle in combination with the expected wood volume at harvest. It can be concluded, that

companies applying the NPV method for the measurement of their standing trees did not interpret IAS 41.21 (in its former version) as a prohibition to take additional biological transformation in form of growth into account. Please refer also to chapter 7.2 'Valuation methods', which describes the widespread use of the DCF valuation among forest owning companies.

Additional biological transformation

Secondly, it has to be taken into consideration whether the companies explicitly state growth assumptions in their disclosures. Many companies decide to comment on their growth assumptions in the descriptions of their valuation models in the period from 2005 to 2008, when the wording of IAS 41 seems to prohibit the consideration of growth (Penttinen & Rantala, 2008). Generally, the comments are very short and do not include numerical values. Often, the companies refer to their growth assumptions outside the note on biological assets, but within the descriptions of felling plans or when it comes to risk assessments. We interpret this as a sign that the companies do not read IAS 41.21 as a prohibition to consider growth, but are still cautious in the wording of their disclosures.

Over time, only two companies change their disclosure behavior regarding growth. Masonite and Bergs Timber choose not to comment on growth in the disclosures of 2005 but do so in 2006. It is plausible to assume that both companies were not sure on how to interpret the paragraph and how others would handle the growth issue. Thus, we presume that after analyzing the industry's practice both companies decide to comment on growth. In case of Bergs Timber, this assumption is also supported by the fact that the overall disclosure quality improves tremendously in 2006. Masonite changes the auditor in 2006, which could be the reason for the change in wording for the note on biological assets.

Assessment of the amendment

Thirdly, we examine whether the companies mention the amendment of IAS 41 in their annual reports of 2008 and 2009 and what financial impact they expect. The review of the standard and the subsequent amendment to consider 'additional biological transformation' in IAS 41 has been triggered by different interpretations in practice. Even though the wording before the amendment was prohibiting the consideration of growth[17], the standard setters later only acknowledge that 'some prepares are reading the current wording of the standard as prohibiting them from taking into account cash flows that are expected to be generated from mature assets when measuring the fair value of immature assets' (IASB, 2007a) and propose to remove the 'perceived prohibition' (IASB, 2007b). This choice of words leads to the impression that the IASB tries to admit that IAS 41.21 was

[17] Original wording: 'The objective of a calculation of the present value of expected net cash flows is to determine the fair value of a biological asset in its present location and condition. An entity considers this in determining an appropriate discount rate to be used and in estimating expected net cash flows. The present condition of a biological asset excludes any increases in fair value from additional biological transformation and future activities of the entity, such as those related to enhancing the future biological transformation, harvesting and selling.' (IAS 41.21, 2005)

misleading for practitioners while trying to abdicate from their responsibility. As a consequence and to avoid further diversity in the calculation of the fair value for biological assets, the IASB adopted the change prospectively as from 1 January 2009. The reason for a prospective adoption is that the IASB expected that some companies would have to re-measure their fair value of biological assets at a past date. However, this was not desired by the IASB (IAS 41.BC 10, 2009). Taking this into account, we assume that the IASB considered the changes in IAS 41.21 to be significant. In contrast, our empirics show that the companies in our sample did not consider this amendment to be of significant importance to their financial statements. As already discussed in the empirical part, 14 companies do not mention the change at all. Still, the rest of the companies at least considers the amendment but concludes that it will not result in any financial impact (Mondi, Norske Skog ASA, Smurfit Kappa) or that it has no significant effect on the group's financial statements (M-Real, Bergvik Skog, Metsä Group, Safcol). Considering the ratio of biological assets to total assets, we find 10 companies with a ratio of more than 30% with 5 out of these companies showing a ratio of 60-90% of biological assets to total assets. With regards to materiality, the change thus should have a significant effect on these companies depending on how they have treated the subject before the amendment. Against this background, we assume that at least all the companies that acknowledge that the amendment is not of significance to them, did not change their model to calculate fair values. This allows drawing the conclusion that the companies have already taken 'additional biological transformation' into account before it has been officially allowed by the IASB.

8.4. Discount rates

The discount rate is a very important input variable to the DCF model, as it can have a significant impact on the valuation. Thus, sufficient information on the level, nature, derivation and tax-status are of high interest to investors and other readers of the financial statements. The companies are aware of the effects of changes in the assumptions in discount rates. A number of entities disclose sensitivity analyses, which enhance the transparency and allow the reader to make a better judgment on the respective company's ability to assess its risks. On the contrary, approximately half of the sample companies do not disclose any values at all. The assessment of the companies' accounting practices is also often hindered by the lack of a description of the specification and derivation of the rates. For the companies describing their discount rates, this study identifies a vast range of variances with variations of WACC and the 'current market determined discount rate' being the most commonly mentioned ones.

Differences in capital structures and industry-related risks are expected to lead to different values of discount rates. Still, companies that plant their trees in the same geographical region, presumably grow similar species with similar growth cycles and that operate in the same or close markets are expected to disclose discount rates within certain ranges. The values of the discount rates seem to be dispersed at first sight. However, geographical patterns can be identified: The lowest discount rates are reported

for the Nordic countries. The rates are held constant at 6.25% pre-tax and 5.50% post-tax over the study period. For the Finnish companies a pre-tax rate of 7.50%[18] and post-tax discount rates between 6.22% and 6.68% are provided.

The two Australian companies apply 12.50% to 13.50% in nominal terms and 9.00% to 10.00% in real terms, which is justifiable taking the inflation target of 2.00 % to 3.00 %[19] of the Reserve Bank of Australia (2012) into account. The increasing spread between the 2008 and 2009 figures could be explained by dissimilar future expectations due to the instable market environment during the financial crisis. In general, economic, political, technological and market conditions affect the determination of the discount rate. In the case of Australia, the higher risk of bush fires can also explain a higher discount rate.

The two Chilean companies apply the same country-specific values for the three countries[20] they grow forests in. Similarly, the value for Brazilian stands used by Precious Woods (11.00%) is close to the rate applied by Arauco and CMPC (10.20%), which supports the finding of a pattern in accounting practice. In general, the discount rates in countries in the southern hemisphere such as Australia, Argentina, and Brazil are higher than the discount rates for the Nordic countries. This might be due to the higher risk of forest fires or pest infestations in warmer climates. Furthermore, it is reproducible for the reader to find higher discount rates in countries with higher political instability and higher inflation risks such as e.g. Argentina compared to Sweden and Portugal[21]. Thus, we draw a positive conclusion regarding the level of applied discount rates. The discount rate applied for operations in China, however, presents an exception to this result. Both Samling Global and Asian Bamboo own vast forest holdings in China. One would of course not expect the same discount rates for dissimilar species. Still, a divergence of 17 percentage points seems too high.

Development over time

Over time the number of companies that adopt the wording of the standard, namely ‘current market determined discount rate’, increases. At first sight, this could be interpreted as a positive development - moving closer to the standard. However, it does not add any value for the reader since these companies neither provide information on the derivation of the value, nor their definition of the markets. Despite the observed patterns for the values of discount rates, the accounting practice over time does not show a positive development regarding the disclosures of non-numerical specifications of the rates; the practice here is still highly dispersed. The increase in the number of companies that disclose sensitivity analyses is regarded as a positive development in the context of discount rates. These companies do not only show that they are aware of the importance of the variable to their

[18] 7.00% in 2005
[19] Prevailing since 1993
[20] Chile 8.00%, Argentina 12.00%, Brazil 10.00%
[21] During the period of the study

model, but they also provide the reader with valuable information to judge the companies' measurement practices for standing trees. Most sensitivity analyses are disclosed after 2007.

Post-tax discount rates before 2009

4 companies apply post-tax discount rates before 2009. Sweden-based Holmen changes from reporting a pre-tax rate in 2005 to a post-tax rate from 2007[22] onwards. Similarly, Mondi and Tornator report post-tax discount rates for 2007 and 2008. Bergvik Skog does not explicitly state the usage of post-tax discount rates but calculating the NPV of after-tax cash flows implies this. Considering that IAS 41.15 explicitly requires the application of a current market-determined pre-tax rate until its amendment in 2009, we interpret this usage of post-tax rates in 2007 and 2008 as non-compliant with the standard.

8.5. Timber prices and forestry costs

As we observed, particularly companies in the Nordic countries apply future prices and costs whereas companies with forest holdings in the southern hemisphere or in Southern Europe mainly apply unadjusted current market prices. This might be due to the fact that trees in the Nordic region, especially the natural forests, have longer growth cycles compared to the plantation trees in the southern parts and the adjustment helps to smooth out short-term volatility in the market prices for logs. For plantations with shorter harvesting cycles, current market prices seem to be sufficiently reliable to model fair values and the need for adjustment seems to be of less importance (PWC, 2011). However, we also find companies with forest holdings in South Africa and South America (Safcol and CMPC) who use prices that are adjusted for future development. Additionally, 3 companies in the Nordic region either apply current market prices or use historical price assumptions. Taking this into account, the different growth cycles cannot entirely explain why some companies adjust the prices that are currently observable in the market and others do not.

The differences concerning inflation adjustments mainly result from the fact that some companies are calculating their cash flows in real terms and thus do not account for inflation. In contrast, others use nominal values and against this background adjustments make sense. Bergvik Skog and Arauco serve as examples for companies that apply real prices, whereas Willmott Forests and Södra, among others, use nominal values. For the companies that adjust for inflation, the different inflation rates are justified by the location they are operating in. Sweden, for example, targets a long-term inflation rate of 2.00% (Riksbank, 2011) which is in line with Holmen's, Bergs Timber's and Södra's long-term inflation adjustment of 2.00%. Precious Woods applies an inflation rate of 2.50%, which is based on a historical 10-year US average as teak, their main wood species, is traded in USD. Willmott Forests adapts the inflation adjustment annually taking into account the current price level in Australia. According to

[22] No assertion can be made regarding 2006 since no specification of the tax-status is disclosed. The value being the same as in 2005 (6.25%), a pre-tax status is assumed. The definition of the discount rate (long-term cost of capital for forests) and the valuation model remains unchanged over the whole period.

calculations made by the Worldbank (2012), the numbers disclosed by the sample companies reflect a reasonable picture.

8.6. Harvesting cycle

We find harvesting cycles that last from 7 years in South Africa to 120 years in Sweden. As this input is very important to the DCF model, variations in the number of years have a great impact on the fair value in the balance sheet. Harvesting cycles vary across the companies due to differences in the planted species, the location of the forest holdings, the soil conditions and the growth rates of the forests. Further, the end use of the wood is of importance as for example dimensional and form stability, which are an advantageous property of slowly grown trees with narrow annual rings, are especially important for furniture and cabins (Finnish Forest Research Institute, 2010).

The companies in the Nordic region disclose harvesting cycles between 60 and 120 years. The species mainly found in Sweden and Finland are Scots pine, Norway spruce and birch (Swedish Forest Agency, 2012). According to the Finnish Forest Research Institute, Scots pine is growing very slowly due to the demanding climate conditions and growth cycles around 100 years are common (Finnish Forest Research Institute, 2010). For spruce, which is especially dominant in Southern Sweden, growth rates per hectare are higher and thus the harvesting cycles are shorter (Sveaskog, 2005). For the companies with forest holdings in the southern hemisphere (South Africa, Central and South America, Australia), harvesting cycles range between 7 years in South Africa to up to 25 years in Australia. Our research identifies species, such as eucalyptus, pine, mahogany, teak and pochote, which are characterized by shorter growth cycles compared to the species in the Nordic region. Further, the climate and soil conditions foster the growing stock per hectare in the forests in South America and Oceania and growth rates are especially high in these areas (FAO, 2010b). A special way on how to determine the harvesting cycle is represented by Asian Bamboo. The company discloses the number of years until its land lease rights expire as an approximation for the harvesting cycle. Even though we think that this approach is feasible, it hinders comparability across companies. As a final remark, we want to emphasize that in 2009 only 15 companies make disclosures with regards to their harvesting cycles, which are, however, essential for the investor to understand the DCF model and the fair value calculation.

8.7. Similarities among Swedish companies and indicators of an industry agreement

Our empirics show a large number of similarities among the Swedish companies in the sample. Firstly, all 6 Swedish companies in the sample report that they include reforestation cost in the valuation of their standing trees. Re-plantations after harvest are a legal requirement according to the Swedish Forestry Act (Skogsstyrelsen, 2011), which is stated as a reason for the accounting practice. Secondly,

all companies disclose 6.25% or 6.26% as the value of their discount rates, which are described as WACC and cost of capital. In 2007, Holmen changes to a post-tax discount rate, which results in a reduction of the value to 5.50%. The same post-tax interest rate is applied in 2009 for Södra's Swedish forest holdings. These similarities could be explained by the fact that all companies operate in the same competitive environment or underlie similar financing conditions. It is reasonable to assume that the WACC for similar assets and business units are within the same range of values even though applied by different companies. Thirdly, all Swedish companies apply the DCF model in order to derive the value of their standing trees. The observation could be explained with the absence of active markets; the companies do not deny the availability of wood prices but find that these markets could not provide fair prices for the enormous amount of wood that the Swedish forest companies own. Fourthly, all companies report growth cycles within the same range of years. The reasonability of these assumptions can be verified when comparing the harvest cycles of the companies to data published by the Swedish Forest Agency (2012).

External circumstances, legal requirements, the geographical proximity or the choice to mimic a competitor's behavior can lead to the similarities as observed in our study. However, we found indicators that lead to an additional explanation. When conducting research on previous studies regarding the valuation methods and variables used for DCF models with respect to IAS 41 and standing trees, we found a few sources mentioning an industry agreement among Swedish forest owners.

In their financial reports, two comments of Sveaskog serve as indicators for the existence of an industry agreement. Commenting on the introduction of fair value accounting under IAS 41 in 2004, the company states '**Together with other major forest owners in Sweden**, Sveaskog has formulated an interpretation of IAS 41' (Sveaskog, 2004, p. 5). The statement '**according to industry interpretation**, the market value of the companies' biological assets is equal to the present value of a return calculation' (Sveaskog, 2005, p. 10) published in the annual report 2005 is an additional explanation for the observed parallels in accounting practices among the Swedish companies. Moreover, interviews with top managers of the Swedish forest-owning companies serve as important indicators of an industry agreement in Sweden. In one of these dialogues, Björn Olhans from Sveaskog repeats the citation from above and admits that Sveaskog has an agreement with other forestry companies on how to interpret IAS 41 due to the uncertainty among the companies[23] (Andersson, Berglund, & Ejerlund, 2005, p. 28). Furthermore, the interview brings forward that Olhans and Sveaskog are reluctant to adopt the standard since the large companies in Sweden feel that IAS 41 supports subjective judgments instead of a fairer view[24] (Andersson, Berglund, & Ejerlund,

[23] Please refer to appendix 10.8 'Industry Agreement', quote I, for the original text of the Swedish source.
[24] Please refer to appendix 10.8 'Industry Agreement', quote II, for the original text of the Swedish source.

2005, p. 29). The interview with the representative of Korsnäs[25] could explain the fact that all Swedish companies in the sample apply the same valuation model. According to Finance Director Mats Östling the choice of the DCF valuation is part of the agreement[26] (Andersson, Berglund, & Ejerlund, 2005, p. 31). He furthermore discusses the inclusion of reforestation costs into the valuation and seems to admit that this procedure is not in line with the literal wording of IAS 41. Being a legal requirement, these cost need to be introduced to the model in order to conduct a truly fair value of the stands, in the opinion of the Swedish forest owners[27] (Andersson, Berglund, & Ejerlund, 2005, p. 31). Another source even claims that the IASB allowed the Swedish forest industry to account for reforestation cost in the valuation of stands (Flamm et al., 2006 in Penttinen & Rantala, 2008). However, other literature neither reproduces this information nor rebuts it.

In conclusion, this study's observations are in line with the statements in the interviews and allow us to assume that the Swedish forestry industry formulated an agreement regarding the accounting for standing trees under IAS 41. According to a statement by Sveaskog (2004), the shortcomings of IAS 41 before the amendment might serve as an explanation for this agreement.

8.8. Auditor

Prior research found that the level of disclosure provided by companies in their annual reports may be associated with the specific auditor contracted (Street & Gray, 2002; Dumontier & Raffournier, 1998; Inchausti, 1997). This follows the reasoning that large accounting companies are especially interested in keeping and strengthening their good reputation and thus force their clients to follow the standards stringently. Moreover, international accounting firms might have a competitive advantage with regards to the application of new and challenging accounting standards due to superior international training and economies of scale when building competences (Street & Gray, 2002; Inchausti, 1997). For our sample, we thus distinguished between companies contracting *Big 4 companies* and *Non-Big 4 companies*. Unfortunately, the number of companies in the *Non-Big 4* group turned out to be negligibly small and thus we could not make any significant observations. However, we do not find any striking differences between the level of disclosure for the two companies in the *Non-Big 4* group, Willmott Forests and Asian Bamboo.

When looking at the *Big 4* companies in particular, we further find that they are under contract widespread across the different countries represented in our sample and work for 28 out of 30 sample companies. Over the study period, 3 of these companies change their auditor by switching within the *Big 4* group. Even though the wording of the disclosures changed slightly for Masonite and Norske Skog, we could not find any other significant changes with regards to the applied accounting methods.

[25] Excluded from our sample due to the defined sample criteria.
[26] Please refer to appendix 10.8 'Industry Agreement', quote III, for the original text of the Swedish source.
[27] Please refer to appendix 10.8 'Industry Agreement', quote IV, for the original text of the Swedish source.

Our attention was, however, especially attracted by the fact that the same auditing company (e.g. PWC) allowed for different valuation methods and amounts of disclosures among countries. For example, Smurfit Kappa, audited by PWC and located in Ireland applies weighted average prices for similar transactions with third parties to evaluate their forest plantations as a first choice. The NPV method is only considered when prices are not available. Tornator, UPM-Kymmene, the Metsä Group and M-Real, all located in Finland, use the DCF model as their first choice and in general disclose very similar information. All of them base their calculations on timber prices that are adjusted for future development and Tornator, UPM-Kymmene and M-Real further state that they approximate fair value for young seedlings by valuing them at cost. With regards to disclosures, we find that Norske Skog, located in Norway and also audited by PWC, only discloses very little information by not stating any assumptions they make to evaluate their forest holdings. The differences across countries are not only found with PWC, but are also true for Deloitte, Ernst & Young and KPMG.

These findings are in line with Cairns (2001) and Zeff (2007), who acknowledge that there is a different auditing culture among countries. Cairns describes that in some countries auditors do not draw particular attention to departures from accounting standards if the company asserts that the financial statements are in line with the prevailing accounting principles and that in other countries an audit qualification might not be given because of the sensitivity or anxiety arising over an auditor publicly questioning a major company for its choice of accounting methods. Elad and Herbohn (2011) confirm this observation by finding different auditing cultures in France, UK and Australia. With regards to disclosure quality, we could identify one company (Norske Skog) that only provides minimal disclosures on biological assets in spite of employing a *Big 4* audit firm and thus presents an exception to former findings (Street & Gray, 2002; Dumontier & Raffournier, 1998; Inchausti, 1997).

Overall, we draw the conclusion that 27 out of 28 companies working with one of the *Big 4* audit firms provide disclosures of high quality. However, the choice of auditor does not impact the accounting practice in a directly observable way.

9. Conclusion

The comparison of accounting practices for growing forests under IAS 41 among companies worldwide and within companies over time revealed that the third stage of the fair value hierarchy, the NPV calculation, is the most commonly chosen valuation technique. The choice of input variables is highly dependent on assumptions and the companies' future expectations. Although the choices seem to be dispersed at first sight, our research could identify some patterns. However, we are not convinced that the disclosure requirements of IAS 41 lead to more comparability and transparency as claimed by Barlev and Haddad (2003). Most interestingly, we find evidence which leads to the conclusion that IAS 41 was amended with respect to the measurement stipulations in order to be in accordance with prevailing practice instead of guiding the preparers proactively.

Study Question I: How do companies account for standing trees under IAS 41, in particular, which fair value measurement techniques do they apply?

The results show a widespread use of fair value measurement practices for standing trees with the NPV method being the most commonly chosen technique. Hereby, the claim that market prices, which are prerequisites for the first two stages of the fair value hierarchy in IAS 41, are not available is the most common rationale for choosing the third stage. In relation to the findings of Svensson et al. (2008), who illustrate that companies could still apply indirect measurement methods based on market prices even if direct market prices for standing trees are not available, our results can be related to Bingsby's (2004) findings. He claims that companies choose the fair value that suits their entity best. In general, companies tend to categorize their stands based on maturity in order to simplify the choice of the measurement method. In many of these cases the acquisition cost of newly planted trees are deemed to approximate their fair value. In contrast, when comparing the accounting practices of companies for timber concessions and forest leases, we could not identify uniform accounting practices. As a conclusion, the guidance or the education with respect to the accounting for intangible assets and leases in the context of biological assets requires improvement. Overall, the dispersed accounting methods are especially surprising against the background that 28 out of 30 sample companies are audited by a Big 4 company. This observation originally led us to the expectation that the accounting under IAS 41 would be more homogeneous. In the context of compliance, we identified 3 companies that report post-tax discount rates before 2009. However, at that time, the standard stipulated a pre-tax discount rate for the NPV valuation. Overall, accounting practices vary significantly among the companies, but are still in line with IAS 41 (in most cases). Please refer to *Study Question IV* for interpretations in relation to the amendment.

Study Question II: Has a development over time regarding the accounting for standing trees under IAS 41 taken place?

Surprisingly, the study could not identify significant developments or learning processes over time; only three small changes could be identified. It is notable that some outstanding accounting practices disappeared over time. This process is considered one small step towards more comparability between accounting choices for standing trees under IAS 41. Furthermore, we observed an increase in the number of companies utilizing the categorization of trees according to their maturity, which can also lead to an increase in understandability on the part of the reader. However, a critical development is the identified trend to describe the discount rate with the words of the standard, which stipulates the usage of a 'current market determined discount rate'. This description provides less relevant information for the reader and diminishes the transparency provided by earlier disclosed specifications of discount rates.

Study Question III: Do companies show patterns in their choice of the fair value measurement and underlying assumptions?

This part of the study mainly focused on the assumptions for the input variables to the DCF model. By comparing the choices in order to find patterns and combining the findings with data from forestry experts or economic information, a small number of the companies' assumptions could be reconstructed. In this context, the disclosures for the harvesting cycles and the values of discount rates attracted our attention in a positive way. Patterns could also be identified for market prices and forestry costs. Here, the majority of the Nordic companies apply adjusted prices while companies with forests in the southern hemisphere tend to apply current prices. Although the disclosures contain a lot of information, we find that too few companies disclose information that is specific enough and allows for a reliable comparison by the reader. The Swedish companies in the sample show a surprisingly high number of similarities, which are explained by the existence of an industry agreement. The assumption that companies contracting the same auditor could be expected to show similar accounting practices was not found to be true. In conclusion, the companies disclose a large number of information but the lack in transparency hinders comparability. Additionally, the multi-national operations of a large proportion of the companies make it more difficult to reconstruct the justifiability of input data for the valuation of forests in different locations.

Study Question IV: Which impact has the amendment of IAS 41 in 2009 on the accounting practices, i.e. did the standard setters approach the preparers or deviate from industry practice?

Here, especially the similarities among Swedish forest owners are of interest. Research shows that these companies were initially reluctant to adopt IAS 41 and as a result formed an industry agreement on how to implement fair value accounting to their forest holdings. This finding serves as a first indicator for the presumption that parts of the forest industry formulated their own best-practice regarding the accounting of forests under IAS 41. Also, the discussion about the perceived prohibition to take additional biological transformation in form of growth into account when measuring forests, did obviously not hinder the sample companies to apply the DCF model, which is based on growth assumptions. Furthermore, the comparison of accounting for growing forests did not change between 2008 and 2009, when the amendment came into effect. One interpretation could be that the standard setters approached the preparers and adjusted the standard to prevailing accounting practice. However, considering the IASB's approach to adopt new standards it seems more logical to assume that there was a mistake in the formulation of the original version that has been corrected in the amendment.

<u>Indications for future research</u>

The analysis of current accounting practices under IAS 41 among forest owning companies indicates the need to conduct further research on the accounting for timber concessions and forest leases. As the

ownership of forests is very capital intense, the right to grow and harvest wood on someone else's land holdings or the lease of another company's forest holdings for timber production is of significant importance. However, the disclosures provided by the companies examined in this study are not in accordance. Due to the limited scope of this paper, leases and concessions were not brought into focus here and a more thorough analysis would be of interest. Furthermore, it could be observed that many companies disclose information on their activities in biomass production. This trend is very recent and IAS 41 does not provide for taking into account the value added by biomass production yet. Future developments in this context are to expect and to be followed.

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Annual reports

All data and information referring to the thirty companies of the sample was retrieved from the respective annual reports of the reporting periods 2005 to 2009, if not stated differently. In addition, the companies' websites were consulted for general information such as descriptions of their operations or products. Please refer to the table in appendix 10.8 'Empirical data' for links to the respective homepages.

10. Appendix

The following legend applies to all tables presented in the appendix.

Legend	
Abbreviation	Description
HC	Historical cost
DCF	Discounted Cash Flow method, [(net) future cash flows from growing forests]
DCF*	Discounted Cash Flow method, [(net) future cash flows from growing forests AT maturity]
NSV	Net Standing Value method (no specification of market prices used)
NSV*	Net Standing Value method (using weighted averages of market prices of similar
AC	Acquisition cost
/	No information discosed
n/a	Not applicable, company does not apply the DCF nor the NSV methods
-	Company does not apply IFRS in this year
yes (qualitative)	Disclosure describes qualitatively that growth of forest is taken into account when performing the valuation
yes (quantitative)	disclosure determines the estimated growth rates per hectar and year taken into account for the valuation
est. SV	Estimated sales value
est. SP	Estimated selling price
unsuit. BP	Appropriate factor to account for its unsuitability for board production
cmd DR	Current market determined discount rate
wacc (nfc)	A 'normal forest company's' wacc
wacc (BU)	Applicable wacc for this business unit
wacc (asset)	Applicable wacc for this asset class
wacc and mix	(Please see text in empirics for explanation)
CoC	Long-term cost of capital for forestry operations
ROR	Group's expected rate of return on forests
IRR	Internal rate of return for each of the five growth groups
CoE	Cost of equity: two-year sliding average of the Finnish State's 10-year interest rate as risk-free component plus fluctuation range of +/-0.5% for the equity risk premium

Categorization	
Format	Explanation
vvv; xxx; yyy	Three categories (newly planted; immature; mature)
- ; xxx; yyy	Company applies only two categories (here: immature and mature trees)
/; xxx; yyy	Three categories, but no valuation method is disclosed for the first
xxx or yyy	Company discloses two valuation models and applies yyy only if xxx is not possible

10.1. Amendments to IAS 41

The table below sorts the amendments into two groups, which are defined as follows:

I. Amendments that result in accounting changes for presentation, recognition or measurement purposes (Deloitte, 2008)

II. Amendments expected to have no or minimal effect on accounting (Deloitte, 2008) but are necessary to align the wording of IFRSs

Group	Paragraph	Wording before 2009	Wording since 2009
II	IAS 41.5	Agricultural activity is the management by an entity of the biological transformation of biological assets for sale or for conversion into agricultural produce or into additional biological assets. […] –	Agricultural activity is the management by an entity of the biological transformation *and harvest* of biological assets for sale or for conversion into agricultural produce or into additional biological assets. […] *Costs to* sell are the incremental costs directly attributable to the disposal of an asset, excluding finance costs and income taxes.

Group	Paragraph	Wording before 2009	Wording since 2009
II	IAS 41.17	If an active market exists for a biological asset or agricultural produce, the quoted price in that market is the appropriate basis for determining the fair value of that asset. If an entity has access to different active markets, the entity uses the most relevant one. For example, if an entity has access to two active markets, it would use the price existing in the market expected to be used.	If an active market exists for a biological asset or agricultural produce *in its present condition and location*, the quoted price in that market is the appropriate basis for determining the fair value of that asset. If an entity has access to different active markets, the entity uses the most relevant one. For example, if an entity has access to two active markets, it would use the price existing in the market expected to be used.
I	IAS 41.21	The objective of a calculation of the present value of expected net cash flows is to determine the fair value of a biological asset in its present location and condition. An entity considers this in determining an appropriate discount rate to be used and in estimating expected net cash flows. The present condition of a biological asset excludes any increases in fair value from additional biological transformation and future activities of the entity, such as those related to enhancing the future biological transformation, harvesting and selling.	The objective of a calculation of the present value of expected net cash flows is to determine the fair value of a biological asset in its present location and condition. An entity considers this in determining an appropriate discount rate to be used and in estimating expected net cash flows. *In determining the present value of expected net cash flows, an entity includes the net cash flows that market participants would expect the asset to generate in its most relevant market.*
II	IAS 41.20	In some circumstances, market-determined prices or values may not be available for a biological asset in its present condition. In these circumstances, an entity uses the present value of expected net cash flows from the asset discounted at a current market-determined pre-tax rate in determining fair value.	In some circumstances, market-determined prices or values may not be available for a biological asset in its present condition. In these circumstances, an entity uses the present value of expected net cash flows from the asset discounted at *a current market-determined rate in determining fair value*.

10.2. Categorization of trees

One category	Two categories		Three categories		No clear categorization
Company (year)	Company (year)	Categories	Company (year)	Categories	
Altri	Asian Bamboo	immature, mature	Gunns Ltd.	young seedlings, other plantations, native forest	Norske Skog (09)
Arauco	CMPC	young seedlings, immature	Masonite (07-09)	young seedlings, immature, mature	Stora Enso (09)
Bergs Timber	Masonite (05, 06)	immature, mature			
Bergvik Skog	Matsä Group	young seedlings, stands			
Empresarial Ence	M-Real	young seedlings, stands			
Holmen	Sappi	immature, mature			
Lecta	Stora Enso (07, 08)	young seedlings, forest			
Mondi	Tornator (08, 09)	young seedlings, forest			
Portucel Emprese	UPM-Kymmene	young seedlings, others			
Precious Woods	York Timbers	immature, mature			
Rougier					
Safcol					
Samling Global					
SCA					
Smurfit					
Södra					
Sveaskog					
Tornator (07)					
Wilmott Forests					

Table M - Number of categories as reported by companies

10.3. Valuation models in use

			Valuation model							
#	Orig	Company	2005	2006	2007	2008	2009	Change	Comments	reforest.
1	FI	**Stora Enso**	DCF	DCF	AC; DCF; /	AC; DCF; /	AC or DCF	clear categories disappear in 08	07: leases in China	/
2	FR	**Lecta**	no AR	DCF	DCF	DCF	DCF	no	/	/
3	CH	**Precious Woods**	DCF + HC	DCF + HC	DCF + HC	DCF + HC	DCF (diameter) +	country-specific; growth profiles and diameter	concessions	/
4	FI	**UPM-Kymmene**	AC; DCF; -	AC; DCF; -	AC; DCF; -	AC; DCF; -	AC; DCF; -	no	/	/
5	PT	**Altri**	AC	HC	HC	HC	HC	no	/	/
6	AU	**Wilmott Forests**	DCF	DCF	DCF	DCF	DCF	no	growers ass.	/
7	SE	**Bergs Timber**	DCF	DCF	DCF	DCF	DCF	no, but more info since 06	/	yes (06ff)
8	SE	**SCA**	DCF	DCF	DCF	DCF	DCF	no	/	yes
9	SE	**Bergvik Skog**	DCF	DCF	DCF	DCF	DCF	no	/	yes
10	SE	**Sveaskog**	DCF	DCF	DCF	DCF	DCF	no	/	yes
11	SE	**Holmen**	DCF	DCF	DCF	DCF	DCF	no	07: felling rights in inventory	yes
12	FI	**M-Real**	/ ; DCF; -	/ ; DCF; -	/ ; DCF; -	/ ; DCF; -	/ ; DCF; -	no	/	/
13	NO	**Norske Skog**	est. SV	est. SP	est. SP	est. SP	FV or HC	yes, in 06 and 09	/	/
14	ES	**Empres. Ence**	HC	HC	HC	HC	HC	no	/	/
15	PT	**Portucel Empr.**	DCF	DCF	DCF	DCF	DCF	no	cap. interest	/
16	ZA	**Masonite**	-; DCF; NSV	-; DCF; NSV	AC; max [AC;DCF]; NSV	AC; max [AC;DCF]; NSV	AC; max [AC;DCF];	yes	/	/
17	ZA	**York Timber**	-; DCF;	-; DCF ;	AC; DCF; NSV	AC; DCF; NSV	AC; DCF;	yes, 2007 (new model maturity date)	/	/
18	FR	**Rougier**	n/a	AC	AC	AC	AC	/	concessions	/
19	AU	**Gunns Ltd.**	AC; DCF; /	AC; DCF; /	AC; DCF; /	AC; DCF; /	AC; DCF; /	no	native forest as category!	/
20	ZA	**Sappi**	-	-; DCF;	-; DCF; NSV	-; DCF; NSV	-; DCF; NSV	no	/	/
21	DE	**Asian Bamboo**	-	-	- ; AC; DCF	- ; AC; DCF	- ; AC; DCF	no	leases	/
22	GB	**Mondi**	-	-	DCF	DCF	DCF	no	/	/
23	FI	**Tornator**	-	-	DCF	AC; DCF; -	AC; DCF; -	yes	/	/
24	IE	**Smurfit Kappa**	-	-	NSV* or DCF	NSV* or DCF	NSV* or DCF	no	/	/
25	MY	**Samling Global**	-	-	DCF	DCF	DCF		08: concessions	/
26	FI	**Metsä Group**	-	-	- ; DCF; /	- ; DCF; /	- ; DCF; /	no	lg-term forest leases in Russia	/
27	ZA	**Safcol**	-	-	-	DCF	DCF	yes, change in assumptions in 09	concessions +	/
28	SE	**Södra**	-	-	-	-	DCF	-	/	yes
29	CL	**CMPC**	-	-	-	-	AC; DCF; -	-	/	/
30	CL	**Arauco**	-	-	-	-	DCF	-	/	/

Table N - Valuation models as reported by companies

10.4. Discount rates

Discount rates			Tax-status					Description					Value					
#	Origin	Company	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	country-spec.?
1	FI	**Stora Enso**	pre-tax	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
2	FR	**Lecta**	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	CH	**Precious Woods**	/	/	/	/	pre-tax	IRR	IRR	IRR	IRR	cmd DR	/	/	/	/	11,00%	/
4	FI	**UPM-Kymmene**	/	/	/	/	pre-tax	/	/	/	/	/	7,00%	7,50%	7,50%	7,50%	Finland 7,50% Uruguay 10,00%	yes (2009)
5	PT	**Altri**	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6	AU	**Vilmott Forests**	pre-tax	pre-tax	pre-tax	pre-tax	pre-tax	/	/	/	/	/	12,50%	12,50%	13,00%	13,50%	13,50%	/
7	SE	**Bergs Timber**	pre-tax	pre-tax	pre-tax	pre-tax	pre-tax	wacc (BU)	wacc (BU)	wacc (BU)	wacc (BU)	wacc (BU)	6,26%	6,26%	6,26%	6,26%	6,26%	/
8	SE	**SCA**	pre-tax	pre-tax	pre-tax	pre-tax	pre-tax	wacc (nfc)	wacc (nfc)	wacc (nfc)	wacc (nfc)	wacc (nfc)	6,25%	6,25%	6,25%	6,25%	6,25%	/
9	SE	**Bergvik Skog**	post-tax	post-tax	post-tax	post-tax	post-tax	CoC	CoC	CoC	CoC	CoC	6,25%	6,25%	6,25%	6,25%	6,25%	/
10	SE	**Sveaskog**	pre-tax	pre-tax	pre-tax	pre-tax	pre-tax	wacc (asset)	wacc (asset)	wacc (asset)	wacc (asset)	wacc (asset)	6,25%	6,25%	6,25%	6,25%	6,25%	/
11	SE	**Holmen**	pre-tax	/	post-tax	post-tax	post-tax	CoC	CoC	CoC	CoC	CoC	6,25%	6,25%	5,50%	5,50%	5,50%	/
12	FI	**M-Real**	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
13	NO	**Norske Skog**	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14	ES	**Empres. Ence**	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15	PT	**Portucel Empr.**	/	/	/	/	/	ROR	ROR	ROR	ROR	ROR	5,50%	/	5,50%	5,50%	5,50%	/
16	ZA	**Masonite**	/	/	/	/	/	unsuit. BP	unsuit. BP	unsuit. BP	unsuit. BP	unsuit. BP	/	/	/	/	/	/
17	ZA	**York Timber**	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
18	FR	**Rougier**	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	/
20	AU	**Gunns Ltd.**	/	/	/	/	/	wacc	cmd DR	cmd DR	cmd DR	cmd DR	/	10% (real)	10% (real)	9% (real)	9% (real)	/
19	ZA	**Sappi**	-	pre-tax	pre-tax	pre-tax	pre-tax	-	wacc	wacc (BU)	wacc (BU)	wacc (BU)	-	/	/	/	/	/
21	DE	**Asian Bamboo**	-	-	pre-tax	pre-tax	pre-tax	-	-	cmd DR	cmd DR	cmd DR	-	-	27,00%	30,00%	27,00%	/
22	GB	**Mondi**	-	-	post-tax	post-tax	pre-tax	-	-	cmd DR	cmd DR	cmd DR	-	-	/	/	/	yes (2008, 2009)
23	FI	**Tornator**	-	-	post-tax	post-tax	post-tax	-	-	CoE	CoE	CoE	-	-	6,57%	6,68%	6,22%	/
24	IE	**Smurfit Kappa**	-	-	/	/	/	-	-	/	/	/	-	-	/	/	/	/
25	MY	**Samling Global**	-	-	/	/	pre-tax	-	-	wacc and mix	wacc and mix	wacc and mix	-	-	NZ 8,50% Malaysia 10,20%	NZ 7,25% Malaysia 10,20%	NZ 7,25% Malaysia 10,20% China 10,00%	yes
26	FI	**Metsä Group**	-	-	/	/	/	-	-	/	/	/	-	-	/	/	/	/
27	ZA	**Safcol**	-	-	-	pre-tax	pre-tax	-	-	-	cmd DR	cmd DR	-	-	-	/	/	/
28	SE	**Södra**	-	-	-	-	post-tax	-	-	-	-	/	-	-	-	-	Sweden 5,50% Baltics 6,50%	yes
29	CL	**CMPC**	-	-	-	-	/	-	-	-	-	/	-	-	-	-	Chile 8,00% Argentina 12,00% Brazil 10,00%	yes
30	CL	**Arauco**	-	-	-	-	/	-	-	-	-	/	-	-	-	-	Chile 8,00% Argentina 12,00% Brazil 10,00%	yes

Table O- Discount rates as reported by companies

The following variances of specifications and values of discount rates were observed:

- No specification disclosed
  - No specifications at all
  - No specifications but values
  - No specification that could be interpreted in a meaningful way:
    - 'Appropriate factor to account for its unsuitability for board production'
    - 'Appropriate factor'
    - 'Applicable interest rate'
- Weighted average cost of capital
  - WACC without further specification
  - WACC of business unit/ Long-term cost of capital for forestry operations
  - WACC of the asset class
  - 'a normal forest company's' WACC
- Current market determined discount rate
- IRR for the five different growth profiles of the company
- Group's expected rate of return on forests
- Two-year sliding average of the Finnish State's 10-year interest rate as risk-free component plus a fluctuation range of +/-0.5% for the equity risk premium

10.5. Timber prices and forestry costs

2005	Bergvik Skog	Holmen	M-Real	Portucel Empr.	Precious Woods	SCA	Stora Enso	Sveaskog	UPM-Kymmene	Wilmott Forests
External evaluator	X									X
Internal evaluation		X	X	X	X	X	X	X	X	
Historical prices/costs								X		
Current prices/costs				X	X		X			X
Future prices/costs	X	X	X			X			X	
Inflation-adjusted		X	n/a	n/a		n/a	n/a	X	n/a	X
Not-inflation adjusted	X		n/a	n/a	X	n/a	n/a		n/a	

2009	Arauco	Asian Bamboo	Bergs Timber	Bergvik Skog	CMPC	Gunns Ltd.	Holmen	Portucel Empr.	Precious Woods	Metsä Group	Mondi
External evaluator				X							
Internal evaluation	X	X	X		X	X	X	X	X	X	X
Historical prices/costs			X								
Current prices/costs	X	X				X		X	X		
Future prices/costs				X	X		X			X	X
Inflation-adjusted		X	X		n/a		X	n/a	X	n/a	n/a
Not-inflation adjusted	X			X	n/a	X		n/a		n/a	n/a

2009	M-Real	Safcol	Samling Global	Sappi	SCA	Södra	Stora Enso	Sveaskog	Tornator	UPM-Kymmene	Wilmott Forests
External evaluator									X		X
Internal evaluation	X	X	X	X	X	X	X	X		X	
Historical prices/costs								X			
Current prices/costs			X	X			X				X
Future prices/costs	X	X			X	X			X	X	
Inflation-adjusted	n/a	n/a		n/a	n/a	X	n/a	X	n/a	n/a	X
Not-inflation adjusted	n/a	n/a	X	n/a	n/a		n/a		n/a	n/a	

10.6. Reforestation cost

Reforestation costs are included by the six Swedish companies within the sample in the valuation models for their forest holdings. One comment per company as found in the respective annual report follows below as example:

a. Bergs Timber, Annual Report 2006, p.41
   ’Kostnader för återplantering har beaktats då återplantering efter avverkning är en skyldighet enligt lag.’

b. SCA, Annual Report 2005, p. 63
   ‘This calculation is based on existing, sustainable felling plans and assessments regarding growth, timber prices, felling costs and silvicultural costs including costs for statutory replanting.’

c. Bergvik Skog, Annual Report 2005, p. 61
   ‘Costs for the replanting of felled areas are included in the cash flow calculation, since reforestation is a legal requirement and these costs are thus regarded as a part of the felling cost.‘

d. Sveaskog, Annual Report 2005, p. 70
   ’Det verkliga värdet har därför beräknats som ett avkastningsvärde, där kassaflödet från framtida intäkter från virkesuttag efter avdrag för avverknings-, återbeskognings- och andra skogsskötselkostnader diskonterats till ett nuvärde.’

e. Holmen, Annual Report 2007, p. 50
   ‘The cost of re-planting has been taken into account as re-planting after harvesting is a statutory obligation.’

f. Södra, Annual Report 2009, p. 20
   ‘Future price and cost development has been estimated, replanting costs taken into account and provisions made for environmental conservation.’

10.7. Industry agreement

Below the original text of the Swedish source that chapter 8.7 refers to:

I. ’De har också haft kontakt med övriga skogsbolag vad gällde övergången och gjort en överenskommelse hur standarden ska tolkas. Syftet med standarden tycker Olhans är vagt i och med att de från externt håll inte verkar finnas något större intresse av standarden utan mest skapar osäkerhet.’ (Andersson, Berglund, & Ejerlund, 2005, p. 28)

II. ‘Olhans och Sveaskog är tveksamma och negativa till standarden. De stora skogsbolagen i Sverige och Finland har gemensamt formulerat ett remissvar då beräkningen innehåller sådana subjektiva bedömningar. Det som bolagen hellre vill göra för att förtydliga redovisningen är att redovisa i not för att skapa en bättre bild av företagets ställning. (Andersson, Berglund, & Eierlund, 2005, p. 29)

III. ‘Det Korsnäs har gjort är att ”snacka ihop sig” med andra skogsföretag i Sverige angående hanteringen av reglerna. Genom denna överenskommelse gör de nu en kassaflödesvärdering.’ (Andersson, Berglund, & Eierlund, 2005, p. 31)

IV. ‘I de grunddata Korsnäs använt för beräkningen har inkluderats utgifter för återplantering, vilket är i strid med en bokstavstolkning av IAS 41. Östling. Deras motiv till att avvika från IAS 41 är att den modell som används för beräkningen är en kassaflödesvärdering som inkluderar samtliga intäkter och kostnader. Om en specifik utgift skulle exkluderas hade det medfört att en annan modell skulle behöva användas. Det skulle enligt Östling inte spegla det rätta värdet på deras skogstillgångar.’ (Andersson, Berglund, & Eierlund, 2005, p. 31)

10.8. Empirical data

Please find on the next pages the collected empirical date per company for the years 2005 to 2009 as found in the respective annual reports. The table furthermore comprises general information on the companies such as origin, location of operations or the size of the productive forest. This basic data was obtained from the financial statements 2009 if not stated differently.

	General Information									
# Company name	Country of origin	Accounting standards	Listed since	IFRS since	Productive forest in th. ha	Value of BA/TA	Location of operations	Location of main forest	Operations	Homepage
1 **Stora Enso**	FI	IFRS	1996	before 1999	114	1,32%	Production facilities in 35 countries; markets in Asia, Europe, North America (recently more focused on growing markets like China and Latin America).	Brazil, Finland, Sweden, Uruguay	Publication and fine paper, packaging, board,and wood products.	http://www.storaenso.com
2 **Lecta**	FR	IFRS	1999	2005	not published	0,02%	Mainly Southern Europe: Spain, Portugal, France and Italy; also other countries in Europe; (to a less extent outside of Europe)	not published	Coated woodfree paper manufacturer (largest in Southern Europe), manufacturer of specialty papers.	http://www.lecta.com
3 **Precious Woods**	CH	IFRS	2002	IAS 41 since 2000	1.090	20,27%	Market: Europe, USA, Asia, Brazil	Gabon, Brazil, (Costa Rica, Nicaragua)	Manufacturing and sale of FSC-certified tropical timber products; electricity from biomass; seed and seedlings.	http://www.preciouswoods.com
4 **UPM-Kymmene**	FI	IFRS	1996	2004	1.200	45,51%	Production: Finland, Russia, Austria; Market: Europe, Russia, Canada, US	Finland, (US, UK, Uruguay)	Producer of chemical pulp, biomass, publication paper and WISA sawn timber products.	http://www.upm.com
5 **Altri**	PT	IFRS	2005	2004	82	7,16%	Europe, China	Portugal	Pulp production and electric energy (industrial cogeneration, black liquor and biomass)	http://en.altri.pt
6 **Willmott Forests**	AU	AIFRS	2000	2005	1,3	2,88%	Australia	Australia	Establishing, managing, harvesting, processing and supplying timber products; biomass and vaneer timber production.	http://www.willmottforests.com.au
7 **Bergs Timber**	SE	IFRS	1998	2005	2.052	13,62%	Production: Sweden Market: Europe, Middle East, North Africa	Sweden	Producer of sawn products for construdtion industry.	http://www.bergstimber.se
8 **SCA**	SE	IFRS	1950	2005	2.600	16,95%	Production: 3 European countries ; Market: Europe (NA, Japan)	Sweden	Fully vertical integrated producer of personal care products, tissue, packaging, publication papers and solid-wood products.	http://www.sca.com
9 **Bergvik Skog**	SE	IFRS	2004	2005	1.900	93,15%	Long-term contracts with Stora Enso and Korsnäs	Sweden, Latvia since 2009	Grows and maintains forests, sells harvesting rights and hunting concessions.	http://www.bergvikskog.se
10 **Sveaskog**	SE	IFRS	2001	IAS 41 since 2005	3.266	81.88%	Mainly Sweden	Sweden	Silviculture, timber harvests, sales of wood raw material, leasing land for hunting, fishing and naturebased tourism.	http://www.sveaskog.se
11 **Holmen**	SE	IFRS	1998	2005	1.032	34,53%	Operations in Europe, Australia, NAfrica, Japan, Hong Kong, Singapore, USA, Middle East	Northern Sweden	Manufacturer of printing paper, paperboard and sawn timber; forestry and energy production operations.	https://www.holmen.com
12 **M-Real**	FI	IFRS	1987	2005	divestment in 2009	0.00% (deinv. in 2009)	Production: Finland, (Sweden, Germany, France, Austria); Market: Europe (worldwide)	Finland, (Uruguay)	Producer for primary fibre paperboard and papers for consumer packaging, communication and advertising end-uses.	http://www.zanders.de/en
13 **Norske Skog**	NO	IFRS	1990	2005	-	0,98%	Production: worldwide	Australia, (Brazil)	Producer of lightweight coated, directory and publication paper.	http://www.norskeskog.com
14 **Empresarial Ence**	ES	IFRS	2001	2005	owns 77, manages 116	12,68%	Prodution: Portugal, Spain, Uruguay Market: mainly Europe, (Asia)	Portugal, Spain, (Uruguay)	Cultivation, promotion, and exploitation of forest species (wood and biomass), producer of pulp and energy.	http://www.ence.es
15 **Portucel Empresa**	PT	IFRS	1993	2005	120	4,62%	Subsidiaries located in Europe (and one in the USA)	Portugal	Producer of paper and (eucalyptus) pulp.	www.portucelsoporcel.com/
16 **Masonite**	ZA	IFRS	1952	2005	25	34,65%	Market: South Africa, Africa, Middle East, Australasia	South Africa	Manufactures, distributes and sells hardboard, soft board, door facings, and decorative wall panels.	http://www.masonite.co.za/

	General Information									
# Company name	Country of origin	Accounting standards	Listed since	IFRS since	Productive forest in th. ha	Value of BA/TA	Location of operations	Location of main forest	Operations	Homepage
17 **York Timber**	ZA	IFRS	1946	2005	61	45,76%	"domestic and overseas"	South Africa	Commercial forestry, softwood sawmilling, plywood manufacture and trade in timber products	http://www.york.co.za
18 **Rougier**	FR	IFRS	1959	2006	2.000	6,17%	Rougier Afrique sells timber logs throughout the world (around 50 countries); Rougier France focuses on France	Central Africa (Congo, Cameroon, Gabon)	International trade in tropical timber	http://www.rougier.fr
19 **Gunns Ltd.**	AU	AIFRS	1986	2005	104	15,05%	mainly Australia (also Japan)	Australia	General forest management, road construction, timber harvesting and haulage, pulpwood processing and marketing of products to export markets.	http://www.gunns.com.au
20 **Sappi**	ZA	IFRS	1998	2006	380	8,37%	Manufacturing: Europe, North America, Asia, Southern Africa	South Africa	Producer of coated fine paper, newsprint, uncoated graphic and business papers, premium quality packaging papers and a range of coated speciality papers.	http://www.sappi.com/
21 **Asian Bamboo**	DE	IFRS	2007	2007	31,7	57,64%	HQ: Germany, Production: China, Sales: China, Japan	China	Producer of bamboo for construction, furniture, paper and pulp.	http://www.asian-bamboo.com
22 **Mondi**	GB	IFRS	2007	2007	2.440	4,04%	Production: Europe, Russia, ZA (31 countries); Market: Europe, Russia, ZA	Russia, (Africa)	Producer of paper, paper board and industrial bags.	http://www.mondigroup.com
23 **Tornator**	FI	IFRS	2002	2007	614	87,76%	Main market is Finland; also customers in Estonia and Romania	Estonia, Finland, Romania	Wood production and sale of cutting rights; Sells plots of land, soil resources, provides forest mgmt. services.	http://www.tornator.fi
24 **Smurfit Kappa**	IE	IFRS	2007	2007	105	1,23%	Operates in 31 countries; (Europe and Latin America)	Colombia, Venezuela	Paper and paperboard manufacturer and converter.	http://www.smurfitkappa.com
25 **Samling Global**	MY	IFRS	2007	2007?	43	17,15%	Japan, US, Korea, China,India, Australia	China, Malaysia, New Zealand	Timber harvesting and processing, manufacture and sale of a wide range of wood products	http://www.samling.com
26 **Metsä Group**	FI	IFRS	[125,000 Finnish forest owning members]	2004	3.500	0,12%	Operates in 30 countries; main market is Europe	Finland	Wood supply, wood products industry, pulp industry, board and paper industry, tissue and cooking paper industry.	http://www.metsagroup.com
27 **Safcol**	ZA	IFRS	still partly state-owned; sold shares in 2007; KLF shall be totally privatized in 2009	2008	141	72,24%	"International"	South Africa	Forestry management, timber harvesting, timber processing; sale of softwood sawlogs	http://www.safcol.co.za
28 **Södra**	SE	Swedish GAAP; IFRS	[privately owned by 51000 forest owners in Sweden]	2009	26	2,80%	International market (home market most important, but also Japan, the USA, the Middle East and most European countries)	Sweden, the Baltics	Pulpwood, saw logs.	http://www.sodra.com
29 **CMPC**	CL	IFRS	1920	2009	659	1,38%	Operations in Chile, Brasil, Argentina, Perú, Uruguay, México, Colombia and Ecuador; customers in 55 countries	Argentina, Brazil, Chile	Pulp, paper, tissue and paper products.	http://www.empresascmpc.cl
30 **Arauco**	CL	IFRS	1967	2009	1007 (2010)	32,92%	Industrial operations in Chile, Argentina, Brazil; sales offices around the world	Argentina, Brazil, Chile, Uruguay	Pulp, forestry and wood products,	http://www.arauco.cl

		2005				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
1 **Stora Enso**	yes (PWC)	FV less est. POS cost DCF from continuous operations; Note 13: IAS 41 in use since 2003; Value of forest of associates not shown seperately (B/S item "Shares in asscoiates")	/	/	current	current
2 **Lecta**			no AR available			
3 **Precious Woods**	yes (PWC)	Central America (1) new plantations at acquisition cost (2) immature trees: Discounted Cash Flow; 5 different growth categories for each sort of wood; calculation of an Internal Rate of Return for each category and sort of wood from budgeted costs and future cash inflows	26-30	IRR (weigthed average CA: 10.8%)	no future prices, inflation is disregarded	no future costs, inflation is disregarded
4 **UPM-Kymmene**	yes (PWC)	FV less POS cost; 2 categories: (1) young seedling stands at actual reforestation cost; (2) immature trees at FV (DCF from continuous operations)	/	/ (7%)	actual prices and cost taking the company's future projections into account	actual prices and cost taking the company's future projections into account
5 **Altri**	yes (Deloitte)	Historical cost (Costs incurred with the acquisition of plantations and plantations made, and costs incurred with its development, conservation and maintenance are included in this caption.)	n/a	n/a	n/a	n/a
6 **Willmott Forests**	no (Arnstrong Partners)	first time adoption of AIFRS: FV less est. POS cost; DCF (net proceeds to be obtained from sale of wood)	25	nominal pre-tax rate (12.5%)	Current, indexed by 3.15% p.a.	Current, indexed by 3.15% p.a.
7 **Bergs Timber**	yes (Ernst & Young)	FV DCF, no further information year of change to IFRS	85	/	/	/
8 **SCA**	yes (PWC)	FV less estimated selling cost; FV = PV of anticipated future CFs for asset **before tax**; cost for **statutory replanting** included, state exp. Growth in numbers	average of 100	normal forest company's pre-tax WACC (6.25%)	future	future
9 **Bergvik Skog**	yes (KPMG)	FV less est. selling cost (= all costs required to sell the asset) DCF: PV of expected FCFs from the asset incl. transportation cost and growth estimates	100	long-term cost of capital within forest business, post-tax (6.25%)	outsourced: long-term trend for real selling prices and costs	outsourced: long-term trend for real selling prices and costs
10 **Sveaskog**	yes (Ernst & Young)	FV less cost of felling; DCF incl. re-forestration cost ("industry-wide agreement")	80-110	pre-tax rate (6.25%)	historic, assumption of unchanged rotnetto, inflation 2 % p.a.	historic, assumption of unchanged rotnetto, inflation 2 % p.a.
11 **Holmen**	yes (KPMG)	FV DCF (exp. CFs from the growing forest); incl. re-forestation costs	100	long-term capital cost of forestry operation, pre-tax (6.25%)	future	future
12 **M-Real**	yes (PWC)	FV - est. expenses making a sale 2 categories: (1) young seedlings at cost; (2) Immature BA: DCF; incl. growth	/	/	future	future
13 **Norske Skog**	yes (Deloitte)	Forest assets recognized at estimated sales value	/	/	/	/
14 **Empresarial Ence**	yes (Deloitte)	Historical cost = cost less acc. depreciation and any acc. impairment losses (" it is not possible to calculate the present value of the future after-tax cash flows from these biological assets")	n/a	n/a	n/a	n/a
15 **Portucel Empresa**	yes (PWC)	FV less estimated selling cost 2 categories: 1) immature forest: DCF 2) mature timber - FV less POS cost, (no further specification) incl. transportation and growth	/	Group's expected rate of return on its forests (5.5%)	future	future
16 **Masonite**	yes (KPMG)	FV less est. POS cost 2 categories; 1) immature timber (0-7yrs): DCF 2) mature timber (>7yrs) -NSV (less harvesting and transportation costs)	assumption: 7	appropriate factor to account for its unsuitabilty for board production (-)	/	/

		2005				
#	Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
17	**York Timber**	yes (KPMG)	FV less est. POS costs (all costs necessary to sell the assets, excl. . transport costs); 2 categories: 1) Standing timber > 10 years: NSV (less harvesting cost) 2) Standing timber < 10 years: DCF (netCFs exp. to be generated by the plantation at maturity)	/	/	/	/
18	**Rougier**	yes (Ernst & Young)	Concessions in Central Africa; Recognized as intangible asset at cost (Amortisation = 20-30 years)	n/a	n/a	n/a	n/a
19	**Gunns Ltd.**	yes (KPMG)	FV less est. POS cost 3 categories: 1) young seedlings: AC 2) immature plantations: DCF 3) native forests: DCF incl estimated growth rates	-	entity's WACC, real (10%)	yes (adj. by long-term inflation rate)	yes (adj. by long-term inflation rate)
20	**Sappi**	yes (Deloitte)	FV 1) immature timber: DCF 2) mature timber: NSV incl. growth and cost of delivery	8 to 18; depends on type of wood and location of forest; (immature: hardwood <5, softwood <8)	appropriate pre-tax WACC (-)	expected delivered market prices	/
21	**Asian Bamboo**	-	-	-	-	-	-
22	**Mondi**	-	-	-	-	-	-
23	**Tornator**	-	-	-	-	-	-
24	**Smurfit Kappa**	-	-	-	-	-	-
25	**Samling Global**	-	-	-	-	-	-
26	**Metsä Group**			no AR available			
27	**Safcol**	-	-	-	-	-	-
28	**Södra**	-	-	-	-	-	-
29	**CMPC**	-	-	-	-	-	-
30	**Arauco**	-	-	-	-	-	-

		2006				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
1 **Stora Enso**	yes (PWC)	FV less est. POS cost DCF from continuous operations; Note 13: IAS 41 in use since 2003; Value of forest of associates not shown seperately (B/S item "Shares in asscoiates")	/	/	current	current
2 **Lecta**	yes (Ernst & Young)	FV Impairment test: Write down to recoverable amount (the greater of net selling price and value in use (calc. with DCF) no regular impariment test for BA	/	pre-tax rate (/)	/	/
3 **Precious Woods**	yes (PWC)	Central America: FV less est. POS costs (1) new plantations at acquisition cost (2) immature trees: DCF 5 different growth categories for each sort of wood; calculation of an IRR for each category and sort of wood from budgeted costs and future cash inflows	26-30	IRR (weigthed average CA: 10.8%)	no future prices, inflation is disregarded	no future costs, inflation is disregarded
4 **UPM-Kymmene**	yes (PWC)	FV less POS cost; 2 categories: (1) young seedling stands at actual reforestation cost; (2) immature trees at FV (DCF from continuous operations)	/	/ (7.5 %)	actual prices and cost taking the company's future projections into account	actual prices and cost taking the company's future projections into account
5 **Altri**	yes (Deloitte)	Historical cost (Costs incurred with the acquisition of plantations and plantations made, and costs incurred with its development, conservation and maintenance are included in this caption; Board of Directors decided not to apply FV due to high number of assumptions necessary for DCF, it thinks that that the acquisition cost of the BA is close to its FV)	n/a	n/a	n/a	n/a
6 **Willmott Forests**	no (Arnstrong Partners)	FV less est. POS cost; DCF model (net proceeds to be obtained from sale of wood)	25	nominal rate (12.5%)	Current, indexed by 3.15% p.a.	Current, indexed by 3.15% p.a.
7 **Bergs Timber**	yes (Ernst & Young)	FV DCF incl. cost for re-plantations	25	WACC for business unit, nominal, pre-tax (6.26%)	historic, assumption of unchanged rotnetto, inflation 2 % p.a.	historic, assumption of unchanged rotnetto, inflation 2 % p.a.
8 **SCA**	yes (PWC)	FV less est. selling cost; DCF incl. cost for statutory replanting growth given in numbers	average of 100	normal forest company's pre-tax WACC (6.25%)	future	future
9 **Bergvik Skog**	yes (KPMG)	FV less est. selling cost (= all costs required to sell the asset) DCF incl. transportation cost and growth estimates	100	long-term cost of capital within forest business, post-tax (6.25%)	outsourced: long-term trend for real selling prices and costs	outsourced: long-term trend for real selling prices and costs
10 **Sveaskog**	yes (Ernst & Young)	FV less cost of felling; DCF incl. re-forestration cost ("industry-wide agreement")	80-110	pre-tax rate (6.25%)	historic, assumption of unchanged rotnetto, inflation 2 % p.a.	historic, assumption of unchanged rotnetto, inflation 2 % p.a.
11 **Holmen**	yes (KPMG)	FV DCF (exp. CFs from the growing forest); incl. re-forestation costs	100	long-term capital cost of forestry operation, pre-tax (6.25%)	future	future
12 **M-Real**	yes (PWC)	FV - est. expenses making a sale 2 categories: (1) young seedlings at cost; (2) Immature BA: DCF; incl. growth	/	/	future	future
13 **Norske Skog**	yes (PWC)	Forest assets are valued at their estimated selling price.	/	/	/	/
14 **Empresarial Ence**	link to AR 2006 shows AR 2005 - sent email and asked for correct one, no answer so far…					
15 **Portucel Empresa**	yes (PWC)	FV less estimated selling cost 2 categories: 1) immature forest: DCF 2) mature timber - FV less POS cost, (no further specification) incl. transportation and growth	/	Group's expected rate of return on its forests (5.5%)	future	future
16 **Masonite**	yes (Deloitte)	FV less est. POS cost 2 categories; 1) immature timber (0-7yrs): DCF 2) mature timber (>7yrs) -NSV (less harvesting and transportation costs)	assumption: 7	appropriate factor to account for its unsuitabilty for board production (-)	/	/

		2006				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
17 **York Timber**	yes (KPMG)	FV less est. POS costs (all costs necessary to sell the assets, excl. . transport costs); 2 categories: 1) Standing timber > 10 years: NSV (less harvesting cost) 2) Standing timber < 10 years: DCF (netCFs exp. to be generated by the plantation at maturity)	/	/	Komatiland long term contract prices; ZA Lumber Index	/
18 **Rougier**	yes (Ernst & Young)	Concessions in Central Africa; Recognized as intangible asset at cost (Amortisation = 20-30 years)	n/a	n/a	n/a	n/a
19 **Gunns Ltd.**	yes (KPMG)	FV less est. POS cost (excl. transportation cost) 3 categories: 1) young seedlings: AC 2) immature plantations: DCF 3) native forests: DCF incl estimated growth rates	-	market determined real discount rate for this asset type (10%)	no	no
20 **Sappi**	yes (Deloitte)	FV less POS cost 1) immature timber: DCF 2) mature timber: NSV incl. growth and cost of delivery	8 to 18; depends on type of wood and location of forest; (immature: hardwood <5, softwood <8)	appropriate pre-tax WACC (-)	expected delivered market prices	/
21 **Asian Bamboo**	-	-	-	-	-	-
22 **Mondi**	-	-	-	-	-	-
23 **Tornator**	-	-	-	-	-	-
24 **Smurfit Kappa**	-	-	-	-	-	-
25 **Samling Global**	-	-	-	-	-	-
26 **Metsä Group**			no AR available			
27 **Safcol**	-	-	-	-	-	-
28 **Södra**	-	-	-	-	-	-
29 **CMPC**	-	-	-	-	-	-
30 **Arauco**	-	-	-	-	-	-

		2007				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
1 **Stora Enso**	yes (PWC)	FV - est. POS costs 2 categories 1) newly acq.+recently planted trees: at cost 2) establ. forest: FV is determined by DCF model using cash flows from continuous operations (incl. growth potential, use PV of one growth cycle) Value of forest of associates not shown seperately (B/S item "Shares in asscoiates")	/	/	future	future
2 **Lecta**	yes (Ernst & Young)	FV Impairment test: Write down to recoverable amount (the greater of net selling price and value in use (calc. with DCF) no regular impariment test for BA	/	pre-tax rate (/)	/	/
3 **Precious Woods**	yes (PWC)	Central America: FV less est. POS costs (1) new plantations at acquisition cost (2) immature trees: DCF 5 different growth categories for each sort of wood; calculation of an IRR for each category and sort of wood from budgeted costs and future cash inflows Brazil: acquisition cost (market value is not realiable measurable)	26-30	IRR (/)	no future prices, inflation is disregarded	no future costs, inflation is disregarded
4 **UPM-Kymmene**	yes (PWC)	FV less POS cost; 2 categories: (1) young seedling stands at actual reforestation cost; (2) immature trees at FV (DCF from continuous operations)	/	**pre-tax** rate (7.5%)	actual prices and cost taking the company's future projections into account	actual prices and cost taking the company's future projections into account
5 **Altri**	yes (Deloitte)	Historical cost (Costs incurred with the acquisition of plantations and plantations made, and costs incurred with its development, conservation and maintenance are included in this caption; Board of Directors decided not to apply FV due to high number of assumptions necessary for DCF, it thinks that that the acquisition cost of the BA is close to its FV)	n/a	n/a	n/a	n/a
6 **Willmott Forests**	no (Arnstrong Partners)	FV less est. POS cost; DCF model (net proceeds to be obtained from sale of wood)	25	nominal (13.0%)	Current, indexed by 3.15% p.a.	/
7 **Bergs Timber**	yes (Ernst & Young)	FV DCF incl. cost for re-plantations	85	WACC for business unit, nominal, pre-tax (6,26%)	historic, assumption of unchanged rotnetto, inflation 2 % p.a.	historic, assumption of unchanged rotnetto, inflation 2 % p.a.
8 **SCA**	yes (PWC)	FV less est. selling cost; DCF incl. cost for statutory replanting growth given in numbers	average of 100	normal forest company's pre-tax WACC (6.25%)	future	future
9 **Bergvik Skog**	yes (KPMG)	FV less est. selling cost (= all costs required to sell the asset) DCF incl. transportation cost and growth estimates	100	long-term cost of capital within forest business, post-tax (6.25%)	outsourced: long-term trend for real selling prices and costs	outsourced: long-term trend for real selling prices and costs
10 **Sveaskog**	yes (Ernst & Young)	FV less cost of felling; DCF incl. re-forestration cost ("industry-wide agreement")	60-120	pre-tax rate (6.25%)	historical (average of 2002-2004); inflation-adjusted by 2%	historical (average of 2002-2004); inflation-adjusted by 2%
11 **Holmen**	yes (KPMG)	FV DCF (exp. CFs from the growing forest); felling rights recognized in inventory incl. re-forestation costs	100	WACC, post-tax (5,5%); tax rate = 28%; state further details (risk-free rate; D/E-ratio, risk premium…) seems to be wacc	future	future
12 **M-Real**	yes (PWC)	FV - est. expenses making a sale 2 categories: (1) young seedlings at cost; (2) Immature BA: DCF; incl. growth	/	/	future	future
13 **Norske Skog**	yes (PWC)	Forest assets are valued at their estimated selling price.	/	/	/	/
14 **Empresarial Ence**	yes (Deloitte)	Historical cost = cost less acc. depreciation and any acc. impairment losses (" it is not possible to calculate the present value of the future after-tax cash flows from these biological assets")	n/a	n/a	n/a	n/a
15 **Portucel Empresa**	yes (PWC)	FV less estimated selling cost 2 categories: 1) immature forest: DCF 2) mature timber - FV less POS cost, (no further specification) incl. transportation and growth	/	Group's expected rate of return on its forests (5.5%)	future	future
16 **Masonite**	yes (Deloitte)	FV less est. POS cost 3 categories: 1) newly planted/re-grown areas: AC 2) immature timber (0-7yrs): higher of (AC; DCF) 3) mature timber (>7yrs) - NSV (less harvesting and transportation cost)	assumption: 7	appropriate factor to account for its unsuitabilty for board production (-)	/	/

		2007				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
17 **York Timber**			n / a (change of reporting period)			
18 **Rougier**	yes (Ernst & Young)	Concessions in Central Africa; Recognized as intangible asset at cost (Amortisation = 20-30 years)	n/a	n/a	n/a	n/a
19 **Gunns Ltd.**	yes (KPMG)	FV less est. POS cost (excl. transportation cost) 3 categories: 1) young seedlings: AC 2) immature plantations: DCF 3) native forests: DCF incl estimated growth rates	/	market determined real discount rate for this asset type (10%)	no	no
20 **Sappi**	yes (Deloitte)	FV less POS cost 1) immature timber: DCF 2) mature timber: NSV incl. growth and cost of delivery "assumptions that are used in determining the extent of biological transformation ("growth") can have a significant effect on the valuation of the plantations"	8 to 18; depends on type of wood and location of forest; (immature: hardwood <5, softwood <8)	appropriate pre-tax WACC of business unit (/)	unadjusted current market prices	/
21 **Asian Bamboo**	no (BDO dt. Warentreuhand AG WPG)	Grow Moso Bamboo; FV less est. POS cost 2 categories: 1) immature plantations: AC 2) mature plantations: DCF growth cycle = duration of lease period, bamboo trees can be harvested after 6 yrs but plant produces further shoots and trees	up to 20; depends on remaining lease period	current market-determined pre-tax rate (27%)	current, inflation-adj. by 3%	current, inflation-adj. by 3%
22 **Mondi**	yes (Deloitte)	FV less POS cost 2 categories: 1) Immature BA: DCF 2) mature BA: FV = expected selling price less costs to harvest and deliver	/	current market determined, risk-adjusted **post-tax** rate	expected selling prices	/
23 **Tornator**	yes (PWC)	First time adoption of IFRS FV less POS cost DCF	70	2-year sliding average of the Finnish State's 10-year interest rate used as risk-free component, fluctuation range of +/- 0.5% used for equity risk premium of the after tax discount rate (6.57%)	future; outside evaluator	future; outside evaluator
24 **Smurfit Kappa**	yes (PWC)	FV less est. cost to sell Hierarchy: 1) Where available: NSV (Weighted average prices for similar transactions with third parties) 2) else: DCF	/	/	/	/
25 **Samling Global**	yes (KPMG)	Own plantations: Valuation is outsourced (FV less POS cost) Timber concessions: at cost less accumulated amortisation and impairment losses (distinction between timber concession [harvest of trees] and plantation concession [plant trees]; amortisation over the remaining term of the licences	/	Country-specific: New Zealand (8,5%) ; Malaysia, pre-tax (10,2%)	current; not inflation-adj.	current; not inflation-adj.
26 **Metsä Group**	yes (PWC)	FV less est. expenses making a sale 2 categories: 1) young seedlings: / 2) immature trees: DCF takes into account future growth Forest land leases in Russia and Latvia are not recognized	/	/	future	future
27 **Safcol**	-	-	-	-	-	-
28 **Södra**	-	-	-	-	-	-
29 **CMPC**	-	-	-	-	-	-
30 **Arauco**	-	-	-	-	-	-

		2008				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
1 **Stora Enso**	yes (Deloitte)	FV - est. POS costs at harvest no clear categorization: 1) FV approximates the cost when little biological transformation has taken place or the impact of the transformation on price is not expected to be material 2) establ. forest: FV is determined by DCF (continuous operations) Stora Enso ensures that the valuation of forest holdings in Associated Companies is consistent with Group accounting policies	/	/	future	future
2 **Lecta**	yes (Ernst & Young)	FV Impairment test: Write down to recoverable amount (the greater of net selling price and value in use (calc. with DCF) no regular impariment test for BA	/	pre-tax rate (/)	/	/
3 **Precious Woods**	yes (PWC)	Central America: FV less est. POS costs (1) new plantations at acquisition cost (2) immature trees: DCF 5 different growth categories for each sort of wood; calculation of an IRR for each category and sort of wood from budgeted costs and future cash inflows Brazil: acquisition cost (market value is not realiable measurable)	26-30	IRR (/)	no future prices, inflation is disregarded	no future costs, inflation is disregarded
4 **UPM-Kymmene**	yes (PWC)	FV less POS cost; 2 categories: (1) young seedling stands at actual reforestation cost; (2) immature trees at FV (DCF from continuous operations)	/	pre-tax rate (7.5%)	actual prices and cost taking the company's future projections into account	actual prices and cost taking the company's future projections into account
5 **Altri**	yes (Deloitte)	Historical cost (Costs incurred with the acquisition of plantations and plantations made, and costs incurred with its development, conservation and maintenance are included in this caption; Board of Directors decided not to apply FV due to high number of assumptions necessary for DCF, thus the fair value is not reliable measurable; it thinks that that the acquisition cost of the BA is close to its FV)	n/a	n/a	n/a	n/a
6 **Willmott Forests**	no (Arnstrong Partners)	FV less est. POS cost; DCF model (net proceeds to be obtained from sale of wood)	25	nominal (13.5%)	Current, indexed by 3.55% p.a. to account for inflation	/
7 **Bergs Timber**	yes (Ernst & Young)	FV DCF incl. cost for re-plantations	85	WACC for business unit, nominal, pre-tax (6,26%)	historic, assumption of unchanged rotnetto, inflation 2 % p.a.	historic, assumption of unchanged rotnetto, inflation 2 % p.a.
8 **SCA**	yes (PWC)	FV less est. selling cost; DCF incl. cost for statutory replanting growth given in numbers	average of 100	normal forest company's pre-tax WACC (6.25%)	future	future
9 **Bergvik Skog**	yes (KPMG)	FV less est. selling cost (= all costs required to sell the asset) DCF incl. transportation cost and growth estimates	100	long-term cost of capital within forest business, post-tax (6.25%)	outsourced: long-term trend for real selling prices and costs	outsourced: long-term trend for real selling prices and costs
10 **Sveaskog**	yes (Ernst & Young)	FV less cost of felling; DCF incl. re-forestration cost ("industry-wide agreement")	60-120	pre-tax rate (6.25%)	historic, (average of 2003-2008) inflation assumptions based assessed development for 2009 to 2108	historic, (average of 2003-2008) inflation assumptions based assessed development for 2009 to 2108
11 **Holmen**	yes (KPMG)	FV DCF (exp. CFs from the growing forest); incl. re-forestation costs	100	WACC, post-tax (5,5%); tax rate = 28%; state further details (risk-free rate; D/E-ratio, risk premium…) seems to be wacc	future	future
12 **M-Real**	yes (PWC)	FV - est. expenses making a sale 2 categories: (1) young seedlings at cost; (2) Immature BA: DCF; incl. growth comment on the amendment ("prohibition")	/	/	future	future
13 **Norske Skog**	yes (PWC)	Forest assets are valued at their estimated selling price.	/	/	/	/
14 **Empresarial Ence**	yes (Deloitte)	Historical cost = cost less acc. depreciation and any acc. impairment losses (" it is not possible to calculate the present value of the future after-tax cash flows from these biological assets")	n/a	n/a	n/a	n/a
15 **Portucel Empresa**	yes (PWC)	FV less estimated selling cost 2 categories: 1) immature forest: DCF 2) mature timber - FV less POS cost, (no further specification) incl. transportation and growth	/	Group's expected rate of return on its forests (5.5%)	future	future
16 **Masonite**	yes (Deloitte)	FV less est. POS cost 3 categories: 1) newly planted/re-grown areas: AC 2) immature timber (0-7yrs): higher of (AC; DCF) 3) mature timber (>7yrs) - NSV (less harvesting and transportation cost)	assumption: 7	appropriate factor to account for its unsuitabilty for board production (-)	/	/

		2008				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
17 **York Timber**	yes (KPMG)	FV less est. POS costs (all costs necessary to sell the assets, excl. transport costs); 2 categories: (1) immature < 4yrs: at acquisition cost; (2) mature > 4 yrs: NSV BA that are expected to be consumed in the next 12 months = current assets	aim for 22 (Highveld) and 25 (Escarpment)	/	no	no
18 **Rougier**	yes (Ernst & Young)	Concessions in Central Africa; Recognized as intangible asset at cost (Amortisation = 20-30 years)	n/a	n/a	n/a	n/a
19 **Gunns Ltd.**	yes (KPMG)	FV less est. POS cost (excl. transportation cost) 3 categories: 1) young seedlings: AC 2) immature plantations: DCF 3) native forests: DCF incl estimated growth rates	-	market determined real discount rate for this asset type (**9%**); advice from an **independent expert** (p.65)	no	no
20 **Sappi**	yes (Deloitte)	FV less POS cost 1) immature timber: DCF 2) mature timber: NSV incl. growth and cost of delivery "assumptions that are used in determining the extent of biological transformation ("growth") can have a significant effect on the valuation of the plantations"	8 to 18; depends on type of wood and location of forest; (immature: hardwood <5, softwood <8)	appropriate pre-tax WACC of business unit (-)	unadjusted current market prices	/
21 **Asian Bamboo**	no (BDO dt. Warentreuhand AG WPG)	Grow Moso Bamboo; FV less est. POS cost 2 categories: 1) immature plantations: AC 2) mature plantations: DCF growth cycle = duration of lease period, bamboo trees can be harvested after 6 yrs but plant produces further shoots and trees	up to 20; depends on remaining lease period	current market-determined pre-tax rate (30%)	current, inflation-adj. by 3%	current, inflation-adj. by 3%
22 **Mondi**	yes (Deloitte)	FV less POS cost 2 categories: 1) Immature BA: DCF 2) mature BA: FV = expected selling price less costs to harvest and deliver assessment of amendment	-	current market determined, risk-adjusted **post-tax** rate	expected selling prices	/
23 **Tornator**	yes (PWC)	FV less POS cost DCF 2 categories: 1) new plantations/acq.: AC 2) DCF incl. growth assumptions	70	2-year sliding average of the Finnish State's 10-year interest rate used as risk-free component, fluctuation range of +/- 0.5% used for equity risk premium of the after tax discount rate (6.68%)	future; outside evaluator	future; outside evaluator
24 **Smurfit Kappa**	yes (PWC)	FV less est. cost to sell Hierarchy: 1) Where available: NSV (Weighted average prices for similar transactions with third parties) 2) else: DCF Comment on IFRS amendment: removal of the prohibition on taking into account biological transformation when calculating FV; amendment is not expected to have a material effect on the Group F/S.	/	/	/	/
25 **Samling Global**	yes (KPMG)	Own plantations: Valuation is outsourced (FV less POS cost) Timber concessions: at cost less accumulated amortisation and impairment losses (distinction between timber concession [harvest of trees] and plantation concession [plant trees]; amortisation over the remaining term of the licences	/	Country-specific: New Zealand (7,25%); Malaysia, pre-tax (10,2%)	current; not inflation-adj.	current; not inflation-adj.
26 **Metsä Group**	yes (PWC)	FV less est. expenses making a sale 2 categories: 1) young seedlings: / 2) immature trees: DCF takes into account future growth Forest land leases in Russia and Latvia are not recognized Comment on change in IAS 41: The amendment does not have any material impact on the consolidated financial statements	/	/	future	future
27 **Safcol**	yes (PWC)	Valuation performed by external forestry economist FV less est. POS cost DCF incl. future growth	/	pre-tax	future	future
28 **Södra**	-	-	-	-	-	-
29 **CMPC**	-	-	-	-	-	-
30 **Arauco**	-	-	-	-	-	-

		2009				
# Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
1 **Stora Enso**	yes (Deloitte)	FV - est. POS costs at harvest no clear categorization: 1) FV approximates the cost when little biological transformation has taken place or the impact of the transformation on price is not expected to be material 2) establ. forest: FV is determined by DCF (continuous operations) Stora Enso ensures that the valuation of forest holdings in Associated Companies is consistent with Group accounting policies	/	/	future	future
2 **Lecta**	yes (Ernst & Young)	FV Impairment test: Write down to recoverable amount (the greater of net selling price and value in use (calc. with DCF) no regular impariment test for BA	/	pre-tax rate (/)	/	/
3 **Precious Woods**	yes (PWC)	Central America: FV less est. POS costs (1) new plantations at acquisition cost (2) immature trees: DCF 5 different growth categories for each sort of wood; now categorization into different diameter classes; exclusion of domestic species except Mahagoni; results in large difference in fair value compared to 2008 Brazil: acquisition cost (market value is not realiable measurable)	Teak: 20 Pochote: 22 Mahagoni: 30	current market-determined pre-tax rate pre-tax (11%)	future price, inflation-adjusted by 2.5%	future cost, inflation-adjusted by 2.5%
4 **UPM-Kymmene**	yes (PWC)	FV less POS cost; 2 categories: (1) young seedling stands at actual reforestation cost; (2) immature trees at FV (DCF from continuous operations)	/	Country-specific pre-tax rates: Finland (7.50%) Uruguay (10%) forests.	actual prices and cost taking the company's future projections into account	actual prices and cost taking the company's future projections into account
5 **Altri**	yes (Deloitte)	Historical cost (Costs incurred with the acquisition of plantations and plantations made, and costs incurred with its development, conservation and maintenance are included in this caption; Board of Directors decided not to apply FV due to high number of assumptions necessary for DCF, thus the fair value is not reliable measurable; it thinks that that the acquisition cost of the BA is close to its FV)	n/a	n/a	n/a	n/a
6 **Willmott Forests**	no (Arnstrong Partners)	FV less est. POS cost; DCF model (net proceeds to be obtained from sale of wood)	25	nominal (13.5%)	Current, indexed by 3.20% p.a. to account for inflation	/
7 **Bergs Timber**	yes (Ernst & Young)	FV DCF incl. cost for re-plantations	85	WACC for business unit, nominal, pre-tax (6.26%)	historic, assumption of unchanged rotnetto, inflation 2 % p.a.	historic, assumption of unchanged rotnetto, inflation 2 % p.a.
8 **SCA**	yes (PWC)	FV less est. selling cost; DCF incl. cost for statutory replanting growth given in numbers	average of 100	normal forest company's pre-tax WACC (6.25%)	future	future
9 **Bergvik Skog**	yes (KPMG)	FV less est. selling cost (= all costs required to sell the asset) DCF incl. transportation cost and growth estimates	90 (100 for forest in Latvia)	long-term cost of capital within forest business, post-tax (6.25%)	outsourced: long-term trend for real selling prices and costs	
10 **Sveaskog**	yes (Ernst & Young)	FV less cost of felling; DCF incl. re-forestration cost ("industry-wide agreement")	60-120	pre-tax rate (6.25%)	historic (average of 2002 -2009); time series will be progressively extended to rolling 10-year period; Inflation-adj. based on the est. development (2010 und 2110)	historic (average of 2002 -2009); time series will be progressively extended to rolling 10-year period; Inflation-adj. based on the est. development (2010 und 2110)
11 **Holmen**	yes (KPMG)	FV DCF (exp. CFs from the growing forest); incl. re-forestation costs	100	WACC, post-tax (5,5%); tax rate = 28%; state further details (risk-free rate; D/E-ratio, risk premium…) seems to be wacc	future	future
12 **M-Real**	yes (PWC)	FV - est. expenses making a sale 2 categories: (1) young seedlings at cost; (2) Immature BA: DCF; incl. growth	/	/	future	future
13 **Norske Skog**	yes (PWC)	FV less est. POS-cost "If the FV cannot be measured reliable, they are carried at cost less any accumulated depreciation and any accumulated impairment losses"	/	/	/	/
14 **Empresarial Ence**	yes (Deloitte)	Historical cost = cost less acc. depreciation and any acc. impairment losses (" it is not possible to calculate the present value of the future after-tax cash flows from these biological assets")	n/a	n/a	n/a	n/a
15 **Portucel Empresa**	yes (PWC)	FV less estimated selling cost 2 categories: 1) immature forest: DCF 2) mature timber - FV less POS cost, (no further specification) incl. transportation and growth	/	Group's expected rate of return on its forests (5.5%)	future	future
16 **Masonite**	yes (Deloitte)	FV less est. POS cost 3 categories: 1) newly planted/re-grown areas: AC 2) immature timber (0-7yrs): higher of (AC; DCF) 3) mature timber (>7yrs) - NSV (less harvesting and transportation cost)	assumption: 7	appropriate factor to account for its unsuitabilty for board production (-)	/	/

		2009				
#	Company name	Big 4-Auditor?	Description of valuation	Growth cycle in years	Discount rate	Prices	Costs
17	**York Timber**	yes (KPMG)	FV less est. POS costs (all costs necessary to sell the assets, excl. transport costs); 2 categories: (1) immature < 4yrs: at acquisition cost; (2) mature > 4 yrs: NSV BA that are expected to be consumed in the next 12 months = current assets	aim for 25 yrs	/	no	no
18	**Rougier**	yes (Ernst & Young)	Concessions in Central Africa; Recognized as intangible asset at cost (Amortisation = 20-30 years)	n/a	n/a	n/a	n/a
19	**Gunns Ltd.**	yes (KPMG)	FV less est. POS cost (excl. transportation cost): 1) young seedlings: AC 2) immature plantations: DCF (Net Market Value Method); incl estimated growth rates; 3) native forests: DCF no inflation-adjustments;	-	market determined real discount rate for this asset type (9%)	no	no
20	**Sappi**	yes (Deloitte)	FV less POS cost 1) immature timber: DCF 2) mature timber: NSV incl. growth and cost of delivery "assumptions that are used in determining the extent of biological transformation ("growth") can have a significant effect on the valuation of the plantations"	8 to 18 years depending on type of wood and location of forest	appropriate pre-tax WACC of business unit (-)	unadjusted current market prices	/
21	**Asian Bamboo**	no (BDO dt. Warentreuhand AG WPG)	Grow Moso Bamboo; FV less est. POS cost 2 categories: 1) immature plantations: AC 2) mature plantations: DCF growth cycle = duration of lease period, bamboo trees can be harvested after 6 yrs but plant produces further shoots and trees	up to 20; depends on remaining lease period	current market-determined pre-tax rate (27%)	current, inflation-adj. by 3%	current, inflation-adj. by 3%
22	**Mondi**	yes (Deloitte)	FV less POS cost 2 categories: 1) Immature BA: DCF 2) mature BA: FV = expected selling price less costs to harvest and deliver assessment of amendment	-	current market determined pre-tax discount rate	expected selling prices	-
23	**Tornator**	yes (PWC)	FV less POS cost DCF 2 categories: 1) new plantations/acq.: AC 2) DCF incl. growth assumptions, report update of model	70	2-year sliding average of the Finnish State's 10-year interest rate used as risk-free component, fluctuation range of +/- 0.5% used for equity risk premium of the after tax discount rate (6.22%)	future; outside evaluator	future; outside evaluator
24	**Smurfit Kappa**	yes (PWC)	FV less est. cost to sell Hierarchy: 1) Where available: NSV (Weighted average prices for similar transactions with third parties) 2) else: DCF	/	/	/	/
25	**Samling Global**	yes (KPMG)	Own plantations: Valuation is outsourced (FV less POS cost) Timber concessions: at cost less accumulated amortisation and impairment losses (distinction between timber concession [harvest of trees] and plantation concession [plant trees]; amortisation over the remaining term of the licences	/	Country-specific: New Zealand (7.25%) Malaysia (10.2%) China (10%)	current; not inflation-adj.	current; not inflation-adj.
26	**Metsä Group**	yes (PWC)	FV less est. expenses making a sale 2 categories: 1) young seedlings: / 2) immature trees: DCF takes into account future growth Forest land leases in Russia and Latvia are not recognized Comment on change in IAS 41: The amendment does not have any material impact on the consolidated financial statements	/	/	future	future
27	**Safcol**	yes (PWC)	Valuation performed by external forestry economist FV less est. POS cost DCF incl. future growth	/	pre-tax	future	future
28	**Södra**	yes (KPMG)	Transition to IFRS: immature trees: DCF if market value is not available	100	6.5 % after-tax	future; inflation-adjusted by 2% pa.a	future; inflation-adjusted by 2% pa.a
29	**CMPC**	yes (PWC)	FV less harvesting costs and transfer expenses to the POS 2 categories: 1) new plantations/acq.: AC 2) immature trees: DCF incl. growth	Country- and species-specific: Chile: pine (24), eucalyptus (13) Argentina: pine (14) Brazil: eucalyptus (7)	Counry-specific: Chile 8% pa Argentina 11% pa Brazil 9% pa	future	future
30	**Arauco**	yes (PWC)	FV DCF (Distinguish between current and non-current BA depending on time until planned harvest)	Country- and species-specific: Chile: pine (24), eucalyptus (12) Argentina: pine (15), eucalyptus (10) Brazil: pine (15), eucalyptus (7)	Country-specific: Chile 8%, Argentina 12 % y Brasil 10 %.	constant prices are assumed (in real terms)	constant, based on estimates