

Forest Industry:

Application Review of IAS 41, Agriculture:
The Fair Value of Standing Timber

Forest, Paper & Packaging

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A photograph of three people playing in a field of autumn leaves. The scene is set outdoors with trees in the background. The ground is covered in fallen leaves, and many leaves are in the air, suggesting a playful activity like leaf-throwing. The people are dressed in casual, autumn-appropriate clothing. The overall atmosphere is joyful and seasonal.

Executive summary

The application of fair value to standing timber requires a considerable degree of judgment, and the presentation of this type of valuation is of growing interest, not only amongst preparers and investors with knowledge about the industry, but also on behalf of new investors, such as investment funds. Amongst preparers and investors there are major questions as to how the standard is being applied to forest assets.

In 2009, we published a first of its kind study on how fair value was being applied by forest owning companies applying IFRS. In this 2011 study, based on financial statements published during 2009 and 2010, we have updated our previous study. We have reviewed the manner in which fair value is being applied by the companies included in the 2009 study, and have added new companies who are early adopters based in regions migrating to IFRS. A few companies have been dropped as they no longer publish IFRS financial statements.

We have not included any timberland investment management organisations (TIMO) in the study. Although their financial statements are usually not publicly available we expect to include TIMOs in a coming update study.

This study aims to provide a follow up on the insights published in 2009 and to highlight certain observations on the difficulties, as well as similarities and differences. What it doesn't seek to do is pass judgment on how IAS 41 is being applied, although, that being said, it does aim to provide pointers as to what might be considered to comprise best practice in fair valuing forest assets and in providing disclosures on these valuations.

The study has shown that companies have different levels of transparency in their disclosures in their financial reports. This can be summarized in three different categories. In the first category, the companies present the complexity of various parameters but there is limited information regarding the effect on the valuation. The next level is to present more information on the effects of variations in key factors. The highest level of transparency is reached by companies who also discuss their assumptions on future prices and costs, as well as disclosing a sensitivity analysis with multiple parameters.

Based on our findings we encourage preparers to include a discussion on the fundamentals of the standing timber as an asset class and the starting point of any valuation exercise: the forest and harvest plans and the complexity of the structure of the asset, such as mix of species, age classes, pulp wood and saw timber and residuals. We encourage preparers to discuss expected future prices and costs development in order for the reader to understand the basis of the valuation and to include a discussion on when and how the values and cash flows are expected to be realised.

Last but not least, we strongly encourage preparers to increase the level of transparency and hence overall confidence in the balance sheet values ascribed to standing timber assets by including in the disclosures, a sensitivity analysis comprising each significant assumption used in the valuation that could have a significant influence on the value in case of a reasonable change, i.e. discount rate, prices, costs and growth. This is of importance especially in times of significant price fluctuations on the market and because changes in valuation assumptions can have a significant and variable impact on reported profits.



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Introduction



Forest owning companies applying international financial reporting standards (IFRS) all share the burden of estimating and recognising changes in the fair value of their standing timber and of disclosing information on significant assumptions. IAS 41, Agriculture, is very specific, and the standing timber valuation process includes several significant assumptions requiring considerable judgement. The presentation of the valuation, itself, tends to require careful consideration due to its inherent complexities and its sensitivity to relatively small changes in the applied assumptions.

In early 2009, PwC published the first of its kind study on the application of IAS 41. This 2009 study was mainly based on 2007 financial statements and focused on how forest owning companies presented and discussed their fair value accounting of standing timber. By studying the methods and assumptions applied by companies in the forest industry, the aim was to provide insight into the key judgments made by preparers from around the world. The study highlighted difficulties, as well as similarities and differences, in the application of IAS 41. The overall conclusion was that there was room for further improvement with regards to the level of transparency of critical valuation assumptions.

The 2011 study is providing an update of the 2009 study. We have not gained any new ground breaking knowledge on how the preparers are assessing fair values or how they present their considerations and disclosures in their financial statements. In many ways this update confirms the findings from the 2009 study.

Although the valuation of standing timber for financial reporting purposes may be considered to be a somewhat isolated issue, only affecting listed forest owning companies, it is apparent that other actors in the market have an increasing appetite for forest land and, consequently, an increasing need to understand and master the valuation of standing timber. Application of IAS 41 to standing timber should be understood together with IAS 1, Presentation of financial statements. The two standards represent the reporting framework which places tough requirements on transparency and disclosures on critical assumptions in financial statements.

What is the importance of this study at this time?

The application of IAS 1 and 41 on standing timber, including both valuation and presentation of e.g. significant assumptions, is of increasing importance to preparers and investors throughout the world:

Preparers and investors have expressed interest in the manner in which IAS 41 is applied in different geographies.

The forthcoming implementation of IFRS in various regions with major commercial forestry activities, such as the United States, Canada, Chile and Brazil, also calls for this follow up study.

Institutional investors are becoming increasingly attracted to forestland as an asset class, seeing such assets as offering the possibility of an alternative and sustainable long-term investment strategy.

Forestry is attracting new strategic investor interest as wood-based biomass is seen as a vital renewable energy resource.

An increased number of institutional investors, who are not familiar with the financial reporting framework related to standing timber, accentuate the need for relevant information in the financial statements of forest owning companies.

The fair value of standing timber could be very sensitive to small changes in key factors which, in turn, imply possibilities for significant effects to the financial statements. In Europe we have recently been through a period of significant turbulence in the industry and we have also seen significant movements in both pulp and saw timber prices.

Given this growing interest, and the results of the 2009 study, this follow-up study attempts to shed light on development over the last two years by reviewing the disclosures in IFRS-based financial reports of forest owners. The study also revisits conclusions reached in the 2009 study.

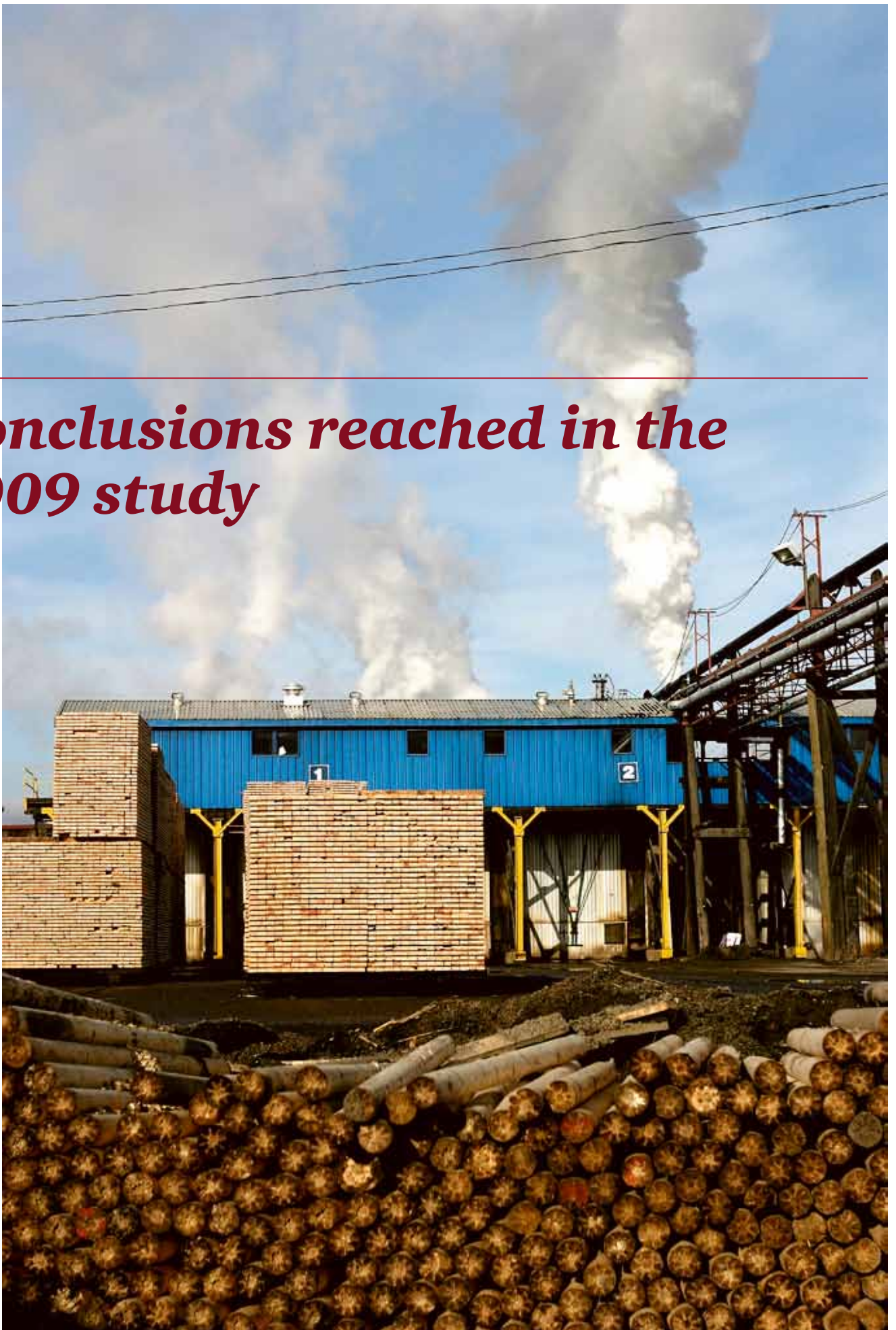


What did we do?

Our procedure has been to study the level of disclosed information in IFRS financial statements by performing a qualitative review of both the note on critical assumptions and estimates and the note on the valuation of biological assets. We have included 25 (19 in 2009) forest owning IFRS preparers based in Asia, Australia, Europe, South Africa and South America. We have included comments on standing timber provided in the MD&A and like. The procedure has also included the summary of significant accounting principles. Based on this qualitative analysis we have compared the level of transparency and have discussed significant observations related to current best practice.

We have tried to keep the list of companies from the 2009 study intact and have added companies from new regions allowing IFRS. We have dropped a few companies because they have withdrawn their IFRS financial statements from the web, and have added six new companies, including three Chilean companies.

Conclusions reached in the 2009 study



Our 2009 study highlighted many similarities as regards the manner in which the fair value provisions of IAS 41 were applied to standing timber, both within regions of broadly similar forestry regimes – managed natural and plantation – and also across regions. The study also highlighted certain differences. Above all, the study showed that a number of judgments are necessary to arrive at the fair value and that, often, further disclosure would be beneficial to users in understanding some of those key judgments.

In brief, the 2009 study evidenced: Reliable market-based prices for standing timber are rare. Of course, even where there are active markets, prices must be imputed from transaction prices which would normally also include the value of bare land. A common approach was, therefore, to use a standing volume method to value mature, or near mature, timber volumes at (imputed) current market prices. There is, however, limited disclosure as to how active markets have been assessed, including for example, limited information to provide an understanding of the degree of liquidity and the price ranges found in relevant/comparable market transactions.

A key conclusion from the 2009 study was that few of the companies applied market-based prices for standing timber. This suggested that markets in timberland assets are limited, at least in the geographic regions in which these companies hold their assets or in commercially-sized timber plots. Consequently, net present value arrived at by DCF-modelling was, by far, the most common method of determining fair value.

The 2009 study further showed that the most important assumptions applied in the DCF-modelling included harvesting plans, timber prices, forestry costs, growth rates, and the discount rate. Preparers used different approaches to determine these key assumptions. There were obvious differences, such as those due to geographic location, silvicultural practices, rotation periods and species, which drove different modelling assumptions; however, there were less obvious differences too, notably the use of current market price as compared to using imputed market price in estimating future timber prices.

IAS 41 requires fair value accounting for biological assets; hence, the reported value of standing timber should reflect fair value less estimated point-of-sale costs. IAS 41 allows for different methods in determining the fair value estimate: market value is preferred but if reliable market-based prices are not available, fair value is the present value of expected net cash flows from the asset discounted at a current market rate (the “discounted cash flows or DCF” method). In certain situations historical cost is an allowed treatment.

*The 2011 update study
– briefly described*



Two years have now passed since we undertook the 2009 study, and the update study has had three key objectives in focus, on which to gain insight:

- 1.** *Has there been any change in the application of the valuation methods or factors used in the cash flow model since our 2009 study?*
- 2.** *Are there significant differences in the value of standing timber among the companies?*
- 3.** *Is there a noticeable difference (i.e. positive or negative development) in the quality of the information disclosed on the value of standing timber?*

The update study is based on an analysis of the published financial statements (mainly 2009 or later) of companies applying IFRS in the reporting of their forests assets. The study covers 25 companies: nine from the Nordic region, six from the rest of Europe, three from Chile, four from South Africa, two from Australia and one from Malaysia¹⁾. The results are briefly summarised below. For a more in-depth analysis, please see the appendix.

Methods used to determine the fair value of forest assets

A key conclusion from our update study is that few of the companies studied have used market-based prices for standing timber. This suggests that markets in timberland assets are limited, at least in the geographic regions in which these companies hold their assets or in commercially-sized timber plots. Consequently, net present value arrived at by DCF-modelling is still, by far, the most common method of determining fair value. A few companies continue to apply multiple methods due to the nature of their various standings.

Discounted cash flow: 21 of the 25 of the companies (18 of 19 in 2009) apply this method, both for managed natural forests and plantations. The main reason stated for using discounted cash flow methods is the lack of active markets for large plots of forest land, implying a lack of reliable quoted market prices for standing timber.

Market value: Three companies (four in 2009) from South Africa and Europe (with standing timber in Africa and Central America), explicitly state that they apply reliable, market-based prices for plantations of certain species and qualities of standing timber. Our updated study shows that these are plantations with relatively short rotation periods, typically between 5-20 years. These plantations are classified as mature when they reach a certain stage in their rotation. The preparers have stated that this type of standing timber could be sold at reliable market prices.

Historical cost: Seven (seven in 2009) companies have stated that newly planted trees are carried at cost, which is deemed to be an indicator of their fair value. Additionally, cost is applied where there are no known reliable parameters, e.g. lack of known prices, growth rates or physical volumes. In both the update and 2009 study, one company, with natural tropical rain forest, concluded that cost represents the only option for certain areas with diverse indigenous species, where there are less well-known growth patterns and where there are no track records of reliable, quoted prices.

1) The Australian companies have applied the AASB 141, which is similar to IAS 41 as regards measurement and recognition at fair value.

Assumptions in applying fair value via DCF methods

The update study has confirmed the conclusion from our 2009 study that the most important assumptions used in the DCF-modelling include harvesting plans, timber prices, forestry costs, growth rates, and the discount rate. Preparers continue to use different approaches to determine these key assumptions. There are obvious differences such as differences due to geographic location, silvicultural practices, rotation periods and species which drive different modelling assumptions; however there are less obvious differences too, notably the basis of timber prices.



Timber price assumptions are fundamental in estimating fair value. The update study shows that some companies continue to base their assumptions on current market prices for timber, while others continue to use adjusted current market prices. It is notable that companies in the Nordic region use, in the main, imputed/adjusted price assumptions. To our understanding, this likely refers to the fact that trees in the Nordic regions, mainly natural forests, have considerably longer growth cycles compared to the plantation trees in the southern hemisphere and the adjustment is made to smooth out short-term volatility in the market prices for logs. For plantations in regions with faster rotation species, there appears to be less of a need for adjusted price assumptions, as current timber prices are considered sufficiently reliable for modelling fair values. However, an example to the contrary is the Chilean companies who are using imputed/adjusted price assumptions.

This said, the length of rotation period (and species diversification) does not entirely explain why some companies adjust current market prices for timber and others do not, as companies handle the price variable in differing manners within similar timber growing regions.

In 2010, one company stated that it revised the methodology for all immature and mature timber to be harvested in more than 12 months from the balance sheet date. Instead of using current market prices, the company now applies a 12 quarter rolling historical average price to this type of standing timber.

Concluding observations from the update study

Our update study has, in many ways, confirmed the findings from the 2009 study. The companies included in the study are using differing approaches to the application of the fair value requirements of IAS 41 to standing timber. There are also differing approaches related to the disclosure practices. Some companies make extensive disclosures, which supports transparency in the financial statements.

However, as noted in our 2009 study, often there is no discussion on the reasons behind a given, adopted fair valuation approach, implying that users may not appreciate the judgments and related uncertainties inherent in the valuation of forest assets. The update study has not identified a noticeable improvement in the overall quality of the disclosures and management's discussions on standing timber compared to the 2009 study.

It is clear, both from the update study and the 2009 study that the majority of preparers have concluded that active and transparent markets in timberlands are the exception, rather than the rule. Hence, the use of net present value/DCF methods is the prevailing method of determining fair value.

Our overall conclusion is that there is still room for further improvement with regard to the level of the transparency of critical valuation assumptions. This is especially true given that standing timber valuations are site specific. Generally, we would welcome an enhanced discussion on the price assumptions used in DCF calculations and a sensitivity analysis of the most significant assumptions driving that value.

Another conclusion is that few preparers have discussed alternative uses or changed mixes of use of their standing timber and the consequences this would have on the valuations. We had expected further evidence of energy wood impacting the valuations.

By comparing the 2009 or 2009/10 fiscal year-end estimated value of the standing timber per hectare of productive forest land, we have attempted to show how the value fluctuates among the companies. However, with few exceptions, the underlying fundamentals, such as geographical location, variations in species and annual yield, are not discussed in the financial statements. This implies that the low level of transparency makes any comparison between the companies in the study much more complicated.

Finally, with forests at the heart of climate change, some preparers already make reference to how climate change is affecting timber growth rates and, hence, valuation. Climate change is already driving changes in commercial forestry, for example, the increasing role of woody biomass as a renewable energy source. There are nascent markets in forest carbon credits which are seen as one way of monetising the environmental contribution of forests. These developments, and more, will impact upon forest valuation and, consequently, financial reporting. We would expect more disclosures on these developments in financial reports.

Where markets do exist, often they are restricted to smaller timberland plots, which are not on a scale that is of interest to strategic or financial investors and, hence, the community of IFRS preparers. A further condition of an active market is that items traded within the market are homogenous. This concept does not square readily with forest, as no two forest plots are the same. This said, the degree of similarity between same species short rotation plantation plots within a local region is far greater than in a managed natural forest. Hence, considerable judgement is required in determining what constitutes an active and transparent market.

Appendix

Introduction

Standing timber and recognition and measurement for financial reporting purposes is, in many cases, a difficult and time consuming exercise requiring various types of expertise on the assets, themselves, valuation techniques, and accounting standards. There are a few International Financial Reporting Standards covering issues related to standing timber. The most important standards are IAS 1, Presentation of Financial Statements and IAS 41, Agriculture.

IAS 41 prescribes the accounting treatment, financial statement presentation and disclosures related to standing timber and other biological assets. IAS 1 prescribes, among other things, disclosure requirements on sources of estimation uncertainty relevant to standing timber valuations.

IAS 41 prescribes the treatment for standing timber during its growth period, degeneration, production, and procreation and as regards the initial measurement as agricultural produce, i.e. harvested timber. There is a presumption that the fair value of standing timber can be reliably measured. For standing timber with no market-determined prices or values, and for which no alternative estimates are available, historical cost can be used, that is, until the fair value becomes measurable. Fair value is stated net of point-of-sale costs. During the period of growth, any change in the fair value should be recognised through comprehensive income and should be included in the profit and loss of the period in which it arises. IAS 41 does not prescribe a valuation method; each preparer must determine the valuation approach which is most representative for its standing timber.

If market-determined prices or values are available, it may be reasonable to expect preparers to apply these to estimate the value of their own standing volume. However, almost all preparers claim that in most circumstances no such active markets are available to provide prices or values for standing timber. Without access to reliable market prices, a preparer is required to apply valuation techniques, typically discounted cash flows to achieve a net present value, requiring that management make judgments about, amongst other things, selling prices, costs and discount rates.

Valuation techniques, per se, and standing timber, in particular, require the preparer to make several critical assumptions and estimates. This circumstance could, in certain cases, require a discussion on estimation uncertainty and disclosures if there is a significant risk of material adjustment to the carrying value.

The 2009 study included 19 companies and evidenced that the single most used valuation method was the DCF-model. This type of model requires critical estimates and assumptions regarding amongst other things:

- future selling prices and harvestable volumes,
- forestry-related factors, such as silviculture costs and growth rates and effects of infestations and fires,
- harvesting costs and
- discount rates

This type of assumption and estimate is of key importance in determining the fair value of the standing timber at any given balance sheet date. A small adjustment in any assumption could lead to significant change in the estimated value of the standing timber.

Our 2011 study includes 25 forest owning IFRS preparers in the forest, paper and packaging industry. Our main purpose has been to provide a summary of how standing timber is valued and how that value is actually derived and to make a comparison with our 2009 study. The main questions we have sought to address are:

- Are there any changes in the application of valuation method and parameters used in the cash flow model since our previous report?
- Are there significant differences in the forest value among the companies?
- Are preparers disclosing sufficient information with an adequate level of transparency to help the reader develop an understanding as to how the valuation has been derived and as regards the assumptions the company has made.

The following forest owning companies have been included:

Home country	Company	Forest land in '000 Ha	Location of main forests
Portugal	Portucel Soporcel	120	Portugal
Portugal	Altri	82	Portugal
Switzerland	Precious Woods	1 096	Brazil, Costa Rica, Gabon, Nicaragua,
Sweden	Kinnevik	15	Sweden
Sweden	Holmen	1 032	Sweden
Sweden	SCA	2 600	Sweden
Sweden	Sveaskog	4 300	Sweden
Sweden	Södra	26	Sweden, the Baltics
Finland	Metsäliitto Group	Not published	Finland
Finland	Stora Enso	114	Brazil, Finland, Sweden, Uruguay
Finland	UPM-Kymmene	1 200	Finland, Uruguay, USA
Finland	Tornator	614	Estonia, Finland, Romania
Ireland	Smurfit Kappa	105	Colombia, Venezuela
Norway	Green Resources	14	Mozambique, Republic of Sudan, Tanzania, Uganda
France	Lecta	Not published	Not published
South Africa	York	61	South Africa
South Africa	Mondi	2 440	Russia, South Africa
South Africa	Safcol	141	South Africa
South Africa	Sappi	555	South Africa
Chile	CMPC	646	Argentina, Brazil, Chile
Chile	Arauco	1 611	Argentina, Brazil, Chile, Uruguay
Chile	Masisa	243	Argentina, Brazil, Chile, Venezuela
Malaysia	Samling Global	43	China, Malaysia, New Zealand
Australia	Gunns	210	Australia
Australia	Wilmott Forests	1,3	Australia

Details from our study

In the following sections, we highlight significant observations related to the valuation methods and assumptions applied. The appendix is structured into two main sections:

- The discounted cash flow model and disclosed parameters
- Perspectives on cash flow parameters

Our analyses focus on the level of transparency in the disclosed information and if this information is sufficient to enable a reader to develop an understanding of how the valuation is performed and of the assumptions and estimates the company has made.

The Discounted cash flow model and disclosed parameters **Discounted cash flow**

The companies in both of our studies are applying IAS 41 or AASB 141 using three different methods for valuation of the standing timber; discounted cash-flow (of expected or current log prices), historical cost (of newly planted trees), and market value (of trees approaching harvest age at current market prices). Certain companies are using multiple methods depending on their forest configurations.

In this update study, 21 out of 25 companies (18 out of 19 in 2009) use the discounted cash flow method, making it the far most common method applied. Consequently, this report will focus on the implications of the cash flow-method, and for further information regarding cost- and market value methods, we refer to the previous report. The update study has confirmed that a few companies apply multiple methods (DCF and historical cost) due to the nature of their standings.

Even though the DCF-model is used instead of the market value, which is preferred by IAS 41, it is clear that not all companies disclose their reasons for using the DCF method. The most common reason described for applying the net present value of standing timber is the lack of active markets with available and reliable market prices for large plots of standing timber. Many companies have concluded that the only realistic option is to use DCF-methods applied to log prices. As the company SCA²⁾ puts it, “Since a market price or other comparable value does not exist for assets the size of our company, the biological assets, that is standing timber, are valued at the value of anticipated future cash flows”.

The effect of chosen assumptions

Any valuation of standing timber is based on a number of assumptions and estimates; some are more difficult than others to prepare. Not all assumptions are mandatory to disclose for financial reporting purposes, but it is recommended to keep in mind the complexity of a valuation when reading the significantly condensed detail in an annual report. A valuation based on discounted cash flow includes several difficult assessments due to the basic characteristics of growing trees. The foundations of a standing timber DCF-valuation is based on management’s knowledge of the physical structure of the asset class and on management’s intentions as evidenced by the harvest plan.

- The structure of the standings refers to basic facts and circumstances vital to the calculation of the value, such as information concerning the mix of species and related growth patterns, age classes or structures, and yield due to soil conditions for different geographical locations.
- The harvest plan, which is the key to the valuation, covers one cycle or rotation period for each species. The plan is the instrument in which management summarises its ideas on what, where, when and which volume of timber will be subject to thinning and final felling in the immediate future. The plan also includes management’s best estimate on growth and harvesting activities following the initial plan period as regards the entire population of standing timber, during one complete rotation period.

The reader is reminded that one rotation period varies with geographical location, specie and the intention with the standing timber and could cover

anything between seven years for certain species of eucalyptus located in the southern hemisphere, to well above one hundred years for slow growing pine and spruce located in boreal forests.

Other significant assumptions in a DCF-valuation, which are based on management's best estimates, are the current and future selling prices of different species and qualities for differing purposes, i.e. pulpwood or saw timber, and residuals for energy production. It is a difficult task to assess future prices for a given rotation period with a realistic level of reliability. However, it appears to be a common practice to use current log prices and build estimates of future prices for the immediate future and, then, extrapolate the price assumption for the entire rotation period based on an assumption of long-term inflation. The selling price assumption is of absolute key importance to the valuation.

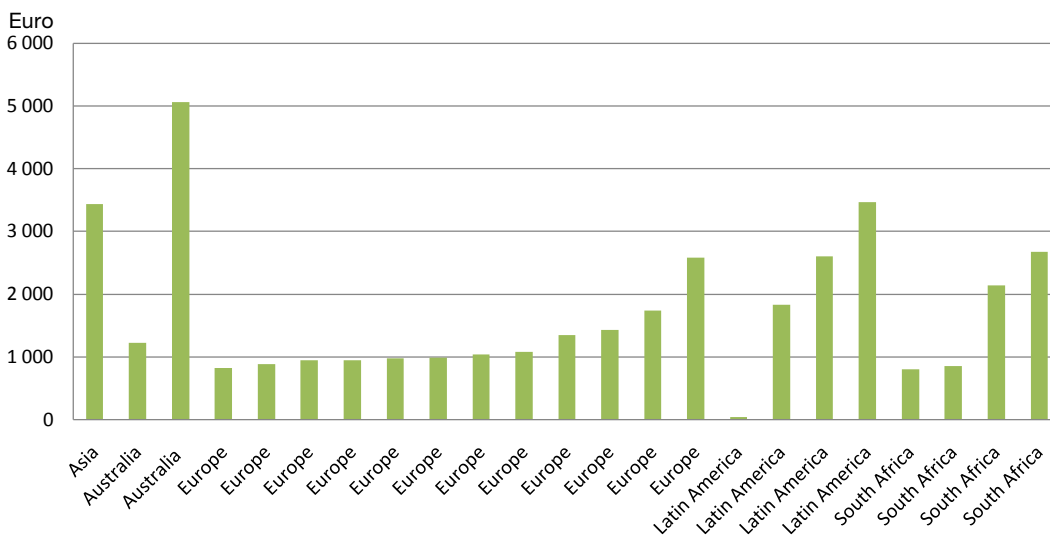
Harvest or logging costs are also of key importance to the valuation. It appears as if preparers treat logging costs very much in the same manner as selling price, i.e. to use current logging cost and build an estimate for the immediate future and, then, extrapolate for the entire rotation period based on an estimate of the long-term inflation.

Other assumptions, which are equally difficult to estimate in terms of volume and growth, selling price and logging costs, refer to basic forestry management, such as silvicultural activities (land preparation, nursing seedlings, planting, thinning, fertilizing, protecting from animals and insects, etc). These assumptions do not appear to be equally important as the previously referred to assumptions, i.e. small changes in any of these assumptions do not tend to have profound effects on the value of the standing timber.

In the 2009 study, it was concluded that several assumptions had to be taken into consideration when applying the DCF valuation model, e.g. growth rate, discount rate, prices and costs. It was also concluded that the level of transparency and disclosure on the most critical assumptions, and also a deeper discussion on the fundamentals behind the valuation process, could, generally, be very significantly improved. The update study has not revealed any change as regards assumptions used to prepare estimates or general level of transparency.

By comparing the 2009 or 2009/10 fiscal year-end estimated value of the standing timber per hectare of productive forest land we have tried to get an indication on how the value fluctuates amongst the companies. The table below represents a crude estimate and has been prepared based on the carrying value in Euro of standing timber divided by the number of hectares of productive forest land for each company who publishes its hectareage (23 of 25). The data is group by each company's domicile.

Table 2
Fair value of standing timber per hector



It should be noted that the illustrated values are based on several critical assumptions and estimates that are not clearly visible to the reader. It should also be noted that, with few exceptions, the underlying fundamentals, such as geographical location, variations in species and annual yield are not discussed in the financial statements. The low level of transparency makes any comparison between the companies in the study much more complicated.

From the table it is clear that the European companies have presented rather similar values on their standing timber. This is probably attributable to the fact that the majority of the standing timber is located in the Nordic region which implies similarities in terms of the standard of the standings and forestry practice, climate and variations in species, etc.

However, looking at Africa and Australia, it is clear that reported values vary considerably between the companies. There is no conclusive evidence of these variations from the financial statements. The fact that there are limited possibilities for a reader to understand the underlying reasons indicates that critical assumptions and significant basic preconditions, such as the capability of the forest land, chosen species, and forestry practice to generate biological transformation (growth in fiber volume), should be discussed more broadly and in greater depth as a compliment to the basic disclosure requirements in any accounting standards.

Another observation is that no information is included in the financial statements as to when these values and the cash flows assuming to apply to the asset class will be, or are, expected to be realised, and in what manner. Such information would increase the reader's possibility of understanding the valuation presented.

But what is good information and what is considered to be a reasonable level of transparency for interested readers? These issues are addressed in the following sections.



Perspectives on Cash Flow Parameters

Application of DCF-models requires management to make several important assumptions for use in their calculation of the fair value of forest assets. The basic systems, such as software support related to the control and monitoring of the standing timber volume at various locations as at balance sheet date and regarding harvested volumes for different age classes and species during the period, are, indeed, of vital importance to management in establishing a reliable estimate of fair value. The integrity of the DCF-model is, itself, also of fundamental importance and, based on our experience, the use of spreadsheet software is widespread. The models applied vary and the companies using DCF employ differing assumptions for similar variables. Similarities and differences in the following key variables are described below: Formula, Harvest plans, Growth, Selling prices, Costs and Discount rate.

Formula

All companies in our update study applying DCF-modelling (21 of 25) have based their assessments on four significant types of variables. These variables do not change compared to the variables observed in the 2009 study. However, the assumptions and conditions underlying certain of these variables differ and are discussed below.

- Expected income at harvest: volume * growth rate * price/unit of volume
- Expected costs during growth: silvicultural, maintenance and thinning, etc.
- Expected point-of-sale cost: harvesting, transport to market, etc.
- Discount rate: cost of capital for standing timber as an asset class

Disclosed information

Six companies do not disclose critical assumptions and estimates separately in the financial statements. These companies have recognised carrying values relating to biological assets ranging from EUR 0.3 million to EUR 300 million. This implies that standing timber has significant values in the balance sheet for at least some of the companies.

Of the 19 companies presenting disclosures, including critical assumptions and estimates, only 15 state that the valuation of the standing timber asset is an important item. These companies have recognised significant carrying values in the balance sheet associated with their standing timber assets.

The most commonly presented assumptions are discount rates, selling prices and costs. However, harvesting plans and estimated growth rates vital to the valuation are not as commonly presented. These observations are the same as those made in our 2009 study.

It is also noted that eight or ready one third companies do not disclose any information on their price assumptions, which is one of the most critical assumptions in a standing timber DCF-valuation.

Harvest plans

Harvest plans can be perceived as the heart of the modelling. The harvest plan includes planned volumes to be harvested (both thinning and clear felling) over a foreseeable future and extrapolations of the remaining volumes expected to be harvested. The plan typically includes one complete cycle from seedlings to harvested trees, although for short rotation plantations, the plan may cover more than one rotation when trees are left to regenerate naturally after the first felling. The companies' rotation periods vary from 10 to 100 years, where the Nordic and European countries tend to have longer cycles due to the species of forest. The harvest plan is, in turn, based on assumptions about growth rates and the expected yield due to soil conditions etc. Companies in the Nordic region often refer to the harvesting or felling plan as the basis of assessing the volumes that can be harvested each year during the forecast period.

Surprisingly, even though the key to determining the harvesting plan is the rotation period, 11 out of 25 companies do not present any information regarding the production cycle. The companies who present this information are mainly companies located in the Nordic region, with a few exceptions. A longer time horizon implies that it is reasonable to assume an increasing level of difficulty in assessing the reasonableness of the harvest plan. A shorter time horizon implies, instead, that it could be more reasonable to expect such a harvest plan proves to be true for the forecast period in question. Regardless of the length of the period, the importance of the harvest plan calls for better information about the plan and its implications in terms of the DCF valuation.



Growth

Growth, i.e. the increase in volume through biological transformation during a given period of time, is essential to the fair value calculation. For any species of tree, growth is dependent upon general climate conditions, soil, silvicultural practice, and quality of genetic material. However, management must perform a series of qualified judgments, assessments and field studies. Sometimes external specialists are engaged to establish growth rates during one cycle for various species, taking into consideration local conditions. Without growth rates, it is not possible to apply DCF-modelling based on future growth until harvest. Assumptions of growth, the need for reforestation, and related thinnings are estimated in the harvesting plan.

A common means of describing the implications of growth assumptions is to disclose that it is difficult to determine growth, but not difficult to determine the actual assumptions undertaken. For example, as one company discloses; *“A major consideration is the estimation of future growth. The inputs to our growth model are complex and involve estimations, all of which are updated regularly.”* This is, of course, not particularly helpful to the reader who wants to understand the underlying facts and circumstances.

A different example from our update study is Wilmott³⁾ who has presented assumptions with a high level of transparency regarding growth and harvestable volumes. In its 2009 financial statements Wilmott states; *“Through consultation with industry experts, the Parent Entity has estimated that each hectare of forest plantation will generate over its 25 year life cycle an average of 539 m³ of timber. This yield results from appropriate silvicultural techniques and assumption that thinning of the plantation will occur at years 13, 18 and clear fell at year 25”.*

Another example on transparency is SCA⁴⁾ that describes growth assumptions as; *“Growth amounts to approximately 3.9 m³ per hectare and year. Felling in 2009 amounted to approximately 4.0 million m³. Approximately 50% of the holdings comprise forest less than 40 years old while about 60% of timber volume is in forests that are more than 80 years old”.*

A limited number of companies in the update study analysis present a sensitivity analysis including growth. This might depend on the fact that growth can be historically derived with a greater degree of accuracy than, for example, future prices. In any case, a sensitivity analysis is a good instrument to describe and discuss implications of significant uncertainty.

The 2009 study addressed the manner in which companies estimate and calibrate their growth assumptions. The update study has not revealed any new information on this issue. The reader interested in this particular subject is recommended to look at the discussion in the 2009 study.

Timber Prices

Timber i.e. log, prices, are key and can be difficult to determine sometimes. The update study confirms the observation made in the 2009 study that companies, rather than using current market prices for logs, often apply averaged prices based on price trend data that is periodically updated. Hence, the actual prices used in models may be higher or lower than the prevailing log prices. Inflation is considered in some cases, but not in all. The update study includes 15 companies applying DCF-modelling based on expected future log prices and six companies applying current market prices. In the 2009 study, nine applied

expected future prices and eight applied current prices. The observation in our update study could be seen as an identification of a trend towards applying expected prices for the companies recently adapting IFRS.

The update study confirms another observation made in the 2009 study, at that time labelled as a general rule: the longer the growth cycle, the greater the tendency to use modelled log prices to smooth out short-term price movements over typically longer forecast periods.

Regardless of whether or not current log prices are modelled, they would seem to be referenced into the assessment process on price assumptions in all cases. Log pricing is, therefore, a key area of management judgment, supplemented sometimes with the help of independent forestry experts.

The difficulty in determining future timber prices is mainly related to the general fluctuations of log prices in the market (covering different geographies) for various species and quality of the timber. In the update study many companies disclose that they use professional valuation companies and that they make a “careful judgment” or that timber prices are “updated periodically” when determining future prices included in the model. Hence, there is limited information regarding the actual assumptions made and, as noted above, eight companies do not include any information on their price assumptions. There may be several reasons explaining the lack of transparency on this critical assumption. A rather obvious reason may be the complexity in presentation. Several species and age classes, harvested for varying purposes, could lead to a quite lengthy discussion on price without helping the reader with the task of understanding how management have formed their judgments.

The update study has concluded that there are only a few companies who stand out in their presentation of assumptions regarding timber prices.

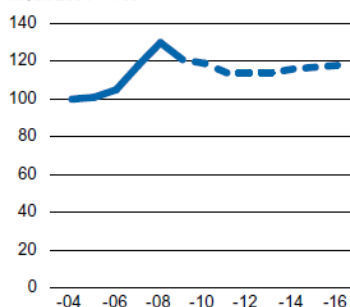
Given the nature of the log price assumption effect on the valuation, we highlight some of the disclosures made by Nordic-based companies. These companies present their views about the future development of prices in a manner that could serve as a good example for other preparers with ambitions to develop their presentations.

Holmen⁵⁾ has included a graphic illustrating the adjusted price curve and trend price, as well as the estimated cash-flow effects for the expected price-inflated, ten-year period. At the end of 2009 Holmen has made the assumption that “prices will decrease in 2011 and thereafter increase 1 % per year until 2035 and thereafter by 2%”.

Table 3

**Average price
Historical and forecast**

Index 2004 = 100



Two other illustrative examples are taken from Green Resources and Safcol

—————
Historical price increase

- - - - -
Forecasted price increase

5) Holmen – Sweden, 2009 Annual report, p 72.

Green Resources⁶⁾:

The future wood prices have been modeled based on sales to three different markets; the domestic (Tanzania, Uganda or Mozambique), East African and Export prices. The price forecasts have two components. Firstly, three scenarios are considered, Low, Medium and High. For Tanzania and Mozambique, a 20%/60%/20% probability distribution has been employed. For Uganda, the corresponding figures are 20%/70%/10%, because the Ugandan prices are already comparatively higher. The Low scenario assumes 0% growth, Medium scenario 5% growth and the High scenario 8-9% annual growth in nominal prices. Secondly, wood prices have been modeled with reference to a given mix between domestic sales, East African sales and Export out of the region. The applied market mix is 40%/30%/30% between domestic, East Africa and Export for Tanzania/ Mozambique and 40%/40%/20% for Uganda.

Safcol⁷⁾

The market prices per cubic metre are based on market expectations per log class. The 2010 financial results include a R342,6 million decrease in the fair value of the biological assets (2009: R757,9 million increase). The decrease is driven mainly by price assumptions utilised in the fair value model and the increase in the discount rate. The weighted average prices used during the year under review were lower than the prior year, due to adverse changes in the market.

For regions with much shorter growth cycles, there is, perhaps, seen to be less of a need to adjust current log prices, as these are deemed to be sufficiently reliable for financial reporting purposes. However, one company, based in South Africa, has revised its pricing methodology during 2010 for immature and mature timber to be harvested in more than 12 months from balance sheet date. Instead of using current market prices, the company now applies a 12 quarter rolling historical average price to this type of standing timber.

Our update study shows that it is only a xx of reporters who make disclosures about assumptions on future prices are. This observation confirms the 2009 study. However, several companies include timber prices as a parameter in their sensitivity analysis of the value of their standing timber. As it is difficult to determine future prices, it is reasonable to expect preparers to include a thorough discussion on the subject. Unfortunately this is not the case in current practice. We would expect readers to ask for better information and, at least, demand a sensitivity analysis on the price assumption, together with a discussion on management's thoughts on the robustness of the price assumption applied. We would also expect readers to require better information on actual outcomes and any necessary subsequent adjustments to the price modelling used.

Forestry costs

The update study confirms the observations made in our 2009 study regarding forestry costs. Expenses related to various inputs in the forest management activities, are an important factor in the presented valuation models. Throughout the forest cycle, including land preparation, nursing seedlings, planting, thinning, fertilizing, protecting from animals and insects, harvest and so on, various activities are required to be performed, and the resultant costs can vary considerably between species, geographies, and over time. Not surprisingly, the costs included in DCF-models are similar to those discussed in the 2009 report:

- Felling costs.
- Silvicultural costs (including fertilizing).
- Point-of-sale costs, including all costs that would be necessary to incur in order to sell the harvested timber; certain companies include, and others exclude, costs necessary to transport the assets to market.
- Costs incurred to protect from natural hazards, such as fires and hurricanes as included in the calculations by the companies included in our study.
- Statutory replanting (Nordic region but also others).

The majority of companies disclose the type of costs included in the model. However, only 15 out of 25 companies disclose the basis of the cost calculation. The update study shows that companies

presenting transparent information about prices also tend to be transparent on their costs. Ten out of fifteen companies, mainly based in the Nordic region, use current cost levels and assume cost increases during the forecast period to determine the cost parameter through the rotation period. Three out of fifteen use current prices and the remaining two base their valuation on historical costs.

A couple of companies assume similar future increases in both timber prices and costs. For example, Södra⁸⁾ states (translated) “*expected development in timber prices and costs are assumed to be 2 % per year*”. It could be reasonable to assume similar future trends in both costs and prices if the production cycle is longer. However, this assumption should be subject to historical validation and subsequent calibration. Facts and circumstances tend to shift over time, and local preconditions can change very quickly due to e.g. migration or urbanization, shifts in available techniques or increased mechanization, changed trade patterns or changed rules and regulations on import and export.

The update study shows that the majority of reporters disclose information on cost but that only a minority subject their key cost in a sensitivity analysis. We consider information to be insightful to timber.

Discount Rate

The companies in this update study are based, or have forest assets, in Africa, Australia, Asia, Europe and Latin. Some of these companies are forestland owners only, others are agricultural companies, and others, again, are integrated forest product companies. Hence, it is reasonable to expect varying discount rates throughout this diverse group of companies.

The update study confirms that the discount rate is the most commonly presented parameter in the disclosures associated with the valuation of standing timber. The discount rate is one of the single most significant factors, and even a small change in the applied rate can have significant effects on the valuation. Surprisingly, eleven out of the 25 companies (nine out of 18 in 2009) applying the DCF-method do not present information regarding the level of the discount rate. This makes it unnecessarily difficult to analyse the effect of alternative risk assessments, etc. and, thereby, to understand the valuation. For the 14 companies disclosing the discount rates applied, the variations between regions can be seen as follows:

2011 Study			2009 Study		
Forests in region	Pre-tax rate	After-tax rate	Forests in region	Pre-tax rate	After-tax rate
Nordic Region			Nordic Region		
2 companies	6,25 - 7,50%		1 company	7.50 %	
4 companies		5.50 – 6.25 %	3 companies		5.50 – 6.25 %
Australia			Australia		
1 company	13,5%		2 companies	12.00 – 17.50%	
1 company	9.00% Real rate		1 company	10.00% Real rate	
South Africa			South Africa		
1 company	12,3%		1 company	Yes	
Asia			Eastern Africa		
1 company	7,25 – 10,2%		1 company	12.00%	
Other Europe			Central America		
1 company	5,5%		1 company	10.87 %	
1 company	11%				
1 company	12 %				
South America					
1 company	8-12 %				

8) Södra – Sweden, 2009 Annual report, p 36.

An observation, comparing the update study with the 2009 study, is that the variations noted in the 2009 study between regions still apply and that after-tax rates are used only in the Nordic region.

The discount rate used varies from applying a company's overall weighted average cost of capital (WACC) to differentiated rates for individual plantations. The majority of companies apply pre-tax cash flows and pre-tax discount rates; still a few companies apply after-tax discount rates and it is presumed these are applied to after-tax cash-flows. From the perspective of the companies, it seems appropriate to use different discount rates for different forest assets located in different regions with varying risks, and five companies have disclosed discount rates for various regions. According to the update study, this type of information is not commonly presented, but there are a few interesting examples, such as Arauco, Samling Global, Södra and UPM, who all own forests in different regions and, therefore, present different discount rates depending on the location of their forests. Holmen⁹⁾ is another interesting example on how the elements of the discount rate can be described; "[the] discount rate is calculated on the basis of the Group's target for debt/equity (0,55), long term nominal risk free interest rate of 4,5 %, risk premium of 1 % of borrowed capital and 2 % for equity". This kind of information increases the level of transparency in terms of the calculation of the discount rate.

One way of presenting the effect of the chosen discount rate is to provide the reader with a sensitivity analysis. Of the 14 companies presenting the discount rate as a significant assumption, ten companies present a sensitivity analysis. We can only encourage the remaining 15 companies included in our update study to do the same.

Concluding remarks on assumptions and cash flow valuations

Valuation of standing timber is a truly complex exercise requiring management's deep knowledge of the structure of the asset class, and that it makes several assumptions on how the standing timber will transform in the future during one rotation period (forest plan). Management is also required to develop a detailed plan based on several assumptions, covering one rotation period, as to when the standing timber will be harvested and for what purpose (harvest plan). i.e. what portions of the expected volumes to be harvested will

be used as saw timber, pulp wood or as bio mass. Finally, management must make assumptions which are subject to disclosure requirements, such as selling price, logging costs, silvicultural costs etc. for one rotation period, and must relate these assumptions to the activities in the forest and harvest plan, assumptions that are difficult to assess and which appear to be sensitive to disclose and discuss.

Both the update study and the 2009 study have shown that current practice generally implies that IFRS financial statements do not include a discussion on either the forest plan or the harvest plan and that several critical assumptions and estimates are not discussed. Consequently, we have to conclude, once again, that there is room for improvement. A preparer wishing to communicate to its readers on the dynamics and sensitivity inherent in its DCF of standing timber should try to discuss the asset based on a more holistic perspective. Such a perspective has the potential to increase reader's possibility understanding of the basis of the valuation.

Another improvement we would like to encourage preparers to consider refers to the current lack of information on when the values assumed to belong to the asset class will be, or are expected to be, realised and in what manner. We believe such information will increase the reader's possibility to understand management's view on the standing timber and also to better understand what it will take the company to realise the values and related cash flows. The easiest way for any preparer to provide its readers with transparent information on the critical assumptions used, and possible effects related to, a reasonable change in the assumptions applied is to undertake a sensitivity analysis. Five out of 25 companies in our update study have disclosed a sensitivity analysis based on variations in several important parameters. Three illustrative examples are disclosed below; Södra, Precious Woods and Sappi.

Södra¹⁰⁾

The following sensitivity analysis shows how the value of standing timber would be affected if the key valuation parameters were attributed other values than those that form the basis of the current valuation.

Variabel	Change	Change in value after tax, SEK million
Discount rate	+/- 0.25%	+/- 25
Wood price	+/- 0.5% in real terms	+/- 5
Harvesting costs	+/- 0.5% in real terms	+/- 3
Harvesting volumes	+/- 1%	+/- 2

Precious Woods¹¹⁾

And as Precious Woods¹¹⁾ puts it "A decrease of the interest rate of 1% would result in an increase in the fair value of the biological assets of USD 6.6 million whereas an increase of 1% would decrease the fair value by USD 5.8 million. An increase in the prices by 10% would lead to an increase in the fair value of the biological assets by USD 8.1 million. A decrease in the prices by 10% would result in a decrease by USD 8.1 million."

Sappi¹²⁾

Changes in estimate prices, the discount rate, costs to sell and, volume and growth assumptions applied in the valuation of immature timber may impact the calculated fair value as tabled below:

US\$ Million	2010	2009	2008
Market price changes			
1% increase in market prices	2	12	17
1% decrease in market prices	(2)	(12)	(17)
Discount rate (for immature timber)			
1% increase rate	(5)	(3)	(4)
1% decrease rate	5	3	4
Volume assumption			
1% increase in estimate of volume	9	6	6
1% decrease in estimate of volume	(9)	(6)	(6)
Costs to sell			
1% increase in costs to sell	(1)	(9)	(10)
1% decrease in costs to sell	1	9	10
Growth assumptions			
1% increase in rate of growth	2	1	1
1% decrease in rate of growth	(2)	(1)	(1)

10) Södra – Sweden, 2009 Annual report, p 36.

11) Precious Woods – Switzerland, 2009 Annual report, p 54.

12) Sappi – South Africa, 2010 Annual report, p 116.

Summary

Our 2011 update study, based on the 2009 and 2009/10 annual financial statements, shows that there is no significant noticeable change compared to our 2009 study in the application of IAS 41 at a global level. The additional companies included in the 2011 update study appear to apply the DCF valuation methodology in a similar manner as the other companies and have also used the same type of parameters. The new IAS 41 applicators have also used the same type of arguments to support the use of DCF modelling. Therefore, the main conclusions reached in our 2011 update study are very similar to the conclusions reached in the 2009 study.

- Active markets, to the extent they exist and are relevant to valuing standing timber for IFRS purposes, appear limited to faster rotation plantation stands, where one would expect a high degree of species homogeneity and hence comparability with other stands. This questions whether the active market criteria can ever have any relevance other than for shorter rotation plantation stands. It could also be questioned if IAS 41 is really relevant in this respect and if it is not time to ask for guidance on how the price factor should be established in this type of situation.
- The overwhelming majority of valuations must be site specific and for which a net present value of discounted cash flows is deemed the best measure of fair value. Significant management judgment is needed in applying this method requiring significant disclosures regarding the many valuation critical factors.
- Although other assumptions are important, the most critical to the DCF-based valuation generally seem to be growth rates, log prices, harvest costs and discount rates. There would appear to be some variations, also, in the type of costs that are included, but the significance of these variations is difficult to judge.
- Surprisingly, many companies lack information regarding the rotation period, even though this information is key to determining the harvesting plan.
- Growth factors are critical. Broadly, the sensitivity of the valuation to changes in growth factors increases as the growth cycle for standing timber reduces. However, disclosures of growth assumptions and the variables that have caused, or might cause, them to change are often limited.
- Log price assumptions have a major impact on valuation. The broad conclusion is that the trend is moving towards using modelled prices, in which we see a need for additional disclosure on the assumptions the companies undertake concerning the future development of the prices. This applies particularly when taking current price fluctuations into consideration.
- The base for costs in the model varies between the companies; both current and historical costs are used, as well as assuming the same increase as for modelled prices.
- Discount rates. Valuation is highly sensitive to this assumption and considerations as to the choice of discount rate are not unique to fair valuing standing timber. What is noteworthy is that the discount rate is often not disclosed. However, in those cases where the interest rate is disclosed, it is not uncommon to provide a sensitivity analysis applying different interest rates.
- None of the companies included in the update study has discussed its valuation in the light of alternative uses of the standing timber, and not one single company has included differing perspectives, such as forest values and carbon sinking.
- By comparing the 2009 or 2009/10 fiscal year-end estimated value of the standing timber per hectare of productive forest land, we have tried to show how the value fluctuates among the companies. However, with few exceptions, the underlying fundamentals, such as geographical location, variations in species and annual yield, are not discussed in the financial statements. This means that the low level of transparency makes any comparison between the companies in the study much more complicated.

The study has shown that the companies have different levels of transparency in their disclosures in the financial reports. This can be summarized in three different categories. In the first category, the companies present the complexity of various parameters but there is limited information regarding the effect on the valuation. The next level is to present more information on the effects of variations in, for example, prices and interests and, in some cases, discloses a sensitivity analysis. The highest level of transparency is reached by the companies also discussing their assumptions about future development in prices and costs, as well as disclosing a sensitivity analysis with multiple parameters.

In order to achieve a high level of transparency, we suggest that the preparer include a discussion on the fundamentals of the standing timber as an asset class and the starting point of any valua-

tion exercise: the forest and harvest plans and the complexity of the structure of the asset, such as mix of species, age classes, pulp wood and saw timber and residuals. We suggest that the preparer disclose the assumptions used and estimates made in the valuation and provide explanations as to why it is difficult to make those assumptions. We also encourage the preparer to elaborate on its reflections concerning expected future prices and costs developments in order for the reader to understand the assumptions and the basis of the valuation. This is of importance especially in times of significant price fluctuations on the market and also because changes in valuation communications can have significant and variable impact on the bottom line. We encourage preparers to consider including a discussion on when and how the values and related cash flows are expected to be realised. Last but not least, we strongly encourage

preparers to increase the level of transparency and hence overall confidence in the balance sheet values ascribed to standing timber assets by including in the disclosures, a sensitivity analysis comprising each significant assumption used in the valuation that could have a significant influence on the value in case of a reasonable change, i.e. discount rate, prices, costs and growth. This is of importance especially in times of significant price fluctuations on the market and because changes in valuation assumptions can have a significant and variable impact on reported profits.



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