

Discussion Paper No. 100

**INTERNATIONALISATION AND THE
VALUATION OF FOREST ASSETS**

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and
Bert Willemse**

November 2004

* This paper is dedicated to Bert Willemse who was tragically killed in climbing accident in Mt Cook National Park in January, 2000.

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Abstract

The paper looks at the implications of internationalisation of forest ownership on forest valuation. With an increase in the international diversity of forest owners questions are raised about the effect that this has on the methods used to value forests and whether there are substantive differences due to the nationality of the owner. A survey of 30 commercial forest owners in New Zealand and 27 commercial forest owners in Australia was carried out. The survey looked at factors such as the legal structure of the owner, whether it was involved in only forest ownership or forest ownership and wood processing, countries in which forest are owned, main species, predominant age class distribution and target rotation age of forests, and valuation method currently used. The results show that there are substantial differences in how forests are valued in either country, but also that these differences do not appear to be linked to the nationality of the owner.

Keywords: Forest valuation, forest asset values

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1. Introduction

This study emerged from an interest in the increasing trend in globalisation of forest ownership in New Zealand during the 1990's and the effect this might have on forest valuation. In New Zealand, as a result of a change in government policy in 1984, ownership of plantation forests went from being 53% state-owned in 1984 (MoF 1993) to 3% in 1999 (Table 1). As can be seen in Table 1, in this process, the number and variety of owners expanded, particularly in terms of overseas ownership and greater range of ownership structures.

Table 1
Forest Ownership as at June 1999

Owner/Manager	Area (hectares)	Percentage of total area
Carter Holt Harvey	325 000	18.4
Fletcher Challenge Forests	288 000	16.3
Rayonier New Zealand	105 000	5.9
Weyerhaeuser New Zealand	64 000	3.6
Juken Nissho	54 000	3.1
Earnslaw One	46 000	2.6
Crown Leases	43 000	2.4
Pan Pac Forest Products	28 000	1.6
Timberlands West Coast	28 000	1.6
Wenita Forest Products	25 000	1.4
Hikurangi Forest Farms	25 000	1.4
Crown Forestry Management	24 000	1.4
Forest Enterprises	21 000	1.2
Roger Dickie New Zealand	20 000	1.1
Evergreen Forests	19 000	1.1
Winstone Pulp International	17 000	1.0
City Forests Ltd	13 000	0.7
Selwyn Plantation Board Ltd	10 000	0.6
Other	614 000	34.6
Total	1 769 000	100.0

Source: MAF (2005)

At the same time as the changes were taking place in New Zealand, state governments in Australia were corporatising their plantation assets or in some case undergoing privatisation and trans-Tasman ownership of forestry assets was increasing. Given the growing international ownership of forestry in New Zealand and Australia, and the requirement for many of these owners to report forest asset values, the question arises of how this valuation is done. A starting point will be industry and accounting standards that would guide forest valuation practice.

For New Zealand businesses, the NZIF Forest Valuation Standards outline a number of possible valuation methods depending on the circumstances of the valuation (NZIF 1999).

- Historic Cost (sum of costs incurred to date)
- Current Replacement Cost (cost compounded historic costs)
- Immediate Liquidation (stock value or current realisation value)
- Net Present Value (NPV) or Discounted Cash Flow (DFC) using a discount rate.

At the time of the survey, the NZIF Forest Valuation Standards had been released in their final form and had been available in draft form for some time, and the basic principles they contain had been around since the early 1980's (e.g., Fraser *et al.* 1985). While this means that it is likely that the Forest Valuation Standards would represent industry practice for New Zealand-based businesses, there is the potential for foreign businesses to bring different requirements.

In Australia, there were no industry standards, however the Australian Accounting Standard 35 August 1998 for Self Generating and Regenerating Assets (SGARA), introduced in June 2001, called for a new reporting method for recording changes (biological growth) in forest value from year to year. The main features of the standard are that SGARGA's are to be measured at net market value, increments (decrements) in the net market values of SGARGA's must be recognised as revenues (expenses) in the profit and loss or revenue and expenditure statement in the reporting period in which the increments (decrements) occur, and SGARGA's are to be presented separately in the statement of financial position. In order of priority, net market value at each reporting date is to be determined, where they exist, by current prices of SGARGA's in active and liquid markets, or where this is not available, the best indicator of that price (net present value or historic cost) is to be identified.

Given the growing international ownership of forestry in New Zealand and Australia, and the background of both industry and accounting standards for forest valuation, the purpose of the research is to develop an understanding of what valuation methods were being used and the factors that are most important in determining the methods chosen for forest valuation. A number of factors have the potential for influencing the choice of forest valuation method.

The legal structure of the forest owning organisation could be anything from a public or privately listed limited liability company to a partnership or a state owned enterprise, each

with its own reporting requirements. In addition, whether the forest owner was also involved in processing, or whether the organisation owned forests in more than one country and which countries might also have an influence on the choice of valuation method, since the organisation might choose methods that were also compatible elsewhere. In terms of forest management, the species grown, the target rotation age, predominant age class distribution (greater or less than 10 years) or the size of the forest estate could also have an effect on the choice of valuation method because organisations could choose valuation methods that gave their particular forest situation the best financial outcome.

The specific objective in this paper is to determine how commercial forests are valued for financial reporting purposes in New Zealand and Australia and whether any of these factors is important in determining the valuation method used. The remaining parts of the paper outline the method use in the study and the results.

2. Method

The method used in this study was to construct a postal survey of commercial forest owners in New Zealand and Australia. The survey first asked respondents to complete general questions about the forests and ownership of the organisation including,

- legal structure of the forest owning organisation
- whether the forest owner was also involved in processing
- whether the organisation owned forests in more than one country and where
- the species grown
- the target rotation age

The survey then asked specific questions for forests owned in each of New Zealand, Australia and the United States, repeating the same questions, but keeping the answers for each country separate. These questions included,

- valuation method
- size of the forest estate
- predominant age class distribution (greater or less than 10 years)
- most important reason for selecting that valuation method in that country

After pre-testing, the survey was sent to the person identified as being the one who had chief responsibility for financial matters in 30 commercial forest owners in New Zealand and 27 in Australia. The New Zealand database was completed with the assistance of the 1999 Forest Industries directory and local knowledge. The Australian database was compiled with the assistance of local knowledge. The survey was completed by 22 of the 30 organisations contacted in New Zealand, of which 21 were useable for the study (70 percent response rate), and by 18 of the 27 organisations contacted in Australia, all of which were useable for some part of the analysis and 16 that were useable for all of the analysis (59 percent response rate).

3. Results

Description of the Forest Owners

The business structure of forest-owning organisations responding to the survey is shown in Table 2. There are a greater variety of business structures used by respondents from New Zealand (7) than from Australia (4).

Table 2
Business Structure of Forest-Owning Organisations

	New Zealand	Australia
Publicly Listed Limited Liability Company	3	7
Privately Held Limited Liability Company	8	9
Partnership of Qualifying Companies	1	
Partnership	2	0
Sole/Individual Ownership	1	1
State Owned/Government Trading Enterprise	2	1
Local Authority	3	0
Joint Venture	1	0

The forests being managed by the organisations in the survey cover a variety of species and management. As can be seen in Table 3, New Zealand respondents were predominantly growing softwoods, *P. radiata* and *P. menziesii*, while Australian respondents were much more involved in shorter rotation hardwood crops.

Table 3
Species Grown

	New Zealand		Australia	
	Respondents Growing the Species	Average Rotation	Respondents Growing the Species	Average Rotation
P. radiata	21	29	10	27
P. menzesii	13	48	0	
C. macrocarpa	5	36	0	
P. caribea	0		1	25
E. globulus	0		11	13
E. Nitens	2	17	4	18
E. Regnans	2	17	2	29
E. Maculata	0		1	30
A. mangium	0		1	7

Forest Valuation Methods

Respondents were asked to indicate which forest valuation method(s) they used. The following four methods were listed in the survey,

- Historic cost - sum of costs incurred to date.
- Current replacement cost - compounded historic costs.
- Immediate liquidation - stock value or current realisation value.
- Net Present Value (NPV) or Discounted Cash Flow (DFC).

Respondents were also given the opportunity to identify other methods used to value their forests. Valuation methods used by growers answering this question are shown in Table 4.

Table 4
Valuation Methods

	New Zealand	Australia
Historic Cost	5	7
Current Replacement Cost	0	1
Immediate Liquidation	2	1
Net Present Value	14	6
Other Method	0	1
Total	21	16

At the time of the survey, the majority of growers in New Zealand used net present value methods (67 percent), with historic cost being the next most common method (24 percent). In Australia, there was a much greater emphasis on the historic cost method with 50 percent of growers using some type of this approach. The next most common method of valuation was the net present value method (38 percent). The ‘Other Method’ was historic cost to age 15 then immediate liquidation value after that point. In addition, 3 respondents (two New Zealand, one Australia) stated that they used a combination of methods but did not indicate when each was used. The common method for these 3 respondents was NPV and this was combined with cost or liquidation methods. Only the NPV method for these respondents is shown in Table 4.

What Determines the Forest Valuation Method Used

The purpose of this paper is to determine whether there are systematic differences in valuation methodology that can be explained by particular demographic variables. None of the organisations participating in the survey owned forests in the United States so the results will be limited to New Zealand and Australian forests. There a number of particular variables of interest.

- Legal structure
- Forestry only or forestry and processing activities
- Species grown
- Estate size
- Rotation age

Respondents were first asked to indicate the most important reason why they used their particular valuation method. Table 5 presents the results of this question along with the respondents' choices of valuation methods. As can be seen in Table 5, there are differences between accounting standards driving the used of cost methods and industry standards driving the use of NPV methods, and between New Zealand and Australia in the reasons that particular valuation methods are chosen. The impact of developments in forest valuation methodology in New Zealand, and in particular the availability of the NZIF Forest Valuation Standards (NZIF 1999), is shown in the importance of an industry standard in determining the choice of valuation methods (57 percent of New Zealand respondents).

Table 5
Major Reason for Choice of Valuation Method

		Accounting Standard	Industry Standard	Company Policy	Tradition	Market Value of Stock	Insurance
Historic Cost	NZ	4			1		
	Aust	5	1				1
Current Replacement	NZ						
	Aust			1			
Immediate Liquidation	NZ	1				1	
	Aust	1					
Net Present Value	NZ	2	11			1	
	Aust	5					
Other	NZ						
	Aust			1			

The impact of the industry standard is also shown by the use of the NPV method by respondents, the recommended method of the NZIF Forest Valuation Standards. New Zealand organizations using cost methods are those who are basing their method on accounting standards in New Zealand. Since this survey was done, a number of the companies using cost methods have announced changes to NPV methods.

The New Zealand results can be contrasted with Australian commercial forest owners who were also surveyed at the same time. In Australia, there was a much greater emphasis on the historic cost method with 50 percent of growers using some type of this approach. The next most common method of valuation in Australia was the net present value method (38

percent). In Australia, the key guideline for valuation was Australian Accounting Standard (AAS) 35 ‘Self-Generating and Regenerating Assets’ which had been released in 1998 for adoption in 2001. The impact of AAS 35 can also be seen in the importance of accounting standards in the selection of valuation methods in Australia (73 percent of respondents). AAS 35 allows businesses to choose which ever of cost or present value methods they thought best represented the value of their forest, and about an equal number of respondents citing accounting standards as the key factor were using either of these approaches.

Table 6 shows a breakdown of the types of legal structures shown in Table 2 by valuation method. To some extent, the Table 6 shows that cost methods are more prevalent in publicly listed limited liability companies, while NPV methods are more prevalent in other legal structures.

Table 6
Legal Structure and Valuation Method

		Publicly Listed Limited Liability Company	Privately Held Limited Liability Company	Partnership of Qualifying Companies	Partnership	Individual Ownership	Government Trading Enterprise/ SOE	Local Authority	Joint Venture
Historic Cost	NZ	2	1		1				1
	Aust	4	2			1			
Current Replacement	NZ								
	Aust		1						
Immediate Liquidation	NZ					1		1	
	Aust		1						
Net Present Value	NZ	1	7	1	1		2	2	
	Aust	2	4						
Other	NZ								
	Aust						1		

It was considered possible that businesses involved in processing might be more likely to use cost methods to value their forests. As can be seen in Table 7, there is no difference in the forest valuation methods used between forest owners who are involved only in forestry, or who are involved in both forestry and processing.

Table 7
Forestry Activity

		Level of Integration		Forest Type		
		Forest Ownership only	Forest Ownership and Wood Processing	Softwood	Hardwood	Both
Historic Cost	NZ	2	3	3		2
	Aust	3	4	3	2	2
Current Replacement	NZ					
	Aust	1		1		
Immediate Liquidation	NZ	2		2		
	Aust	1				1
Net Present Value	NZ	8	6	14		
	Aust	2	4	2		4
Other	NZ					
	Aust	1		1		

Since softwoods are usually grown on longer rotations than hardwoods, it might be expected that NPV methods would be more common for softwood growers. To examine this idea, the species reported by respondents were grouped by softwood and hardwood categories and compared to the valuation method used. As can be seen in Table 7, NPV methods are predominantly used by softwood growers, and cost methods are use mostly used by hardwood growers. The totals for forest type in Table 7 do not add to the number of respondents as some respondents are involved in both hardwood and softwood plantations.

To see if the size of the plantation estate was linked to the choice of valuation method, the estate sizes reported by respondents were grouped into quartiles and compared to the valuation method used. As can be seen in Table 8, there is no apparent relationship between the size of the forest estate and the valuation method that is used.

Table 8
Estate Size and Valuation Method

		<3050 ha	3050 ha <x< 22,500 ha	22,500 ha <x< 47,000 ha	>47,000 ha
Historic Cost	NZ	2			3
	Aust	1	2	1	2
Current Replacement	NZ				
	Aust		1		
Immediate Liquidation	NZ	1	1		
	Aust		1		
Net Present Value	NZ	3	4	5	2
	Aust	1	2	1	1
Other	NZ				
	Aust				1

It was also believed that rotation age might have some relationship to the choice of valuation method, with shorter rotations more likely to correspond to cost methods and longer rotations to NPV methods. To examine this idea, the average rotation ages reported by respondents were grouped into quartiles and compared to the valuation method used. As can be seen in Table 9, average rotation age does not appear to be correlated to the choice of rotation age.

Table 9
Rotation Age and Valuation Method

		< 14 Yrs	14 Yrs <x< 22 Yrs	22 Yrs <x< 27 Yrs	>27 Yrs
Historic Cost	NZ		1	4	
	Aust	2	2	1	2
Current Replacement	NZ				
	Aust	1			
Immediate Liquidation	NZ	1			1
	Aust	1			
Net Present Value	NZ	4	2	4	4
	Aust	1	3		2
Other	NZ				
	Aust		1		

To test if the choice of valuation method was statistically linked to any of the factors discussed previously, an ANOVA test was done. As can be seen in Table 10, only the reason chosen (e.g. accounting or industry standard) has a statistically significant correlation to the valuation method selected.

Table 10
Correlation Between Valuation Method and Explanatory Factors

Variable		Sum of Squares	df	Mean Square	F	Sig.
Legal Structure	Between Groups	77.303	5	15.461	.873	.509
	Within Groups	584.133	33	17.701		
	Total	661.436	38			
Level of Integration	Between Groups	1.276	5	.255	1.000	.433
	Within Groups	8.417	33	.255		
	Total	9.692	38			
Number of Countries in which forest are owned	Between Groups	1.697	5	.339	.971	.450
	Within Groups	11.533	33	.349		
	Total	13.231	38			
Size of Forest Estate	Between Groups	5.709	5	1.142	.853	.523
	Within Groups	41.480	31	1.338		
	Total	47.189	36			
Softwood or Hardwood Species	Between Groups	1.476	5	.295	.438	.818
	Within Groups	22.217	33	.673		
	Total	23.692	38			
Age class distribution	Between Groups	1.469	5	.294	.973	.449
	Within Groups	9.967	33	.302		
	Total	11.436	38			
Rotation Age	Between Groups	3.174	5	.635	.670	.649
	Within Groups	30.300	32	.947		
	Total	33.474	37			
Main Reason for choosing method	Between Groups	24.428	5	4.886	3.560	.012
	Within Groups	42.545	31	1.372		
	Total	66.973	36			
NZ or Aust Forest	Between Groups	1.909	5	.382	1.619	.182
	Within Groups	7.783	33	.236		
	Total	9.692	38			

4. Conclusions

The study was undertaken at a time when there were no definitive requirements for reporting the value of forest assets. The results show that when it was undertaken in early 2000, NPV was the dominant forest valuation method used in New Zealand (67% of respondents). In Australia, more methods were used, with cost methods being used by 50% of respondents and NPV methods being used by 38% of respondents. The only statistically significant reason that explains the use of a particular valuation method is whether an accounting or an industry standard was guiding their choice. When industry standards were important, organisations were more likely to use NPV methods, while if accounting standards were being used the

organisation was more likely to be using cost methods. These results show the importance of developing industry standards in guiding valuation principles and practice.

In this context, the international standard for reporting the value of ‘agricultural’ (including forestry) assets and activities, IAS 41, which national authorities are working towards implementing this standard poses new issues for industry-developed standards. In New Zealand, the Financial Reporting Standards Board (FRSB) announced adoption of IAS 41 in March 2004. The main impact that the new standard will have is that changes in forest value will have to be treated as income (Barnes 2004). The NZIF is now concerned that the accounting standard articulates with the Forest Valuation Standards. The key link is that the accounting standard focuses on reporting of values, while the Forest Valuation Standards focus on calculation of the values to be reported.

The main areas of interest are in defining the vague term “Fair Value” used in IAS 41, and in the cost to small forest owners of annual valuations (Barnes 2004). The key issue with fair value is that it is believed that it will not generate comparable valuations between forest owners due to the latitude it allows for individual businesses to determine what fair value is relative to their business. For example, the potential effect of annual fluctuations in asset value by using current prices to value the entire forest estate might be unacceptable to a business. The fair value concept would allow a business to choose any variety of long run price or harvest level averages to calculate profits, thus destroying the utility of the approach for comparable valuations of businesses (Barnes 2004).

References

- Barnes, A. (2004). New accounting standard for reporting forest values. *NZ J For* 49(1):38-39.
- Fraser, T., Horgan, G. and Watt, G. (1985). *Valuing Forests and Forest Land in New Zealand*. FRI Bulletin 99, Forest Research Institute, Rotorua.
- MAF (2005). Forest Sector Issues. Ministry of Agriculture and Forestry. Retrieved from <http://www.maf.govt.nz/forestry/publications/forestry-sector-Issues/fsioverview.htm#NEW%20ZEALAND%92s%PLANTED%20FORESTS>.
- MoF (1993). *New Zealand Forestry Statistics 1993*. Ministry of Forestry, Wellington.
- NZIF (1999). *Forest Valuation Standards*. New Zealand Insitute of Forestry. Christchurch.