

Discount rates used for forest valuation – results of 2019 survey

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Abstract

A total of 22 forest valuers responded to the survey and provided information on 33 New Zealand and two Australian transactions in 2018 and 2019. The average reported implied discount rate (IDR) for the New Zealand transactions is in the range 3.2% to 8.5% for current rotation post-tax cashflows and 4.1% to 11.5% for pre-tax cashflows. Overall, averages are 6.1% (post-tax cashflows) and 7.3% (pre-tax cashflows), compared to 7.0% and 7.6% in the 2017 survey. IDRs for the transactions of medium or large forests are, on average, lower than for small (<1,000 ha) forests; 6.0% vs 7.8% for current rotation pre-tax cashflows.

Forest valuers also provided the discount rate they use to estimate the market value of a forest. Valuers apply an average discount rate to current rotation pre-tax cashflows of 7.3% for medium/large forests and 7.9% for small forests. Some 20 of the 22 valuers included in the 2019 survey also participated in the 2017 survey. There has been an average reduction of 0.4 percentage points in discount rate for 19 valuers of New Zealand forests and 0.3 percentage points for six valuers of Australian forests. However, on average, valuers are using higher discount rates to value medium/large forests than is evident from the IDRs of transactions.

Introduction

Forest valuers were surveyed during the last quarter of 2019 about the discount rate used for forest valuation. The survey is an update of similar surveys carried out every two years since 1997. Although the last full survey was carried out in 2017 (Manley, 2018), a much simplified survey was undertaken in 2018 (Manley, 2019) to clarify the effect of forest size on discount rate. Some 22 forest valuers were surveyed.

Responses to survey questions

1. Method used to determine the market value of a forest

All 22 valuers use the Income (Expectation Value) approach to determine the market value of a forest. Many valuers use a suite of approaches and

also the Cost approach and, in some cases, the Sales Comparison approach. One valuer noted that:

'If and where useful comparable sales material is available, that would be considered. However, it usually is not available or is not readily comparable apart from through IDR calculations.'

Four valuers blend the Income and Cost approaches for young stands, including one between ages five and 10 years, and another between ages five and 15 years. Five valuers make some use of the Liquidation approach for mature stands. This is essentially the same as using the Income approach with all harvesting at time zero.

Use of the Cost approach

The Cost approach is sometimes used by 18 of the valuers for valuing young stands and in other limited circumstances. For example:

'When there is a significant component of young trees and at least some of the inputs to the future cashflows (yields, costs, log prices and markets) have a relatively high degree of uncertainty. Also as a sense check on discounted cashflow (DCF) for young forests/stands – seeing how the two curves align.'

'Only used if crop replacement cost is greater than expectation value; i.e. cost is used as the minimum value.'

'When net present value (NPV) is negative.'

'Limited to predominantly young under-developed areas from a market perspective.'

'Only used when considering the value of very young stands within a forest estate that is predominantly immature. If considering a more normalised forest estate, then the young stands are valued as part of the overall DCF.'

'In young stands where the value derived by Income approach is less than replacement cost (does not meet willing buyer/willing seller expectations). Minor species if there is a lack of established markets to evidence costs and revenues.'

'Young radiata pine forests and young or mid-rotation alternative species.'

'Rarely used. Only when an investment is a greenfield plantation for an emerging market crop like exotic hardwoods.'

Follow-up questions were answered by the 18 valuers who sometimes use the Cost approach (Table 1).

Table 1: Components included by valuers who use the Cost approach to forest valuation

Component included	Yes	No	Sometimes
Indirect costs (e.g. supervision)	16	1	1
Overhead costs	15	2	1
Cost of using land	13	4	1
Cost of time	17	1	

Thirteen of the valuers use pre-tax costs, four use post-tax costs, while one uses both. One valuer uses post-tax costs because 'the tax benefit has crystallised and been realised.'

All valuers who include the cost of time use a lower rate to compound costs than they do to discount cashflows in the Income approach. However, a wide range of rates is used. Respondents reported using rates of 1.0% to 6.0% on pre-tax costs and 1.0% to 5.0% on post-tax costs. The average rate was 3.4% (3.8% in 2017) for pre-tax costs and 3.5% (3.4% in 2017) for post-tax costs.

2. Discount rate used to estimate the market value of a tree crop (or forest)

Some 20 of the 22 surveyed valuers value New Zealand forests, while eight value Australian forests. Of the 20 valuers of New Zealand forests, three apply the Income approach using only post-tax cashflows, 12 use only pre-tax cashflows, while five use both.

Average discount rates are presented in Table 2. There is only a small number of responses for some of the 16 combinations of country, forest size, type of cashflows and number of rotations. The most precise comparison is when responses are considered only from valuers providing a response for both discount rates in each comparison. These comparisons indicate that:

- Lower discount rates are generally used for medium/large forests compared to small forests (Table 3)
- Lower discount rates are generally used for multiple rotations compared to current rotation (Table 4)
- There is no consistent difference between the discount rates used for New Zealand forests compared to Australian forests (Table 5). One valuer noted that 'the rates applied to Australia have typically been very similar to New Zealand but recent fire events are likely to require a reassessment of this.'

Table 2: Discount rates being used to value forests by country (New Zealand vs Australia), size (small vs medium/large), type of cashflow (pre-tax vs post-tax) and number of rotations (current rotation vs multiple rotations)

New Zealand	Discount rate applied to post-tax cashflows		Discount rate applied to pre-tax cashflows	
	Current rotation	Multiple rotations	Current rotation	Multiple rotations
Small forests (<1,000 ha)	7.1 (6) 6.0–9.0	6.9 (2) 6.25–7.5	7.9 (14) 6.0–10	7.7 (7) 6.0–10
Medium/large forests (>1,000 ha)	6.2 (6) 5.0–6.7	6.3 (3) 6.0–6.7	7.3 (14) 6.0–9.0	7.2 (9) 6.0–8.5

Australia	Discount rate applied to post-tax cashflows		Discount rate applied to pre-tax cashflows	
	Current rotation	Multiple rotations	Current rotation	Multiple rotations
Small forests (<1,000 ha)	7.5 (1) 7.5–7.5	7.0 (1) 7.0–7.0	8.8 (3) 6.5–10	7.3 (3) 6.0–8.5
Medium/large forests (>1,000 ha)	6.9 (2) 6.5–7.25	6.6 (2) 6.0–7.25	7.8 (6) 6.0–9.0	7.3 (7) 5.5–9.0

Note: The results presented for each cell are the average with the number of respondents in brackets. The second row in each cell contains the range across all respondents. Some valuers provided a range of values.

Table 3: Differentials in discount rate for forest size using paired comparisons from valuers who provided a response for both discount rates in a comparison. Differentials are calculated as discount rate for small forests (<1,000 ha) minus discount rate for medium/large forests

	Post-tax		Pre-tax	
	Current	Multiple	Current	Multiple
New Zealand				
Differential	1.05	1.50	0.80	0.51
Respondents	5	1	12	7
Australia				
Differential	1.00	1.00	0.50	0.17
Respondents	1	1	2	3

Table 4: Differentials in discount rate for rotations using paired comparisons from valuers who provided a response for both discount rates in a comparison. Differentials are calculated as discount rate for current rotation minus discount rate for multiple rotations

	Post-tax		Pre-tax	
	Small	Large	Small	Large
New Zealand				
Differential	0.50	0.25	0.25	0.19
Respondents	1	2	6	8
Australia				
Differential	0.50	0.25	0.50	0.52
Respondents	1	2	2	6

Table 5: Differentials in discount rate for country using paired comparisons from valuers who provided a response for both discount rates in a comparison. Differentials are calculated as discount rate for Australian forests minus discount rate for New Zealand forests

	Post-tax		Pre-tax	
	Current	Multiple	Current	Multiple
Small				
Differential	-0.50	-0.50	-0.25	-0.17
Respondents	1	1	2	3
Medium/large				
Differential	0.28	0.28	0.15	-0.06
Respondents	2	2	5	6

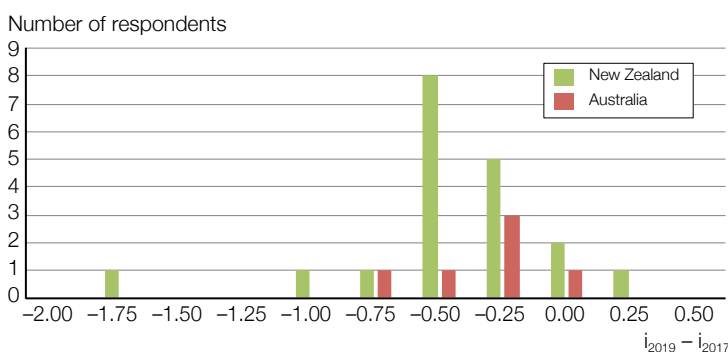


Figure 1: Frequency of change in discount rate from 2017 to 2019 for individual valuers

Has the discount rate used by valuers changed since 2017?

Some 20 of the 22 valuers included in the 2019 survey also participated in the 2017 survey. Figure 1 gives the frequency distribution of the change in discount rate. The average change for the 19 valuers of New Zealand forests is a reduction of 0.4 percentage points, with a reduction of 0.3 percentage points for the six valuers of Australian forests.

3. How is the discount rate selected?

Valuers base discount rate on a range of information sources, with many valuers using multiple sources:

- Nine valuers use IDRs, while another four use unspecified ‘market evidence’
- Seven valuers use the results of this survey, while another two use opinions from other valuers
- Five valuers use investor input or expectations
- Four valuers use CAPM/WACC
- One valuer uses consistency as the basis for deriving discount rate
- One valuer uses discount rates from company reports
- One valuer uses the cost of funds.

4. How are log prices determined?

Some valuers (eight out of 22) use constant prices for all years when forecasting cashflows. These are based on a 12Q average (six valuers), a 6Q average (one valuer) or the current price (one valuer). However, most valuers (14 out of 22) transition over two to six years from current prices (or a 4Q or 12Q average) to a 12Q/20Q average (eight valuers) or forecast prices (six valuers). Examples of the latter include:

‘Start with current prices with an index applied for the first five to six years, then flat. The index is derived for China A grade and based on a CFR forecast with forecast FX and shipping. Domestic prices are assumed to move at 50% of the export index. A separate index is determined for small logs.’

‘Current prices are a 12 month inflation adjusted average of actuals, future trends are derived from econometric forecasting models for export and domestic markets.’

‘Future price projection is based on estimated supply and demand.’

‘The price assumed in the first period of the model is our expectation of what prices will be over the next 12 months. Longer-term prices (five + years) generally return to trend or return to historic average (three to five years, real). We also have developed a supply-demand ‘first principles’ econometric model as a further check on the assumed prices.’

'Australia domestic pricing typically follows an indexation formula – our price projections will then be based on forecasts of the individual components of the formula (fuel, CPI, log price indices, lumber prices indices etc). Generally, though, these will be close to flat real.'

5. How is the cost of land accounted for in valuing a tree crop?

Most valuers (19 out of 22) include the opportunity cost of land for all tenures. On leasehold land, the actual rental is commonly used as the cost of land, whereas for freehold land a notional land rental is applied. Twelve valuers calculate land rental as a percentage of land market value (LMV). The percentage varies from 3.0% to 7.5%, with an average of 4.4%. Two valuers calculate the land rental as a percentage of land expectation value (LEV), while another uses a notional rental of \$150/ha/yr.

Seven valuers, including three who also sometimes use a percentage of LMV, estimate the notional land rental using a range of sources including:

- Forest land rentals for leases, forestry rights and Crown Forestry Licence rentals
- Land valuers.

Three valuers do not include a notional rental for freehold land. For example, one said: 'Actual rentals are used for lease and forestry rights. Freehold assets are assumed to have no land costs other than direct costs such as land rates.'

6. Do you include cashflows from only the current crop?

When estimating the market value of a tree crop, 10 valuers only include cashflows from the current crop. A further three valuers only include cashflows from future rotations in special circumstances:

'When there are replanting obligations and for sense checking future rotations.'

'If undertaking feasibility analysis or instructed to do so.'

'If the owner is looking for a long-term investment or there is a 99-year lease for example.'

While one valuer only does multiple rotation valuations, eight valuers routinely undertake both multiple rotation as well as single rotation valuations:

'Our approach is to attempt to mirror the practice of market participants. In most cases, transactions are on the basis of an ongoing investment model. For a TIMO this may be a 10–20 year horizon, with a terminal value, i.e. a perpetual model is applied. In other cases, the investment may be a single rotation

forestry right, or a rational decision may be to convert the land to an alternative land use. In this situation future rotations will not be considered. Even if we use a perpetual model, we are required to examine the cashflows arising from the current rotation only in order to fulfil the requirements of the financial reporting standard.'

'The market value of the forest estate is determined based on the land use rights for the property – freehold will be perpetual, one-rotation forestry rights will be existing rotation. The tree crop is then derived by deducting land value. For IFRS-compliant tree crop valuation, the current crop only is used with the discount rate derived by imputation to ensure that tree crop value plus LMV = multi-rotation market value of estate.'

'Multiple rotations are valued where the property interest being appraised is the freehold interest; that is, the property owner owns both the land and the timber. In this case, for IFRS purposes, the value of future rotations contributes to the land value, whereas the value of the value of biological assets is limited to the current rotation.'

'Multiple rotations are valued if there is a legislative requirement to replant or the future rotation is expected to be NPV positive. The current rotation is only considered if the land is planned to be sold or returned to the land owner.'

Nine valuers include a terminal value in multiple rotation valuations. These are typically calculated by assuming that the average of cashflows for a period prior to termination apply. The averaging period varies from the last year to the last rotation. One valuer noted:

'Forecasts cashflows for 60 to 80 years with a terminal value included where the land use right permits ongoing forestry. The terminal value is based on an average cashflow and is dependent on the estate. For a regular constant harvest the average of the last five years of cashflows is used. For irregular harvest, the term used to estimate the average cashflow can be up to the forecast horizon.'

7. Do you separately distinguish the value of roads and buildings from the value of land?

Only two valuers distinguish the value of roads and buildings. One values roads at depreciated construction cost, while the other uses a market estimate at the start of a rotation in cutover state. Four valuers stated that the value of roads was not included with the value of land. Rather, the value of roads was captured in the crop value through avoided costs. For example, one valuer stated:

'The value of the land is separated, but we do not generally separate out the value of roads, buildings etc. Their value is intrinsically embedded in the value of the asset by way of an avoided cost (so is typically

part of the tree crop value). In principle, a notional rental could also be included in the cashflows for these components, but this is infrequently applied.'

8. When do you assume that cashflows occur?

Different conventions are assumed for the timing of cashflows:

- Start of a period – four valuers
- Middle of a period – 12 valuers
- End of a period – three valuers
- Mixture – three valuers:
 - Start (annual costs), end (revenues), whenever they occur but usually start (operational costs)
 - Throughout the year
 - Start for costs, middle for revenues.

9. Do you apply a stand-based or estate-based approach?

Seven valuers follow a stand-based approach, while seven valuers adopt an estate-based approach. Eight valuers use both approaches depending on the nature (size, age-class distribution) of the forest being valued.

10. Treatment of risk

Twelve valuers primarily (and a further three valuers occasionally) include risk in the cashflows by adjusting areas, yields, costs or prices. For example:

'Factor risk into cashflows: area attrition, yield adjustment, costs and revenues, and include insurance.'

'We consider the following key value drivers:

- *Stability of existing cashflows*
- *Status of market access arrangements*
- *Market risk*
 - *Price volatility*
 - *Lack of existing log or chip sales evidence*
- *Robustness of resource description (area, yield)*
- *Biotic and abiotic risk*
- *Stumpage margin (low margins more sensitive to changes in prices or costs).*

Where these inputs can't be effectively accounted for in the forest estate model inputs, then the discount rate is adjusted.'

'We use @Risk modelling to place a range around the main variable assumptions usually discount rate, roading costs, logging costs, log pricing, log yields.'

'We project cashflows according to our perception of what typical buyers would project, assuming they are prudent but nevertheless optimistic enough to win the bid.'

Eight valuers use discount rate as the principal means of adjusting for forest-specific risk. A further six valuers use the discount rate as a secondary means to adjust for risk. Some examples include:

'We apply lower discount rates for larger estates that are well described, close to maturity and markets compared to a younger, poorly described small forest a long distance from markets.'

'Where the property suffers (or benefits) from above- (or below-) average risk due to markets, political risk, reputation as a world class investment, or other factors.'

'The discount rate is adjusted to compensate for non-quantifiable risk, usually in the order of 0.5% to 1.0%.'

'Discount rate is applied to factor in unknowns for the forest – better defined forests are valued with a lower discount rate.'

11. Method used to determine the market value of the carbon trading opportunity

Fifteen valuers have valued the carbon trading opportunity (i.e. the value of the opportunity to receive NZUs and the liability to surrender NZUs as carbon stocks increase or decrease) associated with a tree crop on post-1989 forest land. Another valuer noted that it is, 'currently not relevant for Australia – may change with the Plantation Forestry Method introduced into the Emission Reduction Fund.'

The Income approach is the method used by 13 of the 15 valuers. The other two valuers consider only carbon immediately available for sale. One valuer said, 'Mostly looking at what is available for sale immediately. Legislation change has made future-looking a little nervous.'

12. Discount rate used to estimate the market value of the carbon trading opportunity

Discount rates used vary:

- Seven valuers use the same discount rate for valuing the carbon trading opportunity as for valuing the tree crop. One of these valuers noted that:

'We have used a similar rate to that used for valuing the forest (7%) but believe in some circumstances there is an argument for using a lower rate equivalent to the cost of financing. This is because trading carbon can be more akin to a loan which needs to be paid back in the future. Averaging assumptions and the choice of harvesting strategy can however negate that.'

- Two valuers use a discount rate similar to that used for valuing the tree crop:

'6.5% for established Carbon Accounting Areas, 7.5% for land not yet in the NZ-ETS.'

'We assume a discount rate of 7–9% based on the risk associated with forward pricing contracts,

ongoing long-term costs, and carbon volume calculations.'

- Three valuers use a discount rate for carbon that is higher:

'15% to reflect the additional risks associated with the volatility in the NZU market, and the element of political and legislative influence on the ETS.'

'10% to 12% based on the analysis of blocks sold for carbon.'

'Have used 10%, but may lower this as ETS gets more certainty. Possibly will use same as that for tree crop.'

- One valuer uses a lower discount rate for carbon:

'Discount rate reflects the rate a forest owner could earn on the money invested in a risk-free investment. Generally use government bond rates of the appropriate term.'

13. How do you determine the carbon prices used?

Carbon prices are based on:

- Current prices or spot and forward contract prices by nine valuers
- 12 quarter averages by two valuers
- 'Growth history over last five years, projected on same track forward, but constrained by price caps or price floors' by one valuer
- 'Proprietary carbon pricing curve' by one valuer.

14. What carbon trading strategy is assumed?

Ten valuers normally assume that only 'safe' units are sold, including two who stated:

'The trading strategy depends on the strategy of the forest owner – if simply a reporting valuation then will assume safe carbon only is sold.'

'Tend to present several options, but don't typically attach much weighting to the scenario of trading all units. New legislation imposes an averaging approach on all new planting.'

Three valuers assume that all carbon units are sold. One of these assumes that 'all NZUs are traded subject to the constraint that stumpage revenue covers surrender liability.'

15. How is the cost of land accounted for in valuing the carbon trading opportunity?

Only four valuers partition land rental between the tree crop and carbon trading opportunity. One assumes that the 'Cost of land (removing any value associated with carbon to the land) has a market rental assigned to the tree crop, with the carbon opportunity valued separately.'

Two of the valuers who don't normally partition the land cost commented that:

'No, we generally assume the carbon trading opportunity is tied to the tree crop and in particular the first rotation. Future rotations will have no carbon trading opportunity, and this is what we would base our land rental on.'

'We have done this in isolated examples – should be applied to all.'

Another valuer likened the partitioning of land rental between crop and carbon trading opportunity to 'angels on the head of a pin stuff.'

16. Discount rate implied by recent transactions

Information provided by nine valuers on estimates of the IDRs for 33 New Zealand and two Australian transactions is collated in Table 6. In summary, for the New Zealand transactions:

- The range of IDRs (applied to current rotation post-tax cashflows) in the 2019 survey is 3.2% to 8.5% (14 transactions), with an average of 6.1%. In the 2017 survey the range was 4.0% to 9.2%, with an average of 7.0%
- The range of IDRs (applied to current rotation pre-tax cashflows) in the 2019 survey is 4.1% to 11.5% (23 transactions), with an average of 7.3%. In the 2017 survey the range was 4.8 to 13.6%, with an average of 8.6%.

One valuer provided two IDRs for some transactions of small forests. This was where the vendor negotiated a price, subject to due diligence, then found more volume/area etc. The discount rate reported here is the IDR calculated from the initial information used to determine the price paid, rather than the higher IDR subsequently calculated using the higher volume/area.

Replanting and new planting

17. What discount rate do you use to evaluate replanting or new planting investments?

All but one of the 17 valuers who responded to this question use the same (or a similar) discount rate to that for forest valuation.

18. What is your estimate of the IRR on new planting?

Results are shown in Table 7. There is variation between valuers and regions, although one valuer argued that, 'There is no real regional variability as the returns are equalised by varying land costs.'

The estimated increase in IRR from carbon trading is generally in the range 2.0% to 4.0%. However, one valuer stated that, 'Carbon return is competed into land price so returns are the same or below those without carbon.'

Table 6: Estimates of the discount rate implicit in the transaction price of forests or interests in forests sold during 2018 and 2019. Forests are described by location and size class (small <1,000 ha; medium 1,000 to 10,000 ha; large >10,000 ha). Where there are multiple respondents for a transaction the average is reported together with the range

	Size	Location	Number of respondents	IDR applied to post-tax cashflows		IDR applied to pre-tax cashflows	
				Current rotation	Multiple rotations	Current rotation	Multiple rotations
New Zealand							
1	Small	Northland	1			6.5	
2	Small	CNI	1	3.5		4.8	
3	Small	CNI	2	6.9		9.1	7
4	Small	CNI	1	6.7		8.3	
5	Small	East Coast	1	8.2		9.4	
6	Small	Hawke's Bay	1				7.5
7	Small	Hawke's Bay	1			5	
8	Small	Hawke's Bay	1			7.5	
9	Small	Wairarapa	1			7.7	
10	Small	Wairarapa	1				7.1
11	Small	Wairarapa	1				7.5
12	Small	SNI	2	4.5		6.1	7.7
13	Small	SNI	1				7.5
14	Small	SNI	1	5.5		7.5	
15	Small	SNI	1	8.3		11	
16	Small	Marlborough	1				8
17	Small	Marlborough	1				7.7
18	Small	Marlborough	1				7.5
19	Small	Marlborough	1	8.5		11.5	
20	Small	Marlborough	1	8.1		10.4	
21	Small	Nelson	1	5.4		7.4	
22	Small	Nelson	2	7		8	
23	Small	Canterbury	2	3.2		5.2 (3.7–6.8)	6.1
24	Small	North Island	1			7	7.4
25	Medium	CNI	1			6.2	
26	Medium	Wairarapa	1				7
27	Medium	SNI	1				6
28	Medium	SNI	2			5.4	6.1 (5.4–6.8)
29	Medium	Otago	4	4	5	4.5 (3.6–5.5)	5.9 (5.2–6.5)
30	Medium	Southland	2			7.5	6.5
31	Large	East Coast	4	4.9	4.6	4.1	6.6 (5.8–7.4)
32	Large	Otago	1				7.2
33	Large	NZ wide	2			8.1	7.3 (6.7–7.9)
Australia							
1	Medium	Hardwood	1			7.4	
2	Large	Hardwood	1				6.9

Table 7: Estimates of IRR of radiata pine replanting or new planting by region – the carbon add-on column gives the estimated increase in IRR when carbon trading costs and revenues are included

Valuer	New Zealand											Australia	
	NZ	North Is	North-land	CNI	East Coast	Hawke's Bay	SNI	Nelson/ Marlbor.	Canter -bury	Otago/ Southland	Carbon add-on	Radiata pine	Eucalyptus
1	5-7												
2	3-5										2-3		
3			5-7	7-9	5-7		6.5-7						
4	6										2		
5						7-11					11		
6								3.5-4.5			2		
7			6-7	6.5-8			6-7	6-7.5	4-5	5-7			
8				6							4		
9						6					2		
10	5-7												
11								6-8			4		
12	6-8										2	4-6	
13													3-10
14	6.5												
15								4			1.5		
16	4-5												0-12
17					4-7	5-8	4-7						

Discussion

Trends in IDR

Figures 2 and 3 show the IDRs (applied to current rotation post-tax cashflows and pre-tax cashflows respectively) of transactions reported in all 12 surveys to date. Note that IDRs for each transaction have been averaged in the cases where there was more than one respondent.

The average discount rate implied is:

- 6.1% for post-tax cashflows in 2019 compared to 7.0% in 2017:
 - 4.5% for medium/large forests in 2019 compared to 5.8% in 2017
 - 6.3% for small forests in 2019 compared to 7.2% in 2017
- 7.3% for pre-tax cashflows in 2019 compared to 7.6% in 2017:
 - 6.0% for medium/large forests in 2019 compared to 5.9% in 2017
 - 7.8% for small forests in 2019 compared to 8.4% in 2017.

The differences in IDR between the medium/large and small forests in the 2019 survey are most evident in Figure 3, where the IDRs for six medium/large transactions are all in the bottom half of the range. Obviously, caution must be exercised. Although

nine medium/large transactions were reported in this survey, IDRs for current rotation pre-tax cashflows were provided for only six transactions, while IDRs for current rotation post-tax cashflows were provided for only two. However, the reduction in the average discount rate for all forests is a continuation of the trend in recent years from 8.9% in 2013 to 8.6% in 2015 to 7.6% in 2017 to 7.3% in 2019 for pre-tax cashflows. For post-tax cashflows the trend has been from 7.3% in 2013 to 6.9% in 2015 to 7.0% in 2017 to 6.1% in 2019.

Figure 2: IDRs (applied to current rotation post-tax cashflows) for transactions reported in each of the discount rate surveys. Forests are identified by size class (small <1,000 ha; medium 1,000 to 10,000 ha; large >10,000 ha)

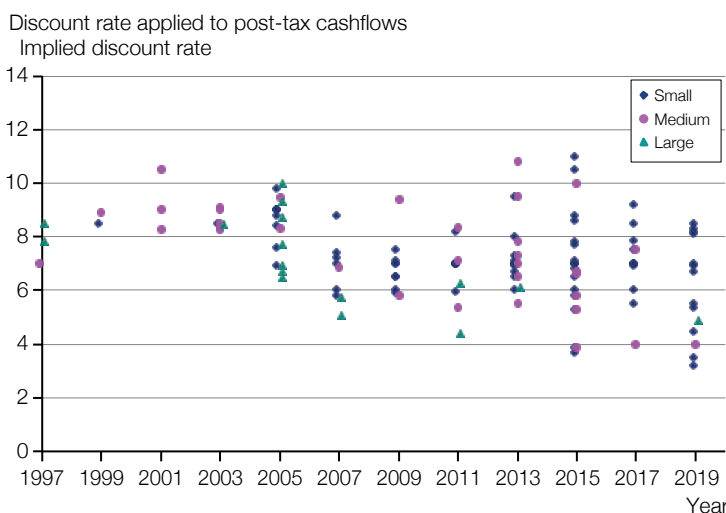
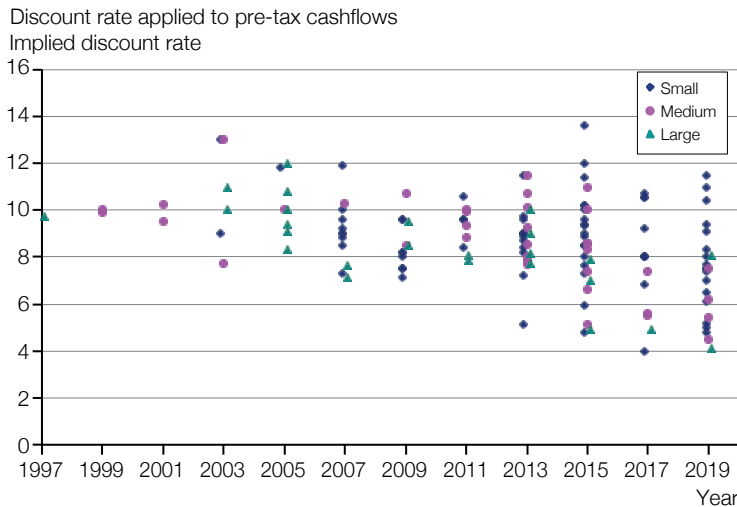


Figure 3: IDRs (applied to current rotation pre-tax cashflows) for transactions reported in each of the discount rate surveys. Forests are identified by size class (small <1,000 ha; medium 1,000 to 10,000 ha; large >10,000 ha)



Discount rates declared in financial reporting

Discount rates being used for financial reporting have also reduced further since 2017 (Table 8). Average reported discount rate for pre-tax cashflows for the 16 companies documented in Table 3 has reduced from 7.5% in 2017 to 7.1% in 2018 to 7.0% in 2019.

Comparison to Sewall survey

US forest valuation company James W. Sewall Company regularly carries out its own survey of discount

rates. In the last Sewall Investor Survey undertaken in March/April 2019 there were 28 responses from active investors to the question ‘What is the “base” discount rate (real, pre-tax, before TIMO fees & expenses) required to acquire generic timberland investments in the U.S. now?’ The mean response was 5.07%, lower than the average of 5.23% for the Sewall December 2017 survey.

Respondents were subsequently asked to ‘Provide the discount rate premium over the U.S. base rate’ for a range of international forest investments. For New Zealand pine the premium was 0.91% (mean), similar to 0.95% in 2017. For Australian planted pine the premium was 1.18%, compared to 1.05% in 2017. For Australian planted eucalypt it was 1.31% compared to 1.83% in 2017.

The discount rates in the Sewall Survey are applicable to multiple rotations, rather than just the current rotation. IDRs for multiple rotation pre-tax cashflows were reported for eight New Zealand and one Australian medium/large forests in the 2019 NZIF discount rate survey. The IDRs for the New Zealand transactions are 5.9 to 7.0%, which just overlaps the mean of 6.0% for the Sewall survey. The IDR for one Australian hardwood transaction is 6.9% compared to the Sewall mean of 6.4%.

IDR vs IRR

Table 4 indicates that valuers are generally using lower discount rates when valuing cashflows from

Table 8: Discount rates declared in financial reporting for New Zealand-registered companies with annual reports in the public domain. All rates are applied to current rotation pre-tax cashflows (apart from City Forests which uses current rotation post-tax cashflows)

Company	Reporting	2014	2015	2016	2017	2018	2019
China Forestry Group	31 Dec	8.2	8.2	8.2	8.0	7.5	7.5
Greenheart NZ	31 Dec	8.5	8.5	8.5	8.5	7.5	7.5
GTI 8 New Zealand	31 Dec	8.5	8.5	8.0	7.5	7.0	7.0
Invercargill City Forests	30 June	9.5	8.5	8.0	7.5	6.75	6.5
Kaingaroa Timberlands	30 June	7.5	7.5	7.0	6.5	6.25	6.25
Matariki Forestry Group	31 Dec	8.5	8.5	8.0	7.75	7.5	6.5
Nelson Forests	31 Dec	8.5	7.5	7.5	7.0	7.38	7.5
Oregon Group (Ernslaw One)	30 June	8.5	8.0	8.0	8.0	7.5	7.25
OTPP	31 Dec	8.0	7.75	7.75	7.5	7.37	7.06
Pan Pac Forest Products	31 March		8.0	7.5	7.25	7.0	7.0
SunChang Forestry NZ	31 Dec	8.7	8.7	8.6	8.6	7.6	7.6
Taumata Plantations Ltd	30 June	8.5	7.5	7.5	7.25	7.25	7.0
Te Waihou Plantations	31 Dec	8.5	8.5	8.0	8.0	7.0	7.0
Tiaki Plantations	30 June	7.5	7.25	6.75	6.5	6.5	6.5
Timbergrow Plantations	30 June	9.0	8.5	7.5	7.5	7.5	7.25
Wenita Forest Products	31 Dec	7.5	7.5	7.0	7.0	6.5	6.5
City Forests (post-tax cashflows)	30 June	7.0	7.0	6.5	6.5	6.5	6.0

multiple rotations compared to just valuing cashflows from the current rotation. Closer examination of the 17 paired comparisons for New Zealand forests reveals that:

- In eight cases the valuer uses a lower discount rate for multiple rotations than the current rotation
- In eight cases the valuer uses the same discount rate for multiple rotations
- In one case the valuer uses a higher discount rate.

In the case of Australian forests, in nine of the 11 paired comparisons valuers use a lower discount rate for multiple rotations than current rotations. In the other two cases the same discount rate is used.

The tendency to use a lower discount rate for multiple rotations indicates that valuers expect the IRR of subsequent rotations to be less than the discount rate used for the current rotation, i.e. that they expect subsequent rotations to produce a negative NPV if the current rotation discount rate is used.

However, the IDRs reported in Table 6 suggest otherwise. Of the nine forests for which IDRs for both current and multiple rotations are reported for pre-tax cashflows (albeit involving different valuers), the average IDR for multiple rotations exceeds that for the current rotation in six cases.

This survey indicates that the IRR on replanting is getting closer to the IDR for the current rotation. Given the IRRs in Table 7, and the reduction in IDRs since 2017, there will be fewer cases of subsequent rotations having a negative value.

Alignment of discount rates

There is good alignment between the discount rates that forest valuers use for large forests and the discount rates companies declare for financial reporting. For example, the average reported discount rate used (for pre-tax cashflows) in 2019 for the 16 companies

documented in Table 3 is 7.0%. This is similar to the average discount rate of 7.3% used by forest valuers for medium/large forests (for current rotation pre-tax cashflows). This alignment is not surprising given that the declared discount rates are those used by the independent valuers appointed by the companies. These valuers are respondents to this survey.

However, the alignment between the discount rates being used by valuers and the IDRs of transactions of medium/large forests is not so close. On average, valuers are using discount rates to value smaller forests that are similar to IDRs, i.e. 7.9% vs 7.8% using current rotation pre-tax cashflows. However, valuers are using higher discount rates to value medium/large forests than is evident from transaction IDRs, i.e. 7.3% vs 6%, which is the average of the six IDRs estimated using current rotation pre-tax cashflows.

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