

Discount rates used for forest valuation - Results of 2007 survey

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Summary

A total of 19 forest valuers responded to the survey and provided information on 13 transactions between 2005 and 2007, as well as additional information on two transactions reported in the 2005 survey. The average reported IDR (implied discount rate) for each of these transactions was in the range 5.1 to 8.8% for post-tax cashflows and 7.1 to 11.9% for pre-tax cashflows. Overall averages were 6.7% (pre-tax cashflows) and 9.0% (pre-tax cashflows), compared to 8.4% and 10.2% in the 2005 survey. The reduction in IDR is most evident for sales of large forests - although data are limited.

Forest valuers also provided the discount rate they use to estimate the market value of a forest. They are using discount rates for forest valuation that are on average 0.8% lower than in 2005.

Introduction

Forest valuers were surveyed during the second half of 2007 about the discount rate used for forest valuation. The survey is an update of similar surveys carried out every two years since 1997 (Manley 1998, 1999, 2001, 2003, 2005).

Method

A total of 19 forest valuers, mostly from consulting firms, were surveyed and asked:

1. What method do you use to determine the market value of a forest?
2. When using the DCF (Discounted Cashflow) approach, what discount rate do you use to estimate the market value of a forest?
3. What is the basis for using this rate?
4. How do you determine the log prices used?
5. How do you account for the cost of land in valuing a tree crop?
6. Do you include cashflows from only the current crop?
7. When do you assume that cashflows occur?
8. What specific allowance do you make for risk?

Forest valuers were also asked for transaction information:

- What is your estimate of the discount rate implicit in the transaction price of recent forest sales? (Valuers were also asked to provide price (\$/ha) and key factors for sales of forests with a narrow age-class. However insufficient information was provided to include here.)

Finally valuers were asked about factors relating to replanting and new planting decisions:

- What discount rate do you use to evaluate replanting or new planting investments?
- What is your estimate of the internal rate of return on new planting?

This last set of questions was motivated by the desire to understand the apparent disconnect between the discount rates being used for forest valuation and the internal rate of return on replanting or new planting.

Responses to survey questions

Method used to determine the market value of a forest

All 19 valuers primarily use the DCF approach to determine the market value of a forest. One valuer noted that "Three methods are used wherever possible - comparable sales, expectation value and cost. To conduct any of these it is normally necessary to utilise a DCF framework."

Fourteen of the valuers sometimes use a cost-based approach in limited circumstances; particularly for valuing young stands:

- When the resource (or a separable part) is all less than 10 years old.
- For 1-2 year-old stands.
- Very young forest with unreliable volume and markets.
- Replacement cost is used for younger ages.
- In situations where the forest consists of only young age classes (< 5 years old). A hybrid approach is used for forests with stands aged 5-10 years.
- Only for young stands (<5 years old) that have received no silviculture - these sort of stands typically have no value under a discounted cashflow approach.
- Forests comprising predominantly young stands (or if specified by insurance policy).

Some valuers use it for special circumstances; for example, for insurance purposes:

- Sometimes use for shelterbelts where valuing loss by fire or for alternative species.
- For insurance only.

feature

Table 1 - Individual responses to survey questions

Respondent	Discount rate applied to post-tax cashflows	Discount rate applied to pre-tax cashflows	Basis for discount rate	Log prices based on	Cost of land based on	Current crop only or multiple rotations	Cashflows occur at period
1	7		IDR	Current/12Q	Market rental if forestry is HBU. 5% LMV otherwise	Current (accounting) Multiple (sale & purchase)	At 30 June
2	8		Market	Current/12Q	Actual rental or market rental	Current	At 30 June
3	5-8	7-10	IDR/ Investor ROR	4Q/12Q	LMV	Current	Middle
4	7		IDR	Current to 20Q over 5 years.	Actual rental (leasehold) or LMV (freehold)	Current	Middle
5	8-9	10	Market/ consistency	Current to 12Q over 5 years.	Actual or notional rental	Current	Start
6	7-8	9	Consistency	12Q	Notional market rental.	Current	Start
7		8-9	IDR/WACC	Current to trend over 5 years.	Actual or notional rental	Current	Start
8		9-10	Consistency	Current/6Q	Actual rental (leasehold) or LMV (freehold)	Current	Middle
9	5.5 (large) 7.5 (small)	7 (large) 10 (small)	IDR	Current to 20Q over 5 years.	Actual or notional rental	Multiple	Middle
10		8	Market	Current	Actual rental	Current	
11		9	Consistency	4Q/12Q	LEV	Current	Start
12		8-8.5	IDR/CAPM	Forecast	Market rental	Current	Middle
13	8.5		Survey	Current/12Q	LEV	Multiple	Middle
14	8.5-9		IDR/Survey/ Court decisions	12Q	LMV	Current	Start
15		7.5-8	IDR	Current to 12Q	LMV	Multiple	Middle
16	8 (6% Douglas fir)		WACC/IDR	Current to 20Q over 5 years.	Market rentals	Current	End
17		8-8.5	Others/ survey	Current/12Q	Actual land rental. Adjusted LMV (freehold).	Current	End
18	7		Market/ industry	Current/12Q	LEV (calculated using 5-6%)	Current	End
19		8.5	Required ROR	Current/12Q	LMV	Current	Start

In other cases, valuers use a cost-based approach to help reflect the perceptions of market participants:

- When NPV is negative or less than replacement cost and a rational owner would not remove the crop.
- Primarily used where there is a component of the resource that, if it was put before the market, the process of negotiating an agreed price would involve reference to the cost of creating the resource.
- For young stands of forests - usually, but not always, in limited age-class range forests. These are situations where the owner would not sell stands for less than the value that a cost-based approach produces. Without a willing seller, there is no sale so a market value determination in these circumstances must include the element.
- When valuing a larger forest where a forestry corporate could be a potential purchaser, then the blending approach may be used from years 5 - 15 as well as using the cost based approach below age 5.

Discount rate used to estimate the market value of a forest

The response from each forest valuer is summarised in Table 1. Seven valuers apply the DCF approach using only post-tax cashflows, eight valuers use only pre-tax cashflows, while four valuers use both.

One of the last group noted that “We take both approaches depending on circumstances and sometimes clients’ wishes. We prefer the post-tax approach as it is more robust, but the majority of our valuations are still pre-tax, largely for historic reasons. We always use a post-tax approach for mature forests. The post-tax approach provides safe ground in the case of valuing forests which are fully or near-fully mature (i.e., a compressed mature or near-mature area distribution). There is a comparatively rapid write-off of the cost-of-bush and this leads to a trap if one is applying a pre-tax discount rate.”

Valuers apply a discount rate in the range 5 to 9 % (average 7.6 %) to post-tax cashflows or a discount rate in the range 7 to 10 % (average 8.6 %) to pre-tax cashflows¹.

One valuer uses a lower discount rate for the valuation of large forests: “Our feeling is that the very keen competition seen for large forests will not necessarily extend to small forests.”

Another valuer uses a lower discount rate for Douglas fir because “it is regarded as an altogether lower risk crop than pine:

¹ If a valuer responded with a range of discount rates, the midpoint discount rate was used to calculate averages.

- Markets show greater long term stability of prices, less risk of wind throw, lower fire risk.
- Lower silvicultural risks; i.e., not entering stands as often and not spending money on things like pruning that may have high potential risk in terms of return on investment.”

Has the “market” discount rate changed since 2005?

In the 2005 survey, respondents were applying an average discount rate of 8.35 % to post-tax cashflows and an average discount rate of 9.1 % to pre-tax cashflows. The averages in the 2007 survey, 7.6% and 8.6%, are lower.

The survey included 18 of the 22 forest valuers who had responded to the 2005 survey. For 16 of these valuers it was possible to compare responses to the 2005 survey with responses to the 2007 survey (The other two had changed from using post-tax cashflows to pre-tax cashflows so rates are not comparable). Fig. 1 gives the frequency distribution of the change in discount rate. The average change is a reduction of 0.8%. However there are three groups: six valuers who use the same or a slightly higher discount rate, four valuers who use a discount rate that is lower by 0.5 to 1.0 %, and six valuers who use a discount rate that is lower by 1.5 to 2 %.

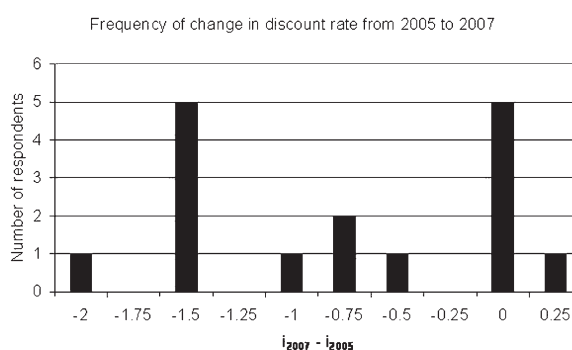


Fig. 1: Frequency distribution of change in discount rate from 2005 to 2007.

How is the discount rate selected?

Fourteen valuers select discount rate based on market information. This information includes analysis of the discount rate implied by recent transactions (i.e. the IDR or implied discount rate), the investor’s required rate of return, WACC (Weighted Average Cost of Capital), use of CAPM (Capital Asset Pricing Model) and other evidence (e.g., “We know that we can currently sell forests based on 8%”).

Two valuers select discount rate primarily on the basis of current industry practice using information from other valuers or from previous rounds of this survey.

Three valuers have consistency as their main

consideration. One of these valuers noted: "When valuing stands on a regular basis we want to be consistent with our past assumptions." The focus of much of their work is on the estimation of fair value for accounting purposes rather than sale and purchase. These valuers use discount rates of 9-10% (applied to pre-tax cashflows) that are at the high end of the range reported in this survey.

How are log prices determined?

The majority of valuers use current prices for the short-term with long-term prices (e.g. after 5 years) predicted using average prices of the last 6, 12 or 20 quarters.

Two valuers use analysis and models to forecast long-term price trends.

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

A range of approaches is still being applied. However, many valuers are using the general approach proposed in the recent Discussion Draft; i.e., that the opportunity cost of occupying land with the current crop should be calculated as the market-based land rental. On leasehold land, the actual rental is commonly being used as the cost of land whereas for freehold land a notional land rental is being applied.

Seven valuers calculate land rental as the product of LMV (Land Market Value) and discount rate, at least for freehold land.

Three valuers calculate land rental as the product of LEV (Land Expectation Value) and discount rate. One valuer calculates LEV using a lower discount rate than that used for valuation purposes.

Do you include cashflows from only the current crop?

Most valuers only include cashflows from the current crop in the valuation model.

One valuer stated: "For accounting purposes, as from June 2007, we include cashflows from the current crop only as specified under the new accounting standard NZ IAS 41. Where there is a legal obligation to establish second or subsequent rotations, (e.g. leases/forestry rights) future cashflows are calculated and disclosed separately in our accounts in the form of a 'Statement of Commitments'. If we are undertaking a valuation for the purposes of a sale, then, if second or subsequent rotations are legally committed for the particular lease or forestry right being valued, these future commitments are included in the valuation."

Another valuer stated that "I always generate both current crop and perpetuity cashflows in the valuation model and commonly present both sets in the valuation

report for the client's benefit. I generally assume that the second and subsequent rotations are NPV-neutral in deriving the value."

When do you assume that cashflows occur?

A number of different conventions are assumed for the timing of cashflows.

A number of different conventions are assumed for the timing of cashflows. Respondents, in different numbers, use the start, the midpoint and the end of the period.

What specific allowances are being made for risk?

Valuers use a range of approaches for incorporating risk into forest valuation.

Some respondents focus on adjustments to cashflows. For example:

- Adjust areas, yields, costs or prices but not the discount rate.
- Attempt to allow for risk in the assumptions: yields, markets, costs.
- Adjust cashflow where possible. Always allow for attrition (area, log volume or quality) to allow for wind damage and slips not accounted for in growth models.
- If there is a history of periodic fire events I will endeavour to model it.
- Adjust for project-specific risk.
- A specific allowance is made if stands being valued are mature where there is risk associated with log volumes by grade. Risk is determined by the quantum and accuracy of inventory data.
- Risk is included in the allowance for insurance premiums (e.g. fire risk). If there is some experience of losses and it is uninsurable then some adjustment of discount rate or area reduction is made; e.g. wind or exposure (particularly true of coastal areas where you have to allow for a protection strip.)

Some respondents adjust the discount rate, sometimes as a last resort:

- I add 1% for stands still to receive the prescribed tending. Valuation depends on the completion of an assumed regime, and there is a risk that this will not be applied. I also vary the discount rate mainly where the information base is suspect.
- Increase discount rate for low operating margin forests.
- The discount rate is set at the top end of the implied discount rate band.

Table 2 - Estimates of the discount rate implicit in the transaction price of sales in 2005-2007 of forests or interests in forests. Forests are described by location and size class (Small <1000 ha; Medium 1000 to 10,000 ha; Large >10,000 ha).²

Forest	Number of respondents	Implied discount rate (applied to post-tax cashflows)	Implied discount rate (applied to pre-tax cashflows)
1. Small forest - King Country (4 transactions)	1		8.5
2. Small forest - East Coast	1	5.8	7.3
3. Small forest - Northern Hawkes Bay	1		8.5
4. Small forest - Hawkes Bay	1		9.0
5. Small forest - Southern NI	1	7.0	9.6
6. Small forest - Wairarapa	1	7.4	8.8
7. Small forest - Wellington	1		10.0
8. Small forest - North Otago	1	7.2	9.2
9. Small forest - Southland	1	8.8	11.9
10. Small forest (Douglas fir) Otago/Southland	1	6.0	
11. Medium forest - Otago/Southland 2006	2	6.5 - 7.2	9.8-10.8
12. Large forest - North Island 2005	4	5.4 - 8.0	7.0 - 11.8
13. Large forest - New Zealand 2005	4	5.5 - 6.8	8.0 - 10.6
14. Large forest - CNI 2006	2	5.7	7.2 - 8.0
15. Large forest - New Zealand 2006	4	4.5 - 5.6	6.5 - 7.5

² The two large 2005 transactions were reported in the 2005 survey. They are included here because additional valuers have provided implied discount rates. In Figs. 2 and 3 they are shown only for 2005.

Some respondents make adjustments to cashflows and to the discount rate:

- Commercial risk is allowed for in the discount rate chosen. Fire and some windthrow are insured against and the premiums included in the costs.
- Risk is built into the cash flow projection where it can be quantified. For non-quantifiable risks, we alter the discount rate.

Discount rate implied by recent transactions

Information provided by valuers on estimates of the implied discount rates in recent transactions is summarised in Table 2.

There is some variation in the implied discount rates that different forest valuers have estimated for the same transaction. In particular, the valuers providing estimates for transaction 12 clearly had different assumptions about some key valuation inputs.

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

The majority of valuers (10 out of 19) reported that they don't commonly do this type of evaluation. Of the nine valuers who responded, five use the same discount rate as for forest valuation, two use a lower discount rate and two use a higher discount rate.

What is your estimate of the internal rate of return on new planting?

There were 14 responses to this question. Responses to this question are given in Table 3. The estimates vary widely depending, to some extent, on the range of activities that the respondent is involved with. Some respondents gave specific examples while others gave a general range.

Discussion

Trends in discount rates since 1997

Table 3: Estimate of the IRR (Internal Rate of Return) on new planting.

Respondent	IRR (post-tax cashflows)	IRR (pre-tax cashflows)	
1	5		East Coast & Wairarapa
2	5.5 - 7.5		CNI & East Coast
3	3.5 - 7.5		NZ range
4	5 - 7		North Island
6		2 - 8	
7		3.5 - 5.5	North Island average
9		6 - 7	
11		6 - 7	Otago/Southland
12		7.5 - 8	
15	6 - 7		Otago, CNI
16	6 - 7		Otago/Southland
17		4 - 6	
18	5 - 6		
19		5 - 6.5	King Country, CNI

Figs. 2 and 3 show the IDRs (applied to post-tax cashflows and pre-tax cashflows respectively) of transactions reported in all six surveys to date. These figures suggest that:

- IDRs have reduced since 2005. This reduction is most evident in Fig.2 (post-tax cashflows). The range of IDRs (with post-tax cashflows), 6.4 to 10.0 % in the 2005 survey, has lowered to 5.1 to 8.8% in 2007. The average IDR has reduced from 8.4% to 6.7%. For IDRs calculated using pre-tax cashflows, the average has reduced from 10.2% to 9.0%.
- The reduction in IDRs has particularly been for sales of large forests. The 2005 survey reported IDRs for seven large forests with a range of 6.4 to 10.0%. These had an average IDR (for post-tax cashflows) of 8.0%. The IDRs for the three “Large forest - New Zealand” sales were at the lower end (6.4%, 6.7%, 6.9%). These forests were sold in 2005. The two large forests sold in 2006 have IDRs of 5.1% and 5.7%.
- One valuer stated that the reduction in discount rates is a reflection of the change in the relative supply and demand for “investment grade forest assets”. There is a limited number of such forests globally. However there is an increasing demand with capital available in

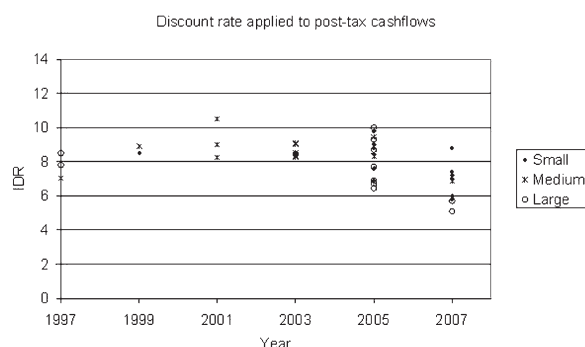


Fig. 2: IDRs (applied to post-tax cashflows) for transactions reported in each of the six discount rate surveys. Forests are identified by size class (Small <1000 ha; Medium 1000 to 10,000 ha; Large >10,000 ha).

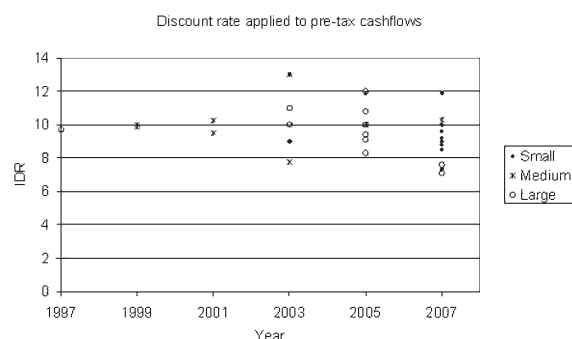


Fig. 3: IDRs (applied to pre-tax cashflows) for transactions reported in each of the six discount rate surveys. Forests are identified by size class (Small <1000 ha; Medium 1000 to 10,000 ha; Large >10,000 ha).

North America and Asia, and investors wanting safer “bricks and mortar” assets.

Alignment with IRR

There has been a disconnect between the discount rates used for forest valuation in New Zealand and the IRR of new planting or replanting projects. For example, Colley (2002) observed that “there is clearly a disjoint (or ‘value gap’) between existing (older) forests and newly planted forests. At some point, those who plant new forests are going to have to mark time (i.e., see the value of their investment remain static for a few years) until it is on the value curve for older stands as demonstrated by sales transactions.”

The estimates of IRR collected in this survey cover the range 3.5 to 7.5 % for post-tax cashflows and 2 to 8 % for pre-tax cashflows. With the reduction in discount rates reported in this survey, there is some overlap between the discount rates used for forest valuation and the these estimates of IRR or “earning” rate of forestry projects.

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institute news

Forests, boundaries and the NZ Emissions Trading Scheme

President's comment

The boundary around forestry has changed forever with the recognition that our climate is changing and the advent of the New Zealand Emissions Trading Scheme. We have talked for years about recognising the environmental benefits of forestry and that time of recognition is now upon us. We have also talked about sustainability, initially from a sustainable wood supply viewpoint and then moving onto sustainability in social, environmental and economic terms.



It has been fascinating to see environmental issues move from the side to centre stage over the last year as the government has positioned New Zealand to become a carbon neutral country followed closely by their intention to implement the NZ Emissions Trading Scheme.

The NZIF has asked for flexibility around land use and equitable treatment for all land users. In doing so the forest growing industry has been unwittingly used by government to "fight" the agricultural lobby because we have pointed the finger at our agricultural industry and said if "we" have to then "they" must too. This is the same group of people, who like foresters, are the custodians of soil and water - resources we are increasingly realising are our most precious resources and ones that cannot be created by technology.

At this time of considerable change the Institute needs to be flexible and adjust to the "new forestry" and to accept that what is and what is not forestry is going to be much more difficult to define. In my view there is no need to define it because our objective must be to be the best custodians we can be of our precious resources, including carbon.

As a person whose core business is sustainability I have decided that I need to put my energies into working with businesses and households to reduce our emissions and use resources more efficiently. At this stage I believe this is more important than planting trees to "pay for our sins" because emissions continue daily whereas carbon can only be sequestered once.

I strongly believe all land users must, and eventually will have to, work together. I find the "us" and "them" approach unconstructive and dislike the thought that we are being used by government. In the future I'd like to play a key role in leading a team with an inclusive approach for all land based industries. By this I mean taking a more intuitive and feminine approach to working through the issues.

We need more women to take leadership roles within our industry. Forestry has a gender imbalance and it will remain this way for some time to come. Even though we're training many young women their numbers decrease as their career develops.

As the outgoing first elected female president I encourage other women in the organisation to make a difference by standing for the NZIF council and helping to shape our organisation. The NZIF will need a flexible structure that is inclusive of the many different people who will be involved in the "new forestry".

Kia kaha, kia ora
Jaquetta (Ket) Bradshaw
 President
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 Te Putahi Ngaherehere o Aotearoa