

# A corporate valuation perspective

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## Introduction

The May 2002 edition of the NZ Journal of Forestry had a number of articles discussing issues around forest valuation, capital budgeting, discount rates, land values, exchange rates, and comparable forest and timber lot sales data. The author, in the course of conducting independent valuations of the shares in forestry companies, applies many of the concepts included in the articles and offers this article as an overview of their application in a corporate valuation context.

This article explains the fundamental approach to corporate valuation and explains how this approach is applied to forestry company share valuation. It also discusses the reasons why a forest consultant's valuation of a forest stand, or the value of net tangible assets, can vary from the value of shares in a company containing those forest assets. In the discussion, the importance of reliance on forestry consultants' expertise is recognised.

## Underlying assumptions

Many forestry companies in New Zealand are not publicly listed on the New Zealand Stock Exchange (NZSE). Forests are grown as a commercial business by many stakeholders including private investors, Maori organisations, local and central government, publicly listed companies and foreign investors. Significant private ownership of forestry that is not publicly traded on the NZSE creates the requirement for independent valuations.

Historical cashflows are often variable, particularly in companies where the age-class distribution is weighted towards younger trees although consistent cashflows may have been generated as a result of a management practice to harvest trees at a deemed sustainable yield level to ensure adequate cash flow. Initial investigations include discussions with the company management and the board of directors to gauge the extent of compliance with company policy on maintaining a sustainable forestry resource and also to understand operational aspects of the business.

## Valuation methodology

In valuing shares of closely held companies there are three primary methods to consider:

### (i) Dividend Yield

This method involves assessing the present value of a company's maintainable dividend. It is appropriate for valuing minority interests where the company has

an established policy of regularly paying dividends. Although a forestry company may have a record of paying profits as dividends, there is often a significant variation between historical profits and dividends. This method is often not deemed an appropriate means of valuing a forestry company.

### (ii) Assets Based

In this approach the value of shares is established by assuming a notional liquidation situation whereby the company's assets are sold and the proceeds applied to retiring liabilities and meeting costs associated with the liquidation process. This valuation approach assumes a decision is made to sell the land, trees and assets of the company, and calculate what those assets would realise in the market given a reasonable time to market the assets. In the case of a forestry company this would involve allowing time to clearfell the entire forest, sell logs at the prevailing prices, and then sell the land in a cut-over state. After allowing for harvest costs, restoration costs of the land, profit to purchaser and associated legal and liquidation expenses the value is assessed.

This approach<sup>1</sup> is hypothetical in nature and represents the value of the underlying forest asset at its particular stage of maturity to a prospective purchaser. A prospective purchaser most likely would not clearfell the forest in the manner described but continue growing the forest until the optimum time to harvest the stand is reached. This approach is considered appropriate when the company is not a going concern<sup>2</sup> or generates low profits relative to its asset backing.

### (iii) Earnings Basis

This approach assesses the present value (PV) of the company's estimated future earnings. This approach, which is similar to the DCF approach adopted by foresters in stand valuations<sup>3</sup> is generally applied when the company is a going concern and future cashflows can be forecast.

## Approach adopted in this discussion

For forestry company share valuations, an earnings approach is considered most appropriate where a company is a "going concern" and is projected to generate reasonably uniform cashflows in the future. Where the directors' objective per the Statement of Corporate Intent is to "operate a profitable, sustainable and innovative business...", management, in applying the director's policy, will ensure the company continues in the forestry

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<sup>1</sup> Immediate Liquidation Approach of the NZIF Forest Valuation Standards.

<sup>2</sup> A going concern business is one, which will continue to operate indefinitely. Value is in continued use, as a mass assemblage of income producing assets.

<sup>3</sup> Expectation Approach of NZIF Forest Valuation Standards.

business and will operate the business on a sustainable yield basis. This will usually assume a forest rotation policy and replanting regime to achieve a sustainable yield such that the forestry resource is restocked so that future harvest and cashflow levels are maintained.

For a hypothetical forestry company, producing radiata pine, a minimum of two full rotations is allowed for in a 60 year cash flow projection. In modelling a forestry resource, that has varying age profiles (sometimes lumpy) forestry consultants may attempt to smooth the harvesting of the forest over time so that the quantity and quality of the harvest is maintained without depleting the forestry resource. The existing cost structure of the business can then be modelled easily going forward. Varying levels of harvest, due to lumpy log maturities and variable future log prices, can be modelled for valuation purposes as well. This makes the valuation process more involved, requiring more analysis to understand the fixed versus variable cost structure of the company.

#### Earnings based valuation

In earnings based valuations a discounted free cash flow (DFCF) approach is adopted to value the forestry business, including the resource. The free cashflows represent the funds available to reward the equity and debt holders of the business. They reflect the cashflows generated by operations on an annual basis (normal timber/wood receipts less harvest costs, silviculture, planting and company overhead costs) less allowances for capital expenditure requirements. In summary this is:

Earnings before Interest and Tax (EBIT)  
- Taxation

Net Operating Profit After Tax (NOPAT)  
+ Depreciation  
- Capital Expenditure  
- Increase (or + decrease) in working capital

#### Free Cash Flow

The forecast free cashflows over the forecast period (60 years) and a terminal value can be discounted to the present value using an appropriate discount rate. The sum of the present value of the free cashflows and terminal value represents the value of the net operating assets of the business. Net operating assets include land, trees, and working capital (including accounts receivable and accounts payable) as well as other fixed assets. Plant and equipment will also be included in the net operating assets, but are usually limited to light vehicles where the operations on the forest are contracted out. This amalgam of net operating assets forms the basis from which operating cashflows are generated. Investors and funding providers look at operating cashflows as the basis for assessing the value of a group of operating assets.

#### Free cash flow assessment

In a discounted free cashflow assessment, we model a forecast level of maintainable earnings; an example is shown in Table 1.

Table 1: Discounted cash flow analysis for an example company.

	Year 1 \$000's	Year 2 \$000's	.....	Year 59 \$000's	
Forest harvested m <sup>3</sup>	532	536	.....	542	
Recoverable volume m <sup>3</sup>	454	454		454	
Forestry sales	29,314	29,064		65,120	
Costs of Production	(13,840)	(13,726)		(30,132)	
Plantation expenses	(2,286)	(2,268)		(5,080)	
Overhead expenses	(2,792)	(2,806)		(3,746)	
Depreciation	(240)	(242)		(322)	
Other income	300	300		300	
<b>Earnings Before Interest &amp; Tax</b>	<b>10,456</b>	<b>10,322</b>		<b>26,140</b>	
Plus depreciation	240	242		322	
Less:					
- Capital expenditure	(240)	(242)		(322)	
- Increase in working capital	(248)	32		(290)	
- Taxation paid	(3,384)	(3,274)		(8,628)	
<b>Free cash flows for valuation</b>	<b>6,824</b>	<b>7,080</b>		<b>17,222</b>	<b>Terminal</b>
					<b>17,396</b>
WACC	9.93%	9.93%		9.93%	8.80%
Applied discount					197,682
Factor	.9538	.8677		.0036	0.0036
<b>Present value of cash flows</b>	<b>6,508</b>	<b>6,143</b>	.....	<b>62</b>	<b>712</b>
<b>Sum of present value</b>	<b>\$83,544</b>				

Our modelling assumes over time that log price fluctuations even out and we take an average. We use consultant reports on volumes of harvested wood, and the recoverable volumes, split out by the different log grades expected to be cut. This is modelled for 60 years. A forecast sustainable forest yield is prepared using a forest description database that provides input for a forest estate model. The database determines the maximum level of cut which could be sustained, without diminishing the biological quality or the value of the estate over time, and the sustainable yield by log grade. Particular emphasis is placed on harvest timing and the marketing of a balanced product mix from the forest estate. A policy in this regard must be consistent with the Statement of Corporate Intent to operate a sustainable business.

It is difficult to predict future log prices. Clearly in the "real world" if log prices get sufficiently low, forestry companies can, and do, choose the option of reducing production until such time that log prices recover. Under those conditions harvest may be delayed to achieve higher income later in the life of the business. This management approach can be reflected in forest values by adopting a "real option analysis" methodology, which is an approach outside the scope of this article.

Log prices for the various grades are based on current prices at the time of valuation. As appropriate, we allow for log prices to increase by an annual real percentage increase. This judgment call will be considered reasonable when anticipated demand for wood internationally is buoyant. Log prices are denominated in \$NZ. Consideration may be given to forecasting log prices into the future based on an analysis of the historical cyclical trend and predicting that forward. This is not pursued as we assume that on average over time, (especially 60 years) the current world price is the best estimate adjusted for an estimated annual real percentage increase. Similarly, when comparing the \$NZ exchange rate with the \$US, we adopted the prevailing exchange rate. Currently we would use \$NZ0.55 per US\$1.00 [April 2003]. A review of bank forecasts indicates difficulty with their predictions of the exchange rates. Consequently we choose the current prevailing exchange rate as the best estimate going forward.

Harvest, cartage, silviculture and replanting expenses are analysed, and expressed, as a percentage of gross income and applied on the same percentage. The underlying assumption with any business is that the underlying resource is repaired or replaced so as to sustain future cashflows. In the case of a forest, once a stand is cut down it will be replanted in the following year. The cost of maintaining the resource as a sustainable business is a normal annual cost of a forestry business.

Overhead expenses and depreciation are then analysed on a line by line basis and projected over the forecast period. Depreciation can be estimated by assessing a maintainable per annum level of capital expenditure based on historical trends, discussions with

management, and applying an average tax depreciation rate. Capital expenditure may be modelled based on a future capital expenditure program, or calculated as an annual average expenditure that normalises capital expenditure over time. Usually a normalised capital expenditure will equal depreciation given that depreciation expenses the cost of an asset over its expected useful life.

The outcome of this analysis is a forecast Earnings Before Interest and Tax (EBIT) over the forecast period. From EBIT a notional annual taxation expense is deducted. As is often the case for forestry companies, there may be a large historical cost of bush balance remaining to be amortised. In our experience, there is often specialist tax advice available, or a specific Inland Revenue Department ruling, to define the time the cost of bush is amortised over. A consultant's estimate of forecast recoverable wood volumes may also contribute to the basis of calculating the annual cost of bush write off. We apply the annual cost of bush write off against projected annual taxable income.

Taxation payable on the earnings figure before interest and after tax is adjusted for cost of bush write off to derive Net Operating Profit After Tax (NOPAT). The NOPAT is then integrated in a forecast cashflow statement and notional balance sheet for the forecast period. From the balance sheet the annual change in working capital requirements is calculated and included in the forecast Net Free Cashflow estimate. By adding back actual annual depreciation allowances and deducting an estimated realistic annual estimate of capital expenditure a Free Cash Flow (FCF) forecast can be calculated for the forecast period.

### Capitalisation and discount rates

Our assessment of appropriate capitalisation and discount rates is based on a company's assessed weighted average cost of capital (WACC). The WACC calculation recognises the market at the date of valuation including returns available from other forms of investment including government stock and listed company shares. It is a measure of the yield we consider the market would receive from an investment of the value and risk associated with this business. This approach assesses the relative weighting of the cost of debt and equity. The intent in a corporate finance analysis is to assess an "after-tax discount rate" which compares with post-tax free cash flow investments applicable to other investments available to a prospective purchaser of the company's shares.

The cost of debt is calculated by a comparison with current bank and bill rates. To assess the cost of equity the Capital Asset Pricing Model (CAPM), the most widely accepted method amongst practitioners and academics for calculating the cost of equity, is used.

## The key variables in the Cost of Equity Calculation (CAPM)

### 1. Asset Beta

An adjustment is required to reflect an industry's inherent risk that cannot be reduced by portfolio diversification. In the CAPM approach this is achieved by adopting a beta coefficient of variation from the overall market for an industry (the forest industry). Estimates can be based on an analysis of international and Australasian forestry companies. Given logs and wood are an international commodity, we analyse forestry companies worldwide but place greater emphasis on Australian and New Zealand companies. Less weighting is given towards those companies that have operations with downstream processing or manufacturing. An asset beta of 0.90 reflects a lower risk compared to the overall market coefficient of variation of 1.00. A range of asset betas from various industries are detailed in Table 2. The asset beta is modified to become an equity beta

Table 2: Examples of asset betas

Carter Holt Harvey	1.00
Wrightsons	0.88
Shotover jet	0.61
Ebos	0.51
Lion Nathan	0.26
Horizon Energy	0.26

reflecting the debt/equity funding ratio.

### 2. Risk free rate

The Risk Free Rate is calculated using current ten year government bond rates.

### 3. Post Tax Market Risk Premium

A market risk premium is a historic measure of the premium required for equities or shares over and above the rate paid for government fixed interest bonds. Current estimates adopted by valuers in New Zealand range between 7.0% and 9.0%.

### 4. Debt to Equity Ratio

The WACC calculation requires an assessment of the most appropriate debt/equity ratio. Our approach is to analyse Australasian companies placing greater emphasis on New Zealand companies, which would include, Fletcher Challenge Forests (FCF), Carter Holt Harvey (CHH), Nuhaka Forestry (NF), and Opio Forestry (OF). An analysis of the industry debt/total assets indicates ratios of about 30/100.

## Calculating the Weighted Average Cost of Capital (WACC)

Allowances for price growth are not included in a discount rate given growth is allowed for in cashflow projections. The real discount rate calculated adopting the WACC approach may range from 9% to 13%, which is a post-tax rate. We compare this WACC rate with

other industries such as energy network companies, food, manufacturing companies and agri business companies as listed on the New Zealand Stock

Table 3: WACCs for different types of industries

Company Type	Range (%)
Power network company	6.0 - 8.5
Gas reticulation network company	7.0 - 9.5
Food manufacturing company	7.0 - 9.0
Agri business	8.0 - 12.0

Exchange (Table 3).

The range for forestry companies is based on an analysis of a number of forestry related companies. Some companies are solely forest owners whereas others have downstream processing or marketing that have added value components. Vertical integration is a means of diversification, thereby reducing variability of returns and therefore reducing risk and the WACC. Power network companies often have a lower WACC than Agri business companies because of their infrastructural nature and generally consistent cashflow generation. Agricultural businesses usually have higher WACC's due to greater variability in returns and therefore greater risk.

## Valuation calculations

The projections usually cover two rotations and include a terminal value for the ongoing business calculated for a level of maintainable cashflows beyond the projections. A real growth rate may be allowed for in the discount rate for cashflows beyond the initial two rotations. For the first two rotations real growth is included in the cashflow projections. The terminal calculation beyond two rotations values the remaining cashflows to perpetuity with the growth in those cashflows incorporated into the discount rate. The sum of the discounted cashflows and terminal value is the value of the operating assets - the forest estate, land, operational working capital (excluding financial working capital) and fixed assets.

To assess the share valuation for the company we deduct financial assets and liabilities (including financial

	(000's)
Value of the operating forest	83,544
Add Cash	300
Less Tax payable	-
Long term liabilities	-
Dividend payable	(2,800)
	(2,500)
Value of equity (prior to equity discounts)	81,044

working capital) from the operating asset value to derive the value of equity of the company. For example:

Up to this stage, the discount rate has been assessed on the basis of the company being listed on the equities exchange with freely transferable share script. Further discounts applicable to privately owned non-listed

companies would be applied to the calculated value of equity. Discounts reflecting control issues and a marketability discount that measures the percentage discount of a less-able-to-be sold share, relative to a liquid share such as that listed on the stock market would be applied to the value of equity. Investor's value liquidity or marketability. Discounts applied to the value of equity may range from 10% to 60% depending on the specifics of each case. There is a wide body of empirical research worldwide analysing and measuring these additional equity discounts.

### Comparable company statistics

An analysis of the equity valuation is done by considering the effective Earnings Before Interest,

	PE Ratio	EBIAT Multiples
Forestry company	11.8	7.7

Amortisation and Tax [EBIAT] and Price Earnings [PE] multiples.

We then consider these ratios and multiples to listed New Zealand forest and forest related companies. The valuation of this fictitious forestry company is considered reasonable for an unlisted company of this size.

### Valuation conclusion

The approach used for the valuation of a forestry company is one consistent with a standard business valuation approach for a going concern entity (see Pratt et al 2000). As a corporate finance and valuation specialist, the author saw no reason to value a forest business any differently to a manufacturing or retail based organisation using fundamental investment analysis.

### Reconciling the value of forest stands with the value of forest company shares

There may be a difference between valuation of shares of a forestry company and the underlying valuation of the forest stands owned by that company. Forest stand valuations are based on a different market concept whereby the owners have direct control over the sale of the forest stand. Under this market approach the owners have a direct interest and are able to benefit from the realisation of a forest at their discretion. Forest stands valued on an asset realisation basis include the anticipated realisation of land based on current prices.

Share valuations for forestry companies reflect a different ownership profile, being that of a shareholder without discretionary rights in relation to the underlying assets. The role of a shareholder is considered to differ from that of an individual forest landowner in that they usually do not have the right to enforce a liquidation of a forest resource. Shareholders when investing in a forest company are reliant on the directors' policy. This view was reinforced by Mahon J in *Coleman v Myers* [1977] 2 NZLR 225 at 295-296:

*A share does not constitute an interest in the assets of a company. It only vests in the holder that collection of rights provided by the memorandum and articles of*

*the company. Its value will depend not only upon the financial status of the company at a given date but also the extent of the individual holding of which that share forms a part.*

These issues underline the differing roles of shareholders, directors, and managers. In assessing the value of a forest on a going concern basis the policy is to run a sustainable cash generating company, thus any policy of realisation of the forest estate (including land) is not an issue. With this in mind share valuations analyse not only expected cashflows over coming years but also consider all the corporate overheads involved with running the ongoing business. To the resulting annual cashflow an appropriate discount factor is applied reflecting the expectations of an investing shareholder rather than an individual forest owner with discretion to realise the asset. An investing shareholder invests for an expected return as compared to other alternative investments. The investment value based on cashflows thus differs from the realisable value on a liquidation basis.

### References

- Pratt S.P., Reilly R.F., Schweihs R.P. 2000: "Valuing a Business. The Analysis and an Appraisal of Closely Held Companies". McGraw-Hill. 923p.  
New Zealand Institute of Forestry. 1999: Forest Valuation Standards. New Zealand Institute of Forestry, Christchurch.

## Registered Forestry Consultant Application

The following individual has made an application under Article 39 of the NZIF Articles of Association for recognition as a Registered Forestry Consultant.

Patrick George Milne Kaiapoi (Christchurch)

Article 40 (2) allows any member of the Institute the right to object to any application for Registered Forestry Consultant.

Any objection should be made in writing and sent to the Registrar, NZIF Registration Board, PO Box 19840, Christchurch within 20 days after the date of despatch of this journal.

## Five Year Review

The following have applied to have a five-yearly consultant review:

Ian Moore Wanganui

The Registrar, NZIF Registration Board,  
PO Box 1860, WHANGAREI