Forward–selling the harvest from a commercial forest using a forestry derivative: a step towards forestry co-operatives

Howard Moore

The author has developed a financial instrument whose value over time exactly mimics that of a commercial forest. Because its value moves like a forest, even though it is not a forest, it may be called a fores*try derivative* (i.e. something whose *value is derived* from a forest).

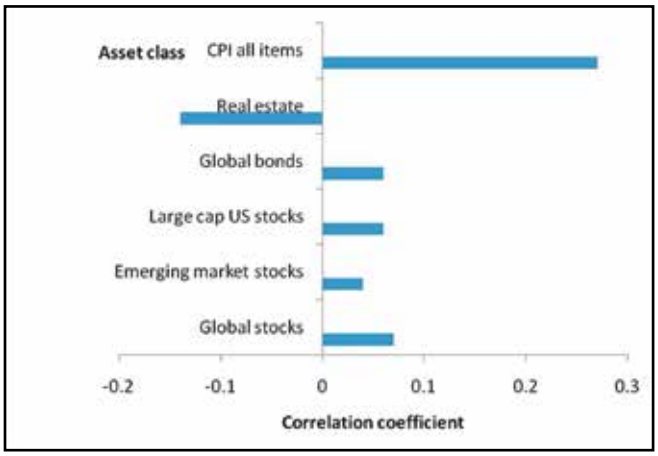
The purpose of the derivative is to provide liquidity into a traditionally illiquid sector. The derivative allows a forest owner to manage his cash flow by forward-selling part of his stumpage income; while it allows an investor to trade in a short-term, scalable forest investment with an averaged industry risk.

The grower issues the derivative for the net present value (NPV) of the future stumpage of his immature forest, and redeems it for the actual pre-tax stumpage on maturity. The effect is that of receiving a loan against the future stumpage, where *the 'interest' on the loan is the annual increase in the net present value of that stumpage*. Title to the trees does not pass and consequently the issue does not invoke the 'cost of standing timber' provisions of the Income Tax Act 2007.

Many investors want forestry returns without being involved in growing trees. Similarly, some forest owners want earlier returns from their forests. The derivative allows both buyer and seller to agree on a price and do a deal, with both treated equally under tax law. This feature may allow owners to consolidate small forests without loss of value, for example through exchanging forests for shares in companies or forestry co-operatives.

1. The value drivers of forest investment

Portfolio investors buy real forests because the value drivers are poorly correlated with those of other asset classes. Consequently the returns from timberland reduce portfolio volatility and increase average rates of return across the portfolio [1,2].



The diagram below illustrates the correlation of the returns from timberland with the USA Consumer Price Index, real estate and financial asset classes.

Historical yearly correlations with timberland returns based on quarterly data between Q1 1987 and Q4 2008.

From: "Timberland investments in an institutional portfolio", Copenhagen, March 11, 2009; International Woodland Company, Denmark. [http://www.iwc.dk/publications/2_Tbld%20investments%20in%20an%20institutional%20portfolio.pdf]

The diagram confirms that forest values somewhat follow inflation, which helps protect investors; but are poorly correlated with the value movements of other asset classes.

The drivers of forest value have been determined to be biological growth (65-75%); log prices (25-30%) and land value (2-5%)[3]. It is clear that land value plays a very small part, because US pension funds were happy to buy New Zealand Crown Forest Licences which exclude land. As other asset classes do not

[1] *J P Morgan, USA 2011*
[2] *Zinkhan, Sizemore, Mason and Ebner, USA 1992*
[3] *Caulfield, USA 1998*

include biological growth, which is independent of financial markets, this is possibly the main reason for the low correlations.

Because forest values are predominantly driven by biological growth and log prices it is possible to create a forestry derivative based simply on the NPV of future harvest revenue. The value of the derivative over time then tracks the value of the age class of the crop on which it is based.

In order to calculate the NPV we need a defined harvest date, a good forest growth model, sound inventory data and appropriate log or biomass prices. Given those inputs, we can value – and therefore trade – the derivative at any time without disturbing the underlying ownership or management of the forest.

2. In New Zealand, standing trees are inventory

The Income Tax Act 2007 requires the seller to declare the sale of standing timber as income when it occurs, while the buyer must carry the 'cost of timber' in an account until he 'disposes of the timber' by sale or harvesting, which may be many years later. Inflation and the time cost of money reduce the value of the tax deduction, and the mismatch of benefit and liability can create irreconcilable differences between buyers and sellers attempting to trade smaller forests[4]. Because the key issues are the effects of inflation and the time cost of money on the deferred tax credit, the mismatch is most pronounced in forests with no early income.

3. Keeping the trees: selling the investment

Assume that the owner of a single age-class immature forest issued an investor a forestry derivative based on a fixed percentage of the expected stumpage of that forest on maturity. The issue price would be the NPV at the time of issue of that share of the future stumpage. Thereafter the value of the derivative would change with the NPV over time, driven by biological growth and mortality (changing forest quality and mass) and prices for forest produce. On a specified date, the grower would harvest the forest and redeem the derivative from the proceeds. *The crop would fully hedge the value of the derivative at all times.*

In tax terms, the derivative would behave like a loan. Although the value of the derivative would change with the value of the crop, it would not confer ownership of any part of it. Title to the trees would stay with the grower who would issue and redeem the derivative for cash.

Grower's tax position

The derivative is a financial instrument, like a loan. The increase in the value of the forest represents the notional 'interest' on that 'loan' over its term. Because the value growth is owned by the investor, it becomes an assessable income to the investor and a deductible expense to the grower, even if no cash changes hands.

The grower pays no tax on issuing the derivative; he deducts the annual change in the NPV of future stumpage from his other income as notional 'interest paid' to the investor who owns the derivative; and when the grower harvests the forest on maturity, *he pays tax on the full harvest proceeds* because he still owns the trees.

Investor's tax position

The investor buys the derivative in order to profit from the difference between the NPV of the stumpage at the date of issue, and at the date of harvest. He must pay tax on the annual increase in this NPV as the forest grows. Because he pays all of this tax in advance, when the derivative is redeemed he receives the pre-tax stumpage revenue tax free.

The net tax effect of issuing the derivative is the same as not issuing it at all, because each year the tax paid by the investor is matched by the tax deducted by the grower. Inland Revenue collects its tax in full from the grower when he harvests the forest, *because he never sold it.*

4. Creating the derivative

As described the derivative takes the form of a loan secured against a forest crop, growing in

[4] *Levack, NZ 2010*

value at the same rate as the crop. It is defined by an Agreement in which the issuer offers the investor a sum of money later, in return for receiving a smaller sum of money now. The Agreement requires that:

- The issue value is the pre-tax NPV of a defined percentage of the issuer's expected stumpage, and the redemption value is the realised value of the same percentage. The redemption date is the harvest date, which is fixed from the outset but may be varied by consent. In the case of a co-operative the derivative may be issued for 100% of the grower's forest subject to conditions on forest management (see below).

- Security for the derivative is by way of a Registered conditional Forestry Right that when exercised, allows the investor to take control of the forest if the issuer defaults. The Forestry Right does not pass title to the trees unless it is exercised.

- The investor may assign his rights under the Agreement at any time, allowing him to freely trade the derivative. The issuer may assign his rights with conditions in the event that he sells the land, when the Agreement transfers to the buyer of the land.

- The issuer is responsible for maintaining the health and vigour of the forest and ensuring that it is harvested for full value. His financial obligation to the investor does not extend beyond the defined percentage of stumpage that he pre-sold.

As described the derivative does not include the assignment of any carbon credits which would continue to accrue to the forest owner. The concept has been discussed with Inland Revenue who accept that it is not a mechanism to reduce a forest grower's tax liability. While the chance of financial loss on a single forest may be low its impact may be catastrophic. In order manage risk a large number of 'level one' derivatives as described above could be issued and aggregated into a pooled investment. Against this pool one could then issue 'level two' derivatives (with an average risk), which would trade and be redeemed from pool income created by the redemption of matching 'level one' derivatives.

5. Controlling the derivative

The key issues involved with the derivative are:

Valuation

The value of the future stumpage must be determined when the derivative is issued, when it is traded, and annually for tax purposes. In order to establish a reliable market for trading forestry derivatives it would be necessary to establish a consistent standard of valuation. That implies perhaps one body undertaking valuations, using a published set of criteria, and accepting into the scheme only those forests that comply.

The valuation process might be simplified by agreeing the harvest yield of the forest in advance (in tonnes per ha of each log grade, typical for the regime and the location). This would remove the need for accurate inventories, cut costs, and give the investor confidence in the outcome (albeit at the grower's risk). The remaining inputs such as log prices and harvesting and marketing costs could be easily sourced and updated.

Harvest date

Forestry valuations require known harvest dates. The redemption date of the derivative must be set on issue and forest planning must work towards that date unless both parties agree that harvesting (and redemption) should be rescheduled to suit the market. Because uncertainty increases with time, forestry derivatives might be issued less than 10 years from planned harvest. Although agreeing the harvest date, the forest owner is not constrained as to how or to whom he markets his forest produce.

Forest management

On issuing the derivative the grower must undertake to manage and protect the

whole forest at his own expense and with all care, making the same decisions and committing to the same expenditure as if he had not issued it. This might be achieved by requiring the grower to retain ownership of say 50% of the stumpage to ensure that he had the right financial incentives; or by appointing an independent forest manager to control forest management and harvesting and marketing, at the grower's expense.

Should growers wish to consolidate small forests into a co-operative they could issue derivatives for 100% of their crops provided the co-operative was given a limited management contract. The issue price of each derivative would reflect the cost of management that would then be borne by the organisation, rather than the growers. Each Agreement would still impose obligations on the grower (access, maintenance of the land and its improvements, protection, pest control), which if neglected could lead to an event of default and the co-operative exercising its security.

Default

Security for the investor is by way of a Registered Forestry Right over the *entire forest* so that if necessary, the investor could appoint a manager to administer and harvest it and take his defined share of the total stumpage in priority to the issuer. As title would pass when the Forestry Right was activated, the investor would have to revalue the forest and create a 'cost of standing timber' account for the new valuation.

Trading

A derivative once issued could be traded on secondary markets. Because the owner of the derivative would not be paying any of the forest costs, the traded value should fall somewhere near or above that of an immature forest owned from the outset, perhaps with a discount in relation to the perceived integrity of the issuer who would continue to manage the forest for the investor.

6. Conclusion

Just as with carbon credits, which we can value, issue and trade separate from the trees themselves, it is possible to separate investment from trees. A forestry derivative based on the net present value of future stumpage will track the value of the age class of the crop on which it is based. Such a derivative could be traded, aggregated and subdivided without affecting the ownership or growth of the underlying forest.

Forest values are driven by biological growth. Consequently they behave differently from the values of nearly all other investments around the world. A forestry derivative offering small scale, easily tradable instruments might tap into the global market for forest investments.

A few large forest owners could create a pool of primary derivatives from which a trader could issue secondary derivatives, each carrying an averaged forest risk. This would provide the growers with more flexibility in generating forest returns, widen the opportunities for investors, and create a secondary market for forest investments. Small forest growers could consolidate their holdings by selling them into a co-operative or company for shares without incurring problems with the 'cost of standing timber' provisions of the Income Tax Act.

7. Disclosure

AuCrop Ltd has patented the derivative in three countries. The author is a shareholder in the company. AuCrop has not yet determined the costs of applying the derivative, and what scale of forest it would best apply to. It may be prove to be uneconomic. The author invites wider discussion, especially comment from the owners of forests who wish to cash up part of their investments, or who wish to consolidate their holdings into co-operatives for economies of scale.

8. Acknowledgments

The author acknowledges the assistance of Hamish Levack who continues to champion the cause for small forest owners; of Chandler Fraser Keating Ltd, who kindly tested the prototype derivative on real data; and of Andy Dick and Gerard Horgan, who together provided a sound and thorough critique of the original paper.

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About the Author

Howard Moore, ME, MNZIF. Howard is a Director of Sinclair Robertson Associates Ltd, a member of the NZ Farm Forestry Association and of the NZ Institute of Forestry.

He is interested in the behaviour of forests as financial assets, and in the 1990s restructured Crown forestry loans of $36 million to Maori and assisted The Treasury in negotiating the sale of $300 million of the Crown's interest in commercial forests to Maori landowners.

He recently assisted affiliate Te Arawa Iwi and Hapu in negotiating a Treaty settlement involving 50,000 ha of Kaingaroa forest land.

New Information

Rare plant discovery 'significant' for kakabeak

New discoveries of the extremely rare, native kakabeak plant (Clianthus) have excited botanists and local DOC workers in the Hawke's Bay.

The discovery of two previously unrecorded plants in Willowflat Forest has been described by local conservation groups as an extremely significant one, with numbers of the endangered Clianthus maximus occurring in the wild as low as 120 known plants.

Andy Fleming, Harvest Planning Manager of Rayonier Matariki Forests, says the find by the company's contractors was particularly surprising as the plants had been in an area where the crew had been working for some months.

"The kakabeak is often mistaken for a Kowhai when not in bloom, so our guys had passed by the plants several times without taking any particular notice of them. It wasn't until their yearly bloom produced the distinctive bright red flowers that we realised they were unmistakeably kakabeak," says Fleming. "The kakabeak is particularly relevant to the Hawke's Bay as it once grew here in abundance and currently occurs naturally only from northern Hawke's Bay to East Cape, with a few plants historically found in the Bay of Plenty region."

Rayonier Matariki Forests staff have collected cuttings from each of the plants which will undergo DNA testing to identify any variances from other Clianthus maximus plants. The seeds collected from

each plant will be used for propagation in a native tree nursery.

Alan Lee, DOC Threats Ranger for the Hawke's Bay area, says the find of the kakabeak and the following DNA tests are both exciting and important for the future of the plant.

"This find is very significant as it is a chance to add to the genetic diversity of plants in the Hawke's Bay population," says Lee. "What's more, new plants are very rarely found these days - only a handful have been found in the Hawke's Bay over the past 10 years, despite a number of searches. The DNA test will ultimately show how closely related these new plants are to other kakabeak in the area."