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

Paper for the NZ Journal of Forestry [in press]

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A forest owner can effectively forward-sell his harvest income fully hedged against market risk, by issuing a financial derivative based on the net present value of his forest, and redeeming that instrument again when the forest is cut. When he issues the derivative the forest owner is selling the forest investment return, not the standing timber. As title to the trees does not pass, the issue does not invoke the 'cost of standing timber' provisions of the Income Tax Act 2007.

There are many investors who want forestry returns without being involved in the gritty reality of growing trees. Similarly, there are many forest owners who want to be able to free up cash flow from their immature forest estates. The derivative allows both buyer and seller to agree on the forest valuation and the sale price without the distortions caused by current tax law.

This feature may also facilitate the voluntary consolidation of small forests without loss of value, for example through exchanging forests for shares in forestry co-operatives.

1. Introduction

New Zealand tax law recognises standing trees as 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. This 'Cost of Bush' as it is commonly known can create irreconcilable differences between buyers and sellers when attempting to trade smaller commercial forests (Levack, 2010).

Because the key issues are inflation and the time cost of money, the effect is most pronounced in forests with no early income. The effect is much less – as a percentage of forest value – for large commercial forests with immediate and ongoing cash flows. These are bought and sold without the Cost of Bush being an impediment.

Using a new financial derivative, a forest grower can sell the harvest forward while retaining title to his trees. As title does not pass, there is no Cost of Bush and both buyer and seller can agree to the same forest valuation. With a suitably structured sale, both parties can enjoy positive cash flows until harvest, while fully complying with New Zealand tax law.

2. Identifying the investment from the fibre

A forest consists of both investment and wood. Although the two parts are connected they are quite different. Investors want the value; wood processors want the fibre. These are two separate markets.

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Wood is a tangible product bound to the land through the trees and delivered only once when the forest is cut. Investment is an intangible product represented by the net present value of the harvest proceeds, less the costs of growing the forest on to the point of felling. It is a function of growth rate, time, costs and log prices. In order to calculate it, you need a defined harvest date, a good forest model and sound inventory data. Given those inputs, investment can be determined and traded from moment to moment. It does not need to be tied to land or fibre.

If the investment can be determined exactly as if it were a real forest when it is not, it is in fact a *forestry derivative*: i.e. a financial instrument whose value tracks the value of a real forest, but which may be traded, swapped and subdivided independent of the fibre.

3. Understanding the derivative

Assume that a forest owner issued an investor a derivative based on a fixed percentage of his immature forest. The issue price of the derivative would be the NPV of that share of the forest at the time of issue. Thereafter the value of the derivative would change with the NPV of the crop as it grew. On harvest, the forest owner would redeem the derivative from the harvest proceeds. The crop would hedge the value of the derivative at all times.

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 would stay with the grower who would issue and redeem the derivative for cash.

4. Tax treatment of the derivative

The tax implications of such a transaction fall into two parts.

Grower

Forest income is taxed on harvest and if the grower sold the trees before harvest, they would be subject to the Cost of Bush provisions of the Income Tax Act. However the derivative is a financial instrument. Its sale (issue) is similar to the grower receiving a loan from the investor repayable on harvest. The issue does not create assessable income to the grower.

The increase in the value of the forest – and the derivative – represents the notional 'interest' on the 'loan' over its term. The value growth is attributed ('paid') by the grower to the investor and so becomes a deductible expense to the grower and an assessable income to the investor, even if no cash changes hands.

The forest grower's tax position is that:

- he pays no tax on the proceeds from issuing the derivative (receiving the 'loan');
- he deducts the annual change in forest value from his other income as notional 'interest paid' to the investor;
- when he harvests the forest on maturity, he pays tax on the full harvest proceeds.

Investor

The investor buys the derivative in the expectation of making a profit, i.e. he expects to redeem it for more than he paid. The change in value is the difference between the NPV of the agreed percentage of the forest at the date of issue, and again at the date of harvest.

This profit is taxable and under Section EZ 35 of the Income Tax Act the investor must pay tax against the annual increase in value of the derivative as the forest grows. As a result, the redemption value of the derivative is the net pre-tax harvest income from the forest. The investor will receive this tax free, as he will already have paid all of the tax in advance. Each year the tax actually paid by the investor will match the tax deduction claimed by the grower.

5. Behaviour of the derivative

To understand how the derivative would work to forward-sell an immature forest crop, the financials of the proposed transaction can be compared to not selling the forest at all, or to selling it subject to Cost of Bush. Refer to the three scenarios in figure 1. [This spreadsheet is available from the author if you find the numbers hard to follow.]

Assumptions in the spreadsheet are that tax is at 30c; the investment in the immature forest is $2,000 and it is bought at full value; no more needs to be spent on the forest; the net harvest revenue before tax for that area of forest after 15 years is $8,000 (representing a nominal value growth rate of 9.68% pa compound over 15 years); the alternative use for the investment of $2,000 is to put it in the bank where it will earn a nominal 7% pa over the same period; and that all cash flows are discounted at the bank rate, i.e. 7% pa.

Separate investments

If the grower and the investor never met, the investor would retain his $2,000 in the bank. At 7% pa before tax he would earn $140 a year, which after 15 years would be $2,100, represented by tax of **$630** and a tax paid profit of **$1,470**. The NPV of his investment would be -$358 (negative, because the after tax rate of interest is less than the discount rate).

The grower would retain all of his forest and harvest it on maturity, paying tax at 30c on the full harvest revenues of $8,000, i.e. tax of **$2,400**, with profit after tax of **$5,600**. His NPV would be $1,897.

The scenario's total gross external earnings would be $10,100; tax **$3,030**; profit after tax **$7,070**, combined NPV $1,539.

Sale with cost of bush

If the investor bought the standing timber from the grower for $2,000, the grower would have to immediately pay tax on that income, i.e. 30c on $2,000 or tax of **$600.** He would then have an interim profit after tax of **$1,400** that he could reinvest.

He would put this $1,400 into the bank where would earn 7% or $98 a year over the period, an increase of $1,470 over 15 years. This would result in tax of **$441** and profit after tax of **$1,029**. His gross earnings would be $3,470 ($2,000 + $1,470), total tax $1,041, final profit after tax $2,429 and NPV $1,058. He would have lost value relative to keeping the forest, as his term deposit would earn less and he would pay more than half of his tax immediately on the sale of the trees.

The investor who bought the trees would carry forward the $2,000 purchase price in a Cost of Bush account, and on harvest pay tax at 30c on the harvest revenue less the Cost of Bush, i.e. 30c on ($8,000 - $2,000) or tax of **$1,800**, giving him an after tax profit of **$4,200**.

His NPV would be $231. It would have improved from scenario 1, because the forest he bought grew in value faster than his term deposit, and his tax was deferred.

The scenario's total gross external earnings would be $9,470; tax paid **$2,841**; profit after tax **$6,629**, combined NPV $1,289. The outcome is lower than in scenario 1 because tax is paid on the forest sale in year one, leaving less money to reinvest to earn interest over the period.

Sale of a derivative

If the investor bought a derivative from the grower for $2,000, the grower would put the money in the bank where it would earn 7% or $140 a year for 15 years, increasing by $2,100 over the period, incurring tax of **$630** and giving a profit after tax of **$1,470**.

The forest (and the derivative) would increase in value over the period from $2,000 to $8,000. During this time the investor would pay 30c on each $ of value increase or tax of **$1,800**, while the grower would receive tax deductions of the same amount.

In order to maintain a positive cash flow, every year the investor would borrow the tax on the derivative (say) from the grower. His borrowings would accumulate capitalised interest at 7% and be repaid from the redemption value of the derivative. The investor would claim against tax the interest 'paid' to the grower on the accumulating debt. As a result, he would earn a small annual tax rebate amounting to **($266)** in total over the period.

The grower would receive a tax credit for the annual increase in the value of the derivative. He would lend the tax credit to the investor at 7% pa with capitalised interest. He would of course pay tax on the interest he earned of **$266** over the period. However at the same time, he would be receiving interest on his term deposit, leaving him with a net positive income after tax over the period of $1,204 ($1,470 - $266).

At the time of harvest the investor would receive from the grower the full redemption value of the derivative (the total pre-tax harvest income) of $8,000. From this he would repay the grower the money he had borrowed, totalling $2,688 ($1,800 for tax plus interest of $888) leaving him $5,312. To this he could add the $266 earned in tax refunds making $5,578. As the total would include the repayment of his original $2,000 investment ('repayment' of his 'loan') his after tax profit would be **$3,578**. His total tax paid would be **$1,534** ($1800 paid less $266 credited) and his NPV would be $47. This would be better for the investor than scenario 1, as the forest would put on value at a faster rate than money in the bank.

On harvest the grower would receive the harvest income and as forest owner, would be liable for tax at 30c on the total of $8,000, i.e. tax of $2,400. He would also have paid tax of $630 on the money in the bank, and $266 on the interest he earned from the investor, but he would have received deductions of $1,800 from the notional interest he paid to the investor. His total tax payments would be ($2,400 + $630 + $266 - $1,800), or **$1,496**. His gross income would be $2,000 from selling the derivative, $2,100 from bank interest, and $888 from interest on money lent to the investor, i.e. $4,988. His net profit after tax would be $2,000 from selling the derivative plus $1,470 from bank interest plus $622 from his loan to the investor, less $600 paid in net forest tax (on the opening forest value of $2,000) being a total of **$3,492**. His NPV would be $1,492.

FIGURE 1: Behaviour of the derivative when selling an immature forest.

USE OF A DERIVATIVE FOR SELLING FORESTS					18/05/2011		Interest rate		7.00%		Investment		2,000				
IMPACT ON TAX, CASH FLOW AND NPV					HBMoore		Growth rate		9.68%		Tax rate		30%				
Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Totals
Investor scenario 1																	
Interest		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	2,100
Tax		- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 630
Investment	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	1,470
Cash flow	- 2,000	98	98	98	98	98	98	98	98	98	98	98	98	98	98	2,098	1,470
NPV	-$358																
Grower scenario 1																	
Forest NPV growth		194	212	233	256	280	307	337	370	406	445	488	535	587	644	706	6,000
Tax																- 2,400	- 2,400
Forest NPV	2,000	2,194	2,406	2,639	2,895	3,175	3,482	3,819	4,189	4,595	5,040	5,528	6,063	6,650	7,294	5,600	8,000
Cash flow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,600	5,600
NPV	$1,897	100%															
Investor scenario 2																	
Forest NPV growth		194	212	233	256	280	307	337	370	406	445	488	535	587	644	706	6,000
Tax																- 1,800	- 1,800
Forest NPV	2,000	2,194	2,406	2,639	2,895	3,175	3,482	3,819	4,189	4,595	5,040	5,528	6,063	6,650	7,294	6,200	8,000
Cash flow	- 2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,200	4,200
NPV	$231																
Grower scenario 2																	
Interest		98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	1,470
Tax	- 600	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 29	- 1,041
Investment	2,000	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,029
Cash flow	-	69	69	69	69	69	69	69	69	69	69	69	69	69	69	1,469	2,429
NPV	$1,058	56%															
Investor scenario 3																	
Derivative growth		194	212	233	256	280	307	337	370	406	445	488	535	587	644	706	6,000
Tax		- 58	- 64	- 70	- 77	- 84	- 92	- 101	- 111	- 122	- 133	- 146	- 161	- 176	- 193	- 212	- 1,800
Loan from grower		58	64	70	77	84	92	101	111	122	133	146	161	176	193	212	1,800
Compound debt		- 58	- 126	- 205	- 296	- 400	- 521	- 658	- 815	- 994	- 1,197	- 1,427	- 1,688	- 1,982	- 2,314	- 2,688	
Interest compounded		-	4	9	14	21	28	36	46	57	70	84	100	118	139	162	888
Tax on loan interest		-	1	3	4	6	8	11	14	17	21	25	30	35	42	49	266
Derivative	2,000	2,136	2,284	2,447	2,626	2,822	3,038	3,274	3,532	3,816	4,128	4,469	4,844	5,255	5,706	6,200	
Cash flow	- 2,000	-	1	3	4	6	8	11	14	17	21	25	30	35	42	5,361	3,579
NPV	$47																8,000
Grower scenario 3																	
Derivative interest		- 194	- 212	- 233	- 256	- 280	- 307	- 337	- 370	- 406	- 445	- 488	- 535	- 587	- 644	- 706	- 6,000
Tax refund		58	64	70	77	84	92	101	111	122	133	146	161	176	193	212	1,800
Loan to investor		- 58	- 64	- 70	- 77	- 84	- 92	- 101	- 111	- 122	- 133	- 146	- 161	- 176	- 193	- 212	- 1,800
Compound loan		58	126	205	296	400	521	658	815	994	1,197	1,427	1,688	1,982	2,314	2,688	2,688
Interest compounded		-	4	9	14	21	28	36	46	57	70	84	100	118	139	162	888
Tax on interest		-	- 1	- 3	- 4	- 6	- 8	- 11	- 14	- 17	- 21	- 25	- 30	- 35	- 42	- 49	- 266
Forest NPV growth		194	212	233	256	280	307	337	370	406	445	488	535	587	644	706	6,000
Tax on forest																- 2,400	- 2,400
Investment interest		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	2,100
Tax on investment		- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 42	- 630
Investment	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	
Cash flow	-	98	97	95	94	92	90	87	84	81	77	73	68	63	56	2,337	3,491
NPV	$1,492	79%															8,000

The scenario's total gross external earnings would be $10,100; tax **$3,030**; profit after tax **$7,070**, combined NPV $1,539. This is the same combined outcome as scenario one. It is not surprising because the tax cash flows are the same, i.e. forest tax is deferred until harvest while tax on the term deposit is paid year by year.

The NPVs of the three scenarios above at a 7% pa discount rate were:

	Scenario 1 No investment	Scenario 2 Cost of bush	Scenario 3 Derivative
Investor	-$358	$231	$47
Grower	$1,897	$1,058	$1,492
Total	$1,539	$1,289	$1,539

The Cost of Bush scenario results in a 16% nominal loss of total NPV compared to doing nothing or selling the forest using a derivative, because tax is paid immediately on sale.

The transfer of NPV from the grower to the investor between scenarios 1 and 3, arises from swapping the forest (earning 9.68% pa) for a term deposit (earning 7% pa), which reflects the swapping of risk.

When the investor is a co-operative that issues shares in return for the derivative, the grower's NPVs are $1,897, $1,539 and $1,897 for scenarios 1, 2 and 3 respectively and the co-operative's NPVs are zero. The assumption is that all benefits earned by the co-operative are paid out in the year received, leaving it with no net cash flows.

6. Creating the derivative

As described the derivative takes the form of a zero coupon forestry bond, i.e. a loan secured against a forest but paying no annual interest. 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 issue value is the pre-tax NPV of a defined percentage of the issuer's forest, and the redemption value is the pre-tax harvest 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 given by way of a Registered 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 until it is exercised and so does not prematurely give rise to a Cost of Bush account.

The investor may assign his rights under the Agreement and Forestry Right at any time, allowing him to trade the derivative. The issuer may assign his rights with conditions in the event that he sells the land, when the Agreement is transferred 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 harvest that he pre-sold.

7. Controlling the derivative

The key issues involved with the derivative are:

Valuation

The value of the forest must be determined when the derivative is issued, and updated annually for tax purposes. If the derivative is traded it must be valued again, exactly as if the forest were being sold. In order to establish a reliable market for trading forestry derivatives it would be necessary to establish a consistent standard of forest 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 valuation inputs such as annual costs, log prices and harvesting and marketing costs could be easily sourced and updated.

Harvest date

Forest valuations require known harvest dates, and valuations react more sensitively to log prices as harvest approaches. The redemption date of the derivative must be set at the beginning and forest planning must work towards that harvest date, unless both parties agree that harvesting (and redemption) should be rescheduled to suit market conditions.

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. To ensure he has the right motivation, the grower must retain ownership of at least 50% of the forest, limiting the investor to 50%.

Should several growers wish to consolidate their 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 be borne by the group, rather than the individual grower. 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 harvest the forest and take his defined share of the total harvest proceeds before giving the balance to the issuer.

If the investor was not a co-operative, on activating the Forestry Right he would appoint a forest manager to continue to protect and maintain the forest to maturity. He would pay the forest manager but record the costs which he would later deduct from the issuer's share of harvest revenues. As title would pass when the Forestry Right was activated, the investor would have to revalue the entire forest and create a Cost of Bush account for the crystallised valuation.

Because the process would require hands-on forest management, it is likely that in the event of a default, an investor might sell the derivative at a discount to a party willing to take on that responsibility.

Trading

A derivative once issued to a private investor could be traded on secondary markets. Its traded value should fall somewhere between that of an immature forest bought with Cost of Bush and an immature forest owned from the outset, with a discount in relation to the perceived integrity of the issuer who would continue to manage the forest for the investor.

8. Next steps

AuCrop Ltd is planning to introduce the derivative in 2011 in partnership with selected owners of small forests who wish to cash up part of their investments, or who wish to consolidate their holdings into co-operatives for economies of scale. Further information is available from the author.

The derivative has been patented in three countries.

9. Acknowledgments

The author acknowledges the assistance of Hamish Levack who continues to champion the cause for small forest owners.

10. References

New Zealand Journal of Forestry, 54(4): 24–27 (2010) "Current forestry tax laws stop the formation of properly structured forestry co-operatives." Hamish Levack, pages: 24–27.