

problem. We know what it is. It is that the place is getting used up. There is less around than there used to be. On the West Coast they are scraping up the moss. After the moa, the trees, the gold and coal, the fish; a small yield of potting mix.

One solution is to prise from our sinecures those of us "too precious to sustain our own resources or to restrain our own demands". (3) Even if we are mostly loath to see ourselves as others see us, a part of the solution, a solvee, there could be some, so the theory goes, who might start sustaining if not restraining. It may work. Already on the Coast they talk of moss cycles and of a movement up market into disposable nappies.

As Ted says, we have it back to front. Everyone has; we imported it that way. There is Andres Katz (4) doing sums for investments in stands of trees, as we have taught. But, throughout history, dis-investment has been more the rule than investment; otherwise there should be more than there used to be. Worldwide, people, radiata pine, gorse, sparrows and so on apart, there is less than there was. Planting trees is one way of putting something back. Our advantage in New Zealand is that it works, given a little care.

So why don't we say so? Let us latch on to the buzz word of the nineties, "sustainability". It used to be what forestry was all about. We have farmers giving up (as Andres says, the current tax change will help see them off); we have idle people; we know how; we have expectations of enterprise; we need resources. We are about where they were in the twenties. So hold them in the picture. Don't edge them out to suit an argument. If we had the inspiration and audacity of H. Langdon Smith and D.H. Wylie (1), teamed with the competence



Two Australian delegates to the ANZIF conference in the snow on the Craigieburn Field Day. Photo: D.J. Mead.

of an Owen Jones and a lawyer crafty enough for an Australian Prime Minister (Menzies), as they had in the twenties, we might go after that record yet.

(1) Owen Jones, *Empire Forestry*, (later Commonwealth), vol.7, 1928, 2 papers.

(2) E.M. Bilek, letters, August

(3) J. Purey-Cust, letters, August

(4) A. Katz, Tax changes – how real are the incentives to forestry? New Zealand Forestry, August 1991

B.J. Allison

## Tax changes – How real are the incentives to forestry?

Sir,

In his paper on this topic Katz (1991) makes a number of important points. Chief among them must be, despite industry protestations as to how dreadful and discriminatory the cost of bush system was (see for example Anon. 1989), his conclusion that this system actually discriminated in favour of forestry. The results showing that the tax

shield provided by the current regime "provides returns that are significantly higher than those [of assets] subject to a neutral income tax [regime]" will surprise many in the sector, including one suspects some in the major forestry companies. The result could certainly come as something of a surprise to many forest owners. For example, Graeme Hall, Chairman of the Forest Owners Association's taxation committee, has been reported as claiming that "from the public perspective the new [taxation] law should not be seen as providing incentives – it merely redresses previous inequities and allows the forest industry to operate in a neutral tax environment". (Anon.1991)

Katz is not, however, the first to conclude that the Labour Government's taxation system was favourable to forestry. Treasury also made this claim when the system was first mooted (see the rather cynical Appendix 9.2 in Anon. 1986). Katz is, however, the first to publish this fact in one of the official organs of this country's forestry sector. One can't help but wonder how his results will be viewed by some within the New Zealand forestry scene.

While there are a number of positive features to the paper there are also a number of disappointing aspects. Firstly, at times the conclusions attri-



A barbecue to celebrate 21 years of the School of Forestry, University of Canterbury was held in conjunction with the ANZIF conference. Photo: D.J. Mead.



buted to some of the paper's referenced sources are not accurate. The most glaring example is provided by: "Thus an increase in tax reduces the cost of capital, and hence the discount rate." (Samuelson, 1976, p.475) In fact, Samuelson never claimed this. He claimed that one can correctly use the pre-tax rate in making optimal decisions. He went on to add that with a "fair" or neutral taxation system "a person in the 50 per cent (or 99 per cent) [tax] bracket will make the same optimal decisions as a person always in the zero per cent bracket." (Samuelson, 1976, p.475.)

A second disappointment is that the paper never actually gets around to quantifying how real the incentives are to forestry, nor which of the two taxation systems studied offers the greater incentive. Given that for the worked example the optimal rotation for both systems is claimed to be identical, perhaps it's simply a case of six of one and half a dozen of the other.

There is also a problem in the "practical approach" definition of neutrality which Katz uses: "neutrality [is] the condition where asset valuations are invariant to tax". This is original and there is a serious question as to whose or what viewpoint is being used in determining this? A standard textbook definition of neutral tax would be more like "taxation falling on something that is completely inelastic in supply, with the tax being so designed as not to affect resource allocation either within or among the affected categories or between them and other activities not subject to the tax." (Harberger 1987) Unless the viewpoint being adopted is resolutely the national one, however, the practical approach, while being simple, is also easy, and wrong.

This can be shown by taking an example. Let's tax land. Let's however assume away all complicating factors. That is to say begin with a closed economy country, with a known and constant interest rate ( $i$ ), no taxes, known prices for all the potential products from this land from now until the end of time, no externalities, etc., etc. In this world the value of any bit of land will then simply be  $R/i$ , where  $R$  is the annual rental value of the land and  $i$  is the interest rate.

Into this idyllic, rather sterile and boring world let us now unexpectedly introduce a taxation authority. This authority decides to tax both actual and implicit land rental income at a rate of  $q$  cents in the dollar – note that this tax rate will, like everything else, be fixed for evermore. To a first approximation this decision is not going to change the country's land area by a single jot. The supply of land is going to be, in the jargon, totally inelastic. So taxing land

will in this world meet the first condition for neutrality.

As the best use for any particular bit of land will, after the imposition of the tax, still be the same as it was before the product mix the second condition should also be met. Moreover, because the same products continue to be produced, the rental value of land shouldn't change. Because of this the national value of our favourite bit of dirt should remain as before,  $R/i$ . But tax will affect the distribution of this value. The person receiving the rent will now only get  $(1-q)R$  dollars of rent each year ( $q$  in the Katz notation is the tax rate) where previously they had enjoyed an income of  $R$  dollars. The taxation authority that was previously getting nothing will now receive an income of  $qR$  from the annual rent.

From a national viewpoint the value of the land remains unchanged. From the viewpoint of the person receiving the rent, however, his income has fallen by  $qR$  dollars a year, and the present value of owning land has likewise fallen from  $R/i$  to  $(1-q)R/i$ . The taxation authority meanwhile has increased its income from nothing – with a present value of zero – to  $qR$  dollars per annum. The present value of this is, surprise, surprise,  $qR/i$ . What the tax does is redistribute the value of the land between the land owner and the tax authority. While from a national perspective it doesn't change the value of the land, it does if either the perspective of the land owner or the taxation authority is used.

In the Katz paper the question of perspective is glossed over by claiming that owners' or investors' discount rates vary with tax via a formula that the post-tax discount rate  $r = (1-q)i$ . If one uses this formula in the above land rental example then the present worth of the land owner's post-tax income of  $(1-q)R$  from land is going to be  $(1-q)R / (1-q)i$  which simplifies to  $R/i$ , or the same as it was before taxation was introduced. This, however, raises the intriguing question of what discount rate the taxation authority uses? Is it  $i$ , or  $r$ , or some other number? Whatever it is (let's call it  $x$ ), the taxation authority by taxing land has, if you accept Katz's logic and believe the above, increased national wealth. The reason for this is that the present value of land tax for evermore is going to be  $qR/x$ , which will be positive. As all landowners have adjusted their discount rates so that the value of their land to them is unchanged, and the tax authorities have created out of nothing a positive net benefit. The sum of these two has to be greater than the value of the land alone – which was all that existed before the tax authority came along and made the world a much richer

place. Were our current Government and in particular its Finance Minister to be made aware of this result perhaps its antipathy to increased taxes could be considerably lessened!

There seems to be little in the way of a logical reason for varying the discount rate with tax rate. If an investor wants  $x\%$  before the imposition of tax ( $s$ ) he should still want at least a pre-tax  $x\%$  after taxes are imposed. It could be argued that even Katz goes some way towards recognising this fact in his example. This uses "a 33 per cent tax rate and a real post tax discount rate of 5 per cent (7 per cent pre tax)". According to the author's own formula, either the 7% pre-tax should have been 7.46% or alternatively, if the 7% pre-tax is correct, the post-tax rate should have been 4.69%. We might also wonder as to how all this squares with the claims that the real discount rates used by successful bids in the recent sale of Crown forest assets were between 7.23% and 8.8% (Anon.1991a), or for that matter claims that nominal "hurdle" rates of 24% or thereabouts should be used for SOE's (Wheeler, 1989), or Electricorp's aim to obtain a real post-tax rate of not less than 7%. (Anon.1991b) The answer has to be "not well. . . not well".

There is a further problem to be faced if one thinks that varying the discount rate is the way to go. This is that the nice little formula for varying it,  $r = (1-q)i$ , assumes that the tax system is "fair" – a most unlikely occurrence – and doesn't distinguish between tax systems. Thus a 33% tax rate with tax paid on accrued income is not the same as a 33% tax rate with cost deduction and tax payment at the time of income realisation. If one is going to adjust discount rate for tax rate, won't one also have to in turn (re)adjust the adjusted rate to reflect any departure of the nominal tax rate from the fair or neutral tax of the same nominal value?

If all 33% tax rate systems are not the same – one unfair, i.e. non-neutral, may well be equivalent in its revenue raising to a neutral tax system of 22%, while another may be equivalent to a neutral rate of 44% – appropriate adjustments are going to vary from case to case. Using just any old adjustment won't be good enough; the adjustment used will have to be exactly the right one. Otherwise the taxation bias for or against different types of forestry will be unquantifiable, as will be the relative bias between forestry and other forms of investment.

The discussion by Katz of tax effects on the sale of immature forests is a little disappointing. Here many of the problems seem to arise because of imprecise use of language. There is no reason why, for example, buyers and sellers should

**“WE’VE TALKED  
TO THE GAS  
AND ELECTRICITY  
PEOPLE.**

**THEY’RE JUST  
NOT INTERESTED.”**



# **“CoalCorp has got the technical backup and at least they’re interested in our industry.”**

**Recently, Coal Corporation of New Zealand Limited sponsored a visit by eleven management and engineering people, from a number of sawmills around the country, to New Zealand Timber Processors at Orini.**

It’s nearly three years since Colin Routley took over New Zealand Timber Processors, a sawmill and kiln drying operation at Orini, near Huntly.

It wasn’t very long before Colin recognised the diminishing opportunity for small sawmill businesses and, at the same time, saw the potential in kiln drying timber for the export market.

Initially, he fuelled his operation with wood waste, brought in at roughly 25 tonnes a day.

Then, in 1990, Colin converted one of his two boilers to coal.

“Now I use 7 tonnes of coal and 8 tonnes of wood chips a day. We used to have a man working the chipper 6 days a week. Now we only need him two. So our savings are on man hours and the electricity. Plus there

are less mechanical breakdowns.”

To begin with, the visitors to Colin’s kiln drying site had mixed feelings about the efficiency of coal versus wood waste. Particularly when wood waste is often available on site.

Obviously, one of the first things they asked about was the reliability of supply — especially in the more remote areas.

“Not a problem. It arrives like clockwork. In fact, CoalCorp ring me when they figure I need to order.”

Significantly, however, the visitors all realised the industry necessity to look towards cost efficient kiln drying. The export market requires a standard far higher than sun drying can provide.

As one visitor said, “There are hundreds of little mills around the country, and most of them are interested in kiln drying of one sort or another.”

For example, one sawmill in the North Island is putting in a steam dryer. They feel that coal is their only viable option.



*As coal burns, it emits a combustible gas, so the whole furnace provides greater heat and increased efficiency. (In comparison, wood chips burn directly on the boiler firebox with a much smaller flame).*

“We’ve talked to the gas and electricity people. They’re just not interested.”

“The wood peel we produce is too difficult and expensive to reduce to a usable size. There’s no gas supply,







*"The best thing about coal is the reliability of supply and the consistency of the products. You can rely on it," explained Colin.*

except by truck and that's out of the question, and oil isn't a consideration."

The group agreed that making the right energy decision at the start was imperative.

"The problem with using wood waste is that it's so inconsistent. If you went for wood waste now, then you'd just have to look at changing to coal in the future anyway — and that's another extra cost."

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**"You just can't afford to make the wrong choice."**

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Obviously, cost is a critical factor in both the installation and on-going efficiency of any kiln drying timber processing business.

As one person from the New Zealand Forest Research Institute pointed out:

"70 percent of the energy used in getting the wood from the tree to the customer is involved in getting the moisture out of the timber.

Therefore, any efficiencies that can be made are really significant."

One sawmill owner was even more specific:

"I'm surprised at how low the set up and on-going energy costs are for coal. I'd been led to believe that it was much more expensive."



*"We're involved in exporting and have to have the product dried and sterilized — we've just got to get it right."*

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Clearly, as timber volumes and markets increase dramatically, the timber processing industry is facing crucial long-term investment decisions.

And it would seem, from the recent NZ Timber Processors visit, that one decision remains somewhat smarter than others.



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have the same valuation for standing timber simply because the taxation system is neutral. Buyers and sellers can, and no doubt will, differ in their views as to the future, regardless of how neutral or non-neutral the taxation system is. When the tax system is non-neutral, however, some of the difference between what sellers ask and buyers offer may be due to the tax system. However when the tax system is neutral it cannot be a source of any of the variation between the two.

A major finding of the section "Tax Effects on the Sale of Immature Forests" is that the cost of bush system discourages sale of immature forestry blocks. The case for this important result is made in an appendix. Unfortunately gremlins in the mathematics and some problems with definitions make the case harder to follow than it need be. Examples of gremlins at work are provided by:

1. The divisor in equation 6 which should be  $d(1 - Q)$  not  $(d - Q)$  as given.
2. Equation 9 where it is not at all obvious why "a", which is defined as the cost of bush account from  $t=1$  to  $n$ , should be included, as equation 9 is supposed to represent the sellers' viewpoint under the proposed tax regime, i.e. the one where cost of bush no longer applies – so long as the forest is not sold.

There are a few other problems too, such as the undefined "B" which keeps appearing in some equations. These, however, all appear trivial when compared to the major result of the analysis. This is that with a well functioning market in immature forests – i.e. a market where trading occurs sufficiently frequently so that all buyers and sellers equalise their expectations about future costs, returns, etc. – the recent tax changes would have the effect of reducing the prices that sellers could expect to be offered to:  $d(1-Q)/(d-Q)$  times that which they could expect with a neutral tax system.

Most forestry analyses use discount rates in the 6 to 12% (real) range. With a discount rate in this range and a 33% tax rate the reduction implied in bid price for a forest with some 10 to 20 years to go until harvest is going to be of the order of 20 to 30 per cent of its value. (The exact level is going to depend both upon the discount rate and the years to go until harvest – being greatest for higher discount rates and longer time periods. The reduction in buyer bid is also going to vary with the tax rates, being greatest with high tax rates and nothing should the tax rate ever be set at zero).

While "losses" of the magnitude mentioned may not have yet occurred, this, to a large measure, must be simply

because we do not have a well functioning market in immature forests. This may have been of little consequence when the State and a couple of large public companies owned the bulk of the forests and were at best only very reluctant and infrequent traders of small bits of immature forest. It does matter now. The State is getting out of commercial forestry. Ownership of the existing estate is in the hands of a more diverse group than in the past (with the likelihood of increased trading in immature forests) and expansion of the estate is going to involve attracting an even wider section of the community into investing in forest growing. The disincentives of a poorly functioning market and the likelihood of having a penalty imposed by the tax system, should a forest owner find that because of changed circumstances (s)he must dispose of an immature forest, must pose a significant barrier to attracting new investment into forestry.

In the context of this, and the general results of the Katz paper, the latest vision of the NZ forestry sector, in some quarters at least, warrants mention. This vision is that another three million hectares of commercial forest is what is needed. However the Katz paper could be seen as placing some doubt on the validity of this claim. The first part of the Katz paper could be read as saying that the cost of bush system was more favourable to forestry than a neutral tax system. If with a non-neutral but allegedly favourable taxation system – subsidies to forest growing may well be the correct description – expansion of the sector had virtually ceased, one has to ask just how big the subsidies will have to be if the vision for NZ forestry is to be achieved. Inevitably this must lead to questions as to whether extra forestry truly is the best use of New Zealand's scarce resources. Answering questions of this ilk may prove to be rather difficult if Katz's analysis is accepted.

Accepting the Katz analysis as correct is tantamount to accepting that the 'new' taxation system is likely to pose a significant barrier to any visionary view that calls for a widely based expansion of forest growing in this country. This is because the tax system would appear to impose a significant transaction cost to any trading in immature forests. A few 'fire sales' of immature forest blocks, where the low price for the block is seen to be the result of a poorly functioning market and a discriminatory tax system, and the public's current interest in investing in forestry could very quickly disappear.

While it could be argued that the forestry sector is at present in desperate need of a period of limited rule changes,

if only to allow it the chance of absorbing the full implications of the changes of the last five years, Katz's logic would suggest that we should be urgently seeking at least one more change to the taxation rules. Otherwise, like old age pensioners with the GRI surcharge, we may shortly discover that, compared to the new scheme, the taxation scheme that some so assiduously agitated to have replaced looks like a much fairer and desirable system.

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G.P. Horgan