Valuation prices for wood in New Zealand exotic forests:¹
A critique by E.M. Bilek²

This was a report commissioned by Treasury in June 1987 to provide a basis for valuing the assets proposed for transfer to the Forestry Corporation Ltd. With the proposed privatisation of the Corporation, the report should have had relevance in determining an acceptable bid from a private buyer. Unfortunately, the report fails. The report does not state that its goal was to produce a justification for high-valued wood, but it should have. Even in this very narrow sense, the report fails. It is a highly biased report, but the bias is not clearly stated. Many of the report’s assumptions are questionable, misleading, wishful, or untrue. The logic is faulty and incomplete. The report’s arguments are unsupported. The report fails to document adequately a single source for the material which was quoted or referred to. The report fails to provide sound and believable rationale for using high wood prices in valuing New Zealand’s exotic forests.

Many Assumptions are Questionable at Best

- Technology Assumptions are Heroic
  - Will stumpage prices rise or fall if milling technology improves? The report assumes that any improvements in milling technology will be passed directly through and be reflected in higher stumpage prices. This is an unproven hypothesis. The report notes that new technology mills will come on stream and “... competition among mills for logs for the range of export and domestic uses will ensure that the industry does pay these higher real prices” (p.16). This assumption may not be realised for two reasons: (1) While New Zealand mills will have to pay at least export prices for export-quality logs, not all the logs produced will be of export quality. The new mills will be both more efficient and have higher capacities than the old mills which they replace. As this happens, competition for logs on the static domestic market could be expected to decrease, since there will be fewer mills competing for these logs. (2) While prices for export logs may be high, prices for lower-grade domestic logs could conceivably decline.³ Domestic demand for sawn wood is projected to be relatively constant into the foreseeable future. Therefore, if technology improves sawmill recoveries, mills will demand less roundwood to fulfil their requirements. This would translate into decreased rather than increased stumpage prices. BERL does not mention this scenario.
  - The report notes that there are a number of other factors (processing productivity, port charges, and freight) where one-off improvements and cost reductions likely over the next three years should flow directly through to stumpage prices (Summary #11, Section 2.5.5, p.24). This is wishful thinking. Just because a company can afford to pay more, does not necessarily mean that they will pay more for their raw materials. To say where savings in processing efficiency improvements, port charges, and freight will go without examining the relevant negotiating strengths of the parties involved is naive. It is one option to say that the benefits will flow directly through to stumpage prices. An equally plausible option is that the cost savings will flow directly through to the port authorities, or the companies which make the improvements. The most realistic option is probably that the benefits will be somehow split, based on the relative power of the parties involved. Without documentation or without additional research, it is indefensible and misleading to say that all benefits should flow through to stumpage.

- Some Demand Assumptions are Untrue and Misleading
  - “... wood products like fuelwood, paper, housing, quality furniture etc. have a relatively high income elasticity of demand over a broad range of incomes internationally, so that as real incomes rise, real demand for wood rises.” Cursory research indicates this is not true for the United States.⁴ Since 1950, as real disposable incomes have risen, total per capita consumption of timber products has remained relatively static (Figure 1).
  - More detailed study of this problem was conducted by Abel (1977). He noted that studies determining income elasticity of demand for lumber had estimates ranging between 0.31 and 0.63 according to species group. This means that the elasticity of demand for lumber is relatively low.
  - In his study of the New Zealand market, Abel (1977) found the demand for exotic sawn timber to be quite inelastic. He estimated the most likely short-term income elasticity of demand for exotic sawn timber to be 0.35.
  - The value of stumpage will depend on the value of the products produced from it. BERL has not investigated changing demands for specific products. While total per capita wood use has remained relatively static, the mix of wood used has changed over time. In the US market, since 1950, consumption of solid lumber has declined while consumption of pulp products, plywood and veneer have increased. Consumption of fuelwood has also increased, but I suspect that this would be more highly correlated with energy prices than with income (Figure 2). ⁵ BERL should have investigated changing demands for specific products in potential major markets.
  - In any case, most of the world’s wood is consumed in developing countries. And most of the wood consumed in developing countries is fuelwood. Developing countries account for roughly 45 per cent of

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³ A similar situation already exists in horticulture where export prices for kiwifruit are relatively high while the seconds are being given away within New Zealand.
⁵ Except perhaps at luxury ski resorts.
the world's roundwood production; however, roughly 82 per cent of their wood produced is fuel-wood. This compares with roughly 16 per cent in the developed countries. These people are using wood as fuel out of necessity rather than by choice and I suspect that their consumption of fuel-wood will drop if their real incomes rise, just as it did in the United States. This would mean a drop in demand for fuelwood, probably accompanied by an increase in demand for paper and reconstituted wood products. This will dictate not only what we can sell, but what we should be producing.

Other Demand and Price Assumptions are Just Wishful

The report did not adequately question the bias of the sources it quoted. Liberal use was made of US Forest Service (USFS) projections. BERL made much of the fact that the USFS was pessimistic about their current supply projections. However, they did not question the basis for this pessimism. The USFS has a long history of under-projecting wood supply and over-projecting prices. Gifford Pinchot, the first Chief of the USFS, stated in 1910: "The United States has already crossed the verge of a timber famine so severe that its blighting effects will be felt in every household in the land." He also noted: "If the present rate of forest destruction is allowed to continue, with nothing to offset it, a timber famine in the future is inevitable." In 1982, the USFS stated: "... a substantial rise in the relative prices of softwood stumpage and most softwood timber products... will be necessary to balance demand and supplies in future decades. The rise in prices will be especially rapid in the 1980s (italics added)..." This prediction could not have been farther from what really did happen. The relative producer price index for softwood lumber stood at 128.4 in 1980. By December 1986, it was down to 117.1. Stumpage prices dropped even more dramatically over the same period. It is understandable that the US Forest Service should underestimate supply and overestimate demand. That is how they obtain budget increases. It is not understandable that BERL should accept USFS forecasts without questioning. By doing so, they undermine the credibility of their entire report.

BERL also makes use of other projections without critical questioning of the bias. While they do note that the supply projections may be underestimated, there may be similar arguments to believe that they are overstated. "The emergence of new log markets would be expected to ensure that real prices increase at least to some degree, in future, particularly given that Japan will now have to actively compete for supply" (p. 35). There are two problems with this optimistic statement. The first is that it is totally unsupported. While new markets may open up, the report gave no evidence of where or how big those might be. Even if new markets do open up, Japan may or may not have to compete actively for supply. Much depends on how New Zealand products are marketed to Japan. In general, the Japanese see radiata as a low-grade wood suitable chiefly for packaging and other low-value uses. If this view continues, then there will be more competition among the suppliers...
since radiata from Chile, South Africa, and Spain is maturing at the same time as New Zealand's plantations. This scenario implies continued low prices for export logs. BERL should have considered this.

- **Assumptions and Assertions in "Wood Resource Pricing"** are Questionable.
  - Two of the report's three "fundamentals" are questionable. The first, that "the price of wood should reflect the wood users' ability to pay," assumes either a benevolent and socialistic stumpage owner, willing to sell discount wood to inefficient and undercapitalised processors, or it assumes a stumpage owner with so much market power that it can extract all downstream profits from processors. The former is unrealistic and the latter could be prosecuted under the Commerce Act 1986.
  - The second that "...the supply of wood is relatively inelastic in the medium term...". Again, this assumes market power and the ability to restrict alternative supplies. Over the medium term, alternative sources of supply could be found, assuming reasonably free trade. The supply of wood would be relatively inelastic over the short term, if there was sufficient market concentration among the potential suppliers.
  - Finally, this section concludes: "The successful resource owner is the one who...captures as much as possible of the supernormal profit from the marketing chain, either by ensuring competition amongst buyers or by entering the chain himself." A third option to capture this "supernormal profit" (and one which BERL does not consider) would be to become such a large resource owner (without violating the Commerce Act) that you have a monopoly share of the market so that the buyers have little other choice.

- **Assumptions implied in Figures 6A and 6B (p.31) are not given.**
  - BERL notes that "Expressed in April 1987 prices, the fob price [of sawn timber] has been increasing at $8.20 per cubic metre per year in recent years," (p.30). They do not list their sources. They do not note the basis for converting into 1987 prices. They only carry their data back to 1969. They give no basis for doing so. A much longer data series is in fact, available.

- **The section on future pulpwood prices is incomplete.**
  - The report assumes that industry's moves to improve pulp and paper efficiency will imply higher stumpage prices for pulpwood in New Zealand (p.38). They ignore the possibility that domestic paper prices in New Zealand are higher than overseas prices and that increased efficiency may lead to lower domestic retail prices rather than higher stumpage prices.
  - The report also fails to document trends in world pulpwood prices, even though they note that New Zealand pulpwood prices can be expected to follow these trends (p.38). This could be because there is evidence indicating that real pulpwood stumpage prices have not moved over the past 30 years. In the United States, real prices for pine stumpage in Louisiana, Wisconsin, and Northern New Hampshire (the only states for which data were available) have not shown any upward trend since the 1950s (Figure 3). BERL did not present evidence indicating an overall upward trend in world pulpwood stumpage prices. On the contrary, cursory evidence suggests that pulpwood stumpage prices may be moving downward!

**Logic is Incomplete**
- The paper examines the pricing issue only from one side. This does not lead to a convincing argument. BERL argues for higher prices noting that, "Although the three large buyers are assured of a long-term supply there is no price premium to reflect this at present. On the contrary, the prices for these sales are lower than prices for wood sold spot or on shorter contracts" (p.7). However, they fail to note that with bulk purchases, the Forest Service (and later the Forestry Corporation) was assured of a market for a percentage of its logs. This guaranteed market by itself should have been worth some sort of discount price to an organisation which does not have much processing capacity of its own. In addition, the large sales should have kept the administrative overhead costs down. These lower costs and guaranteed markets are possible justifications for lower stumpage prices. Without examining these factors, BERL's arguments are incomplete.
- BERL accepts US prices as a proxy for world prices. This in itself is arguable since the largest single owner
of commercial forestland in the US is the Federal Government and there has been much controversy over the bidding process for stumpage on these lands. In addition, the US is a net importer of wood. Most of these imports come from Canada. There has also been controversy about how the Canadians price their stumpage.

If one ignores these reservations and accepts that the US prices would provide some guidelines to world prices, there are further problems with BERL’s arguments. They present a graph of real US lumber prices rising since the 1800s (p.3). While this graph makes a dramatic case for long-term timber price increases, a more detailed examination of the data since 1950 is not so conclusive (Figure 4). The data clearly show that over the past 36 years (longer than the average rotation age for radiata), while there may have been some upward movement in prices, the trend has not been steady, nor has the trend been anywhere in the region of the 2-3 per cent per annum which BERL projects. While data from the 1800s are interesting, timber usage then was so different from what it is now that the relevancy of looking so far back when projecting future trends is questionable.

In any case, BERL did little more than present a trend which has long been known17 and often discussed. The trend was discussed in detail by Zaremba (1958).18 They should have examined and discussed some of the reasons for this long-term upward trend given in this article and follow-up articles.19 The chief reason attributed to this long-term upward trend in prices was declining relative productivity in the lumber industry.

It was well summarised by Zivnuska20 who stated: “The trend in the real price of lumber depends, fundamentally, on the relation between the trend rate of change in productivity in the economy and that in the lumber industry.” Productivity in the rest of the economy was increasing faster than in the lumber industry. BERL noted that the New Zealand lumber industry was lagging in productivity when compared with the rest of the world. Following Zaremba’s logic, the technological improvements which BERL imply should be coming into sawmilling should reduce long-term lumber prices rather than lead to increased stumpage prices.

BERL notes that “The prices in the US south for Southern Pine is probably the most relevant to the present purposes . . .” (p.58). It is interesting to note that in the US South (where technology has had the biggest impact on the forest products industries in recent times) not only is the Southern Pine lumber price index lower than that for all lumber, but so is its upward trend (Figure 5). In addition, if the exceptionally high prices of the late 1970s and early 1980s21 were removed from the series, the slight upward trend could be eliminated completely.

It is arguable whether or not the data support the hypothesis that there will be increasing lumber prices. It is also arguable whether or not increasing lumber prices will translate back into increased stumpages. BERL fails to present a convincing case for either argument.

- As the market for wood shifts from domestic to export, the demand for the wood in specific export markets must be examined. It is not enough to say that the wood will be exported. For the exports to have a positive effect on foreign exchange, it must be exported to countries able to pay for it. Where are those countries, and what are their supply/demand scenarios? BERL should have examined this rather than assuming that the markets will be there and will be able to pay.

The report notes22 that “. . . Chile reputedly markets radiata in 60 countries . . .” (p.42). However, it does not question where those markets are, the types of products Chile is selling in them, or the potential for New Zealand. In fact, other than for a few brief scattered passages, the report fails to mention the world’s other suppliers of radiata.

- The report investigates two scenarios, a “Commodity” and a “Status Quo” (or “More Realistic”) Market Scenario.
BERL notes that “... [the commodity scenario’s] main assumptions [italics added] are for unconstrained supply especially from North America and Russia, and thus a limited market for New Zealand’s solid wood products in the Pacific Rim; and the non-acceptance of radiata for other than low-grade uses,” (p.29). They then proceed to totally ignore these assumptions in their writing about the “commodity scenario”. In this section, they do not consider the ability of North America or the Soviet Union to supply wood fibre.23 And they do not examine demand and market acceptance of radiata. They make some conclusions about prices (pp.35-36) which are totally unsupported. Their arguments fail to address the very issues which they claimed to be important.

The report blithely accepted that “... the pruned sawlog percentage increases to a maximum in 2005 and then declines in line with the Corporation’s assumption of low silvicultural input from now onwards” (p.41). Later they noted that the relative price indices per cubic metre at stumpage for the different types of sawlogs are highly dependent on the type of silvicultural input. In fact, they noted that the price indices for stumpage for unpruned sawlogs are below the 1987 level (p.44). Based on their own findings, they should have questioned the logic of the Corporation’s plantation management strategy. If silvicultural management leads to such high price premiums (as the report implies), then prudent management would dictate that such silvicultural operations be expanded rather than cut back. BERL failed to examine or discuss this apparent anomaly in their report.

The report’s conclusion that sawn timber will play a much more important role in New Zealand’s forest products exports (p.39) implies major changes in the capital investment and structure of the country’s sawmilling industry. The output of wood will triple. The implications for the capital required to process this timber are enormous. Is it reasonable to assume such changes will occur? The authors should have discussed this.

- The statement “... that pulpwod returns should lift $7 in 1987 to at least reflect world trends” (Summary, #9) is simplistic. This would be true if the Forestry Corporation both could and would want to export all its pulpwod. But this is probably not the case. It would be a strategic mistake to trust the profitability of the Corporation (or of the Corporation’s plantation forest resources) to the vagaries of international markets. While exports will play an ever increasingly important role in New Zealand forestry, a solid and efficient domestic industry will be important to the long-term profitability of any owner of the country’s exotic forests.

Miscellaneous

- The report restates the obvious. BERL’s estimates for “national average prices sustainable, realistic for Radiata at April” were very close to the actual Corporation prices. While it may be useful for a company in a monopoly position to know that the prices it is charging are realistic, the Corporation has maintained that it is not a monopoly position. The prices the Corporation is currently receiving are by definition current market prices. They may be higher or lower depending on differing market structures; however, there is no need to re-estimate these.

- The report totally ignores the question of substitutes for wood products. The real price of wood cannot continue to increase indefinitely. As real prices climb, demand drops. The report notes that real wood prices have been increasing over time. However, over time, per capita demand for wood has decreased, and the types of wood demanded have changed. Reconstituted and composite wood products have become more important. Plastic and paper have replaced solid wood in many uses. Composite wood products have replaced solid wood in building products. All this has affected the demand for wood fibre and the type of wood demanded. Will there be demand and a price premium for clearwood radiata? The report should have addressed this issue.

- The report has at least one unsupported hypothesis: “The fundamental reasons for the trend in prices of logs having risen only a little in NZ dollar terms are found in structural weaknesses of the New Zealand market, and in dominant sales contracts being set at low prices” (p.33). This hypothesis may sound reasonable; however, BERL proved no cause and effect exists. Nor did they present any references to support this. Another hypothesis, that the reasons log prices rose only slightly were because of slight real movements in lumber prices, is equally as plausible. An examination of US Southern Pine lumber and stumpage prices between 1950 and 1986 shows that during this period both stumpage and lumber prices fluctuated widely and on average rose only slightly (Figure 6). Since the value of the lumber supports the value of stumpage (and logs), it is more reasonable to hypothesise that the chief reason stumpage prices did not increase markedly over this period was because lumber prices did not show much increase, not because of structural weakness in the domestic market and low price contracts. BERL’s hypothesis sounds plausible, but no more plausible than any other. In addition, they do not give anything stronger than circumstantial evidence to support their hypothesis.

- The report presents its findings in a misleading manner. Throughout the
document, the expected price increases are stated per annum in both percentage terms and in fixed dollars. These two increases are not equal. Fixed dollar increases distort the long-term trends, if those trends are actually constant percentage increases. Fixed dollar increases add much more weight to the value of harvests in the immediate future than do percentage increases. When entered into a valuation formula, they provide a much higher present value than does a percentage increase. Since BERL's final recommendations are stated in percentage terms, it is misleading to present long-term price increases in per annum dollar terms within the document.

The Report Contains No References

- The authors failed to document their work. There is no references section. This alone is enough to discredit the entire document.
- The entire document was filled with statements which should have been referenced. Reports were quoted vaguely and referred to without giving the exact sources or dates. This made it impossible to query any of the authoritative support BERL referred to.
- Projections were given without noting either the sources (if they were based on others' work) or the basis for the projections. Lines were drawn through graphs without giving any details on goodness of fit or how the projections were made.
- Figures were shown without noting the sources for the data on which they were based. In addition, there were no supporting data in appendices. Tables were also shown without noting their sources.

Summary

- This report fails as an unbiased report on valuation prices for New Zealand's exotic forests. The report was written as if its purpose was to justify a high price for the Forestry Corporation's plantations. However, even in this biased sense, it fails. The authors did not critically examine the implications of their projections. They naively accepted the forecasts in other reports without examining the assumptions and weaknesses in them. They failed to document their work. To produce a report such as this, they should have at least mentioned and dismissed the shortcomings of their projections. As it is, their projections may or may not be justifiable, but they did not provide solid evidence to defend them.
- The problem of what to use for future prices for the wood in New Zealand's exotic plantations is critical in determining a valuation for them. It is understandable that Treasury should want a credible report supporting high prices. They did not get one.
- The BERL report raised a host of questions which deserve more research. This report addressed in a preliminary manner some of the topics which should be examined. The valuation of the State exotic plantations is an important enough issue that such research should be undertaken. The BERL report failed to examine the issue in a critical manner.
- For the sake of the New Zealand economy, I hope the BERL projections are correct. However, their report does nothing to support the use of higher log prices in the valuation of New Zealand's exotic forests.

REFERENCES


Response to E.M. Bilek critique

by Kel Sanderson, Director, Business and Economic Research Ltd

I have received a copy of the article "Valuation Prices for Wood in New Zealand Exotic Forests: A critique by E.M. Bilek" and as main author of the subject report I am very grateful for the opportunity to respond.

The critique does not directly question and refute the two main pricing conclusions of the BERL report, namely the underlying trend of free market prices for wood in New Zealand at April 1, 1987, and the projected increase in prices over the valuation period by an average of about 2% per annum in real terms. The critique appears to accept the April 87 price levels, and in relation to increasing real prices concludes only that it is arguable whether the data support the BERL conclusion. Unfortunately, having adopted the critique form, Bilek did not have to include his own analyses, projections or forecasts of wood prices.

The BERL/Treasury report documents a series of analyses and investigations undertaken during 1987 and in 1988 in the course of various discussions and negotiations between Treasury and the NZ Forestry Corporation in an attempt to place the most realistic value on the Government's forests. The report describes only the work on wood prices, and only that on the Treasury side. In a time of fundamental structural change it was necessary to explore possible change in most industry parameters and to obtain reasonable indications of the likely direction and extent of change in each area. We had to rely on much overseas published material. There is a dearth of such material for New Zealand, which says little for the quality and extent of research into these areas to date. We certainly did not have the time or resources to fully investigate for ourselves, in the field, all of the areas of change identified, nor did we have the time or desire to convert this working document into an academic treatise.

Dr Bilek's main concerns are now mentioned.