Log price expectations and forest valuation

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Introduction
This paper reviews historical trends for radiata pine log prices received by New Zealand growers, and discusses factors that are likely to control future log prices in New Zealand in the short to medium term (2001-2015). An approach is suggested for determining prices for use in valuing forest crops.

General limitations of published log prices
While there is currently no specific financial reporting standard for the valuation of forests, it is likely that New Zealand will follow the Australian practice and adopt market value rather than cost as the standard. Pricing then becomes a critical factor in determining asset values for financial reporting as well as in estimating market value for sale or purchase. Indirectly, prices also impact on return on investment and share valuations.

There is no single radiata pine price in New Zealand. Rather, radiata logs are broadly categorised as being of three types - pruned, unpruned and pulp. Each of these is used to make quite different products for distinctly different markets.

The estimated total roundwood removal from plantations was 20.4 million m³ in the year ending 31 December 2001 (MAF 2002a). In most regions there are numerous producers, a diversity of markets and competition between buyers. There is therefore an active market and the prices obtained by sellers can generally be said to be at a market level. There is good knowledge available about the market, with prices and a commentary available from several independent sources (such as MAF, Agri-Fax).

The prices quoted by these sources are not precise and are intended to be used to determine trends rather than for use in valuation. The lack of precision is due to the variation in specifications within the generic log grades, the fact that the prices are not weighted by volume and the variation in price received between large corporate and mid- to small-sized companies. Prices are therefore expressed as a range and the mid-points are used to determine trends. Mid-points are often used for valuation, notwithstanding the limitations of the data.

While historic prices over the last 10 years are reasonably well documented, future price trends are more speculative. Prices have proved to be very difficult to forecast even in the short term. This is due to the fact that international wood products markets and a multitude of interrelated factors in the global economy influence them. Most of these factors are difficult to predict even in the short term.

The past as a guide to future log prices
During the 1980s the future supply, demand and prices for wood products were forecast by agencies such as the International Institute for Applied Systems Analysis (IIASA), the United States Forest Service, the World Bank and the FAO, who all predicted strong growth in demand (BERL 1988). These predictions were based on historical long-term log and lumber price series, and global supply and demand for wood products. On average, real increases in stumpages of 2.5% per annum to the year 2000 were predicted by these agencies, and 1.9% per annum after that. Although these were based on US prices, they were considered to be the best indicator of world prices because of the size of the US market and its relative openness to free trade.

However, over the last 20 years stumpage price indexes have levelled off or decreased. In the US Pacific Northwest, real Douglas-fir stumpages increased by 2.4% per annum from 1910-1998, but over the last 20 years they decreased by an average of 1.56% per annum and by 0.92% per annum over the last 10 years (Flynn & Neifson 2001). Similarly the real confier stumpage index in the United Kingdom has fallen by an average of 6.3% per annum from 1979-2000, and 4.4% per annum from 1971-2000 (UK Forestry Commission 2001). Despite these pessimistic statistics, the US Forest Service RPA Timber Assessment recently projected US softwood sawtimber stumpage prices to increase over the next 50 years, but at a rate (0.4% per year) considerably below that of the past 50 years (1.9% per year) (USFS 2002).

Confounding factors influence any attempt to construct a long-term trend line. As illustrated above, one of the most important is deciding when the series should begin. Secondly, political factors may distort prices to varying extents over the term of the series.

A report by Business & Economic Research Ltd (BERL) published in 1988 for the New Zealand Treasury investigated the past, present and future influences on wood prices in New Zealand (BERL 1988). It determined free market stumpages for pruned, unpruned and pulp logs in 1987 and forecast the future real growth in these prices. The main conclusions of this report were:

1. New Zealand Forest Service (NZFS) stumpages for exotic trees remained flat in real terms until 1985 when they began to increase rapidly. This was due to the removal of market distortions relating to:
   - Price control on sawn timber for the domestic market that had been in place for 40 years. This was lifted on 8 November 1984;
   - Government influence on the export of exotic logs by the NZFS. This ceased on 31 March 1987;
   - A change from a social to an economic approach to labour utilisation in many production and processing operations; and
   - Long-term sale contracts for the supply of wood at prices unrelated to the market.

2. Because of these factors, the report concluded that the NZFS stumpage price series before 1987 was unlikely to be of use in predicting future price trends. The fact that New Zealand’s stumpage prices had increased so rapidly from 1985-1987 indicated that the fundamental forces for determining prices had been suppressed by price control and market distortions. Once these were removed, prices were able to respond to the mar-

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Table 1: Price Change from 1987 to 2001 (NZD/m3 FOB)

<table>
<thead>
<tr>
<th>Log Type</th>
<th>April 1987 nominal prices</th>
<th>December 2001 prices*</th>
<th>Nominal Annual Change 1987-2001</th>
<th>Real (CPI adjusted) Annual Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruned</td>
<td>118</td>
<td>212</td>
<td>4.0%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Unpruned</td>
<td>78</td>
<td>97**</td>
<td>1.5%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>Pulp</td>
<td>50</td>
<td>68</td>
<td>2.0%</td>
<td>-0.6%</td>
</tr>
</tbody>
</table>

* MAF price series - assumes JAS/m3 = 1 (MAF, 2002b)
** unweighted average of A, K and J grades.

Although the data are limited, the analysis indicates that only the pruned log type has shown real price growth over this 15-year period. Both unpruned and pulp log prices have shown slight negative annual growth in real terms (Table 1).

A time series of prices (CIF Japan in yen/koku) is available in the Japanese Lumber Report for the unpruned A-grade radiata pine logs exported to Japan. After converting the prices to real NZD per m³ via the CPI, the trendline is negative from 1987-2001 (Fig. 1). Prices were generally at a lower level after the 1993 price spike. Similarly, Fletcher Challenge Forests (www.fcf.co.nz) presented a graph in its May 2001 presentation to analysts of real A-grade export log prices expressed in USD/JAS m³ FOB from 1972 to 2000. This indicated no real price growth since 1972, but perhaps more significantly a negative trend since the 1993 spike.

An analysis using "at wharf gate prices" might be more positive. As an example of political factors distorting prices, port charges fell significantly in 1989 following New Zealand port reform.

An analysis of Japanese log prices (D.A. Neilson pers. comm.) found that in real terms, imported hemlock log prices had fallen by 2.0% per annum on average from 1970-1996 and local hinoki by 3.4% per annum from 1980-1996. Only the strengthening Yen-USD exchange rate from 1984-1996 enabled Japanese log prices to stay up reasonably well in USD terms. If the yen were to weaken to more than 130-140 Yen/USD, this would lead to a major reduction in USD based pricing with a significant impact on the pricing structure in the Asian log market. There is a risk that Japan could use such a devaluation to boost its economy. Relative movements between the yen, and the United States and New Zealand dollar exchange rates have been an important factor in determining prices in New Zealand dollars, perhaps more so than supply or demand factors (Fig. 2).

Long-Term Price Trend Lines

The long-term trend lines for radiata pine log prices received by New Zealand forest owners should be measured from no earlier than 1987 when market distortions were removed. The limited data available indicate that there has been no real price growth since that time, with the possible exception of a small increase for pruned logs. Also, it is not axiomatic that future

Fig. 1: Real A Grade Log Prices 1987-2001

Source: Japan Lumber Reports

ket and had probably reached equilibrium by 1987. This date then is the earliest appropriate starting date to begin a trend line for real log price growth in New Zealand.

Both the 1988 BERL report and a 1993 report on Pacific Rim wood supply and demand (REI/DANA 1993) made optimistic predictions of future log price growth in the context of global factors of supply and demand. Based on the historical information available in 1988 and the forecast prospects, BERL considered real growth in stumpages of 95% over the period 1987-2010, and 15% over the period 2010-2030 to be both reasonable and readily attainable.

These rates of price growth were not totally accepted in New Zealand valuation practice at that time, but a more conservative rate of 0.5% per annum was used by the Crown in its forest sales process in 1980.

Given the bullish predictions of the late 1980s, what actually has happened over the intervening period? Comprehensive industry-wide surveys of log prices across all grades did not begin until the 1990s. However BERL in 1987, after in-depth analysis of the prevailing markets and prices, determined free market export stumpages and production costs to a FOB price point and included these figures in its 1988 report to the Treasury. These prices can be compared with the 2001 prices from the MAF price series (MAF 2002b) giving a simple comparison between two points in time.

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prices will return to any particular form of historic trend line, given the riskiness of the future trading environment. For forest valuation purposes, price trends in the recent past might have more relevance. Prices stabilised by late 1995 after the 1993 spike, and have remained at that level in real terms albeit with some volatility (Fig. 3).

However, price changes since 1987 should be considered in the light of a substantial increase in supply within New Zealand. The log supply has increased by over 100%, from 9.1 million m$^3$ in 1987 to 20.4 million m$^3$ in 2001, and it may be regarded as a considerable achievement by forest owners that (despite their limited control over world affairs) they have maintained prices relatively constant in real terms. Of course critics would argue that with more co-ordinated marketing we should have been able to increase both volume and price over that period because:

- There was a huge one-off reduction in the log supply from the US Pacific Northwest to SE Asia.
- Korean housing starts increased substantially from 1990 to 2000, requiring a large increase in log imports for lumber production.
- The Soviet Union collapsed disrupting Russian supplies for several years.
- Japanese housing starts held up well.

There is evidence now of more cohesion and co-operation in the global marketing of radiata pine. For example, a joint venture has been set up between three major New Zealand and Australian log exporters which aims to work co-operatively on sales and market development in India, and there has also been a proposal for a centralised global marketing structure similar to the successful New Zealand dairy industry model (Neilson 2001). These initiatives may allow exporters to raise prices in real terms, with benefits to New Zealand growers.

**Valuation Prices**

Historical price trends can be extrapolated to provide a base for predicting future log prices, but consideration must also be given to the risk of a new trend emerging due to changes in the economic environment. Purchasers of forests try to minimise their risk and look for immediate cashflow, so as to recoup as much of the purchase price as possible within a short time. They tend to be conservative in their assessment of value and weight their price expectations heavily in favour of current prices. In practice, forests with early cashflow are the most liquid, while mid-rotation forests and especially young forests are much less liquid.

Positive factors that might impact on future prices include:

- Development of new higher value wood products.
- Development of new markets such as India and China.
- Increasing demand in SE Asia.
- Favourable exchange rate movements.
- Co-ordinated marketing by New Zealand suppliers.
- Increased domestic processing capacity.
- A decrease in supply from natural forests around the world.
- Competitive advantage gained from environmental certification for plantation forests.

Negative factors include:

**Fig. 2: Yen/USD and USD/NZD exchange rates 1987-2001.**

Source: Japan Lumber Reports, Reserve Bank of NZ

**Fig. 3: Real (June 2001) Prices for Selected Grades Post-1993 Spike.**

Source: MAF Historical Price Series
• The potential for the New Zealand log supply to increase to a new plateau of 30 million by 2006.
• Competition from overseas plantation softwood suppliers.
• Increasing self-sufficiency in Australia.
• Poor perception of radiata pine for higher quality uses in offshore markets.
• Loss of market share to non-wood substitutes.
• Competition between log suppliers within New Zealand.
• A high degree of control of the market and prices by foreign buyers.
• Adverse exchange rate movements.
• Limited ability of New Zealand suppliers to withhold volume because of their cashflow requirements.
• Insufficient domestic processing capability.

The factors listed above simply highlight the uncertainties about the future prospects for radiata pine. Taking these uncertainties into account as well as recent price trends, the question for forest valuers is: what prices should realistically be assumed in a discounted cashflow valuation?

It is reasonable to expect the real price of pruned logs to be maintained or increased given the past trend, and because they are a product where New Zealand has some comparative advantage. We have no comparative advantage in unpruned export logs that may face stronger competition from Russian and the Pacific Northwest logs and European lumber. Our supply of these logs will also increase, while at the same time the demand for imported softwood logs into Japan is also expected to decline (RISI 2000).

The Chinese and Indian markets may develop but currently their prices are less than in the Japan/Korea markets and orders are sporadic. Continued development of the New Zealand domestic sawmilling and wood processing industry may offer a better prospect for price growth in the unpruned log category. The rough sawn timber output of New Zealand mills has increased each year since 1987 (with the exception of a small decline in 1996). Exports of sawn timber have increased annually since 1996. A Wood Processing Strategy Group has been set up with the objective of significantly raising the level of on-shore processing in New Zealand to optimise value from the industry’s expanding harvest.

Despite the proliferation of electronic media, and the declining cost of communication, the global trend has been toward more paper being used rather than less (Rennel 2001). The growth rate for pulp and paper products in the Asia Pacific region is expected to be 4-5% per annum for the next 10 years, although the demand for pulp logs and chips will be offset by an increase in recycling.

In general there is some room for optimism on log prices because Asia-Pacific is likely to be the fastest growing region in the world in terms of the consumption of all wood products for the foreseeable future (Ogle & Miller 2000). FAO modelling (Whiteman & Brown 2000) indicates that the Asia Pacific region will offer significant export opportunities for producer countries such as New Zealand, and that there are likely to be opportunities for countries with significant forest plantation resources to expand market share against supplies from natural forests. However, the FAO paper notes that there is little evidence to suggest that the overall regional supply and demand balance up to 2010 will be radically different from what it is today. The one major exception is for large-sized logs (sed >300 mm), which are already becoming relatively scarce. New Zealand has a comparative advantage in the production of these logs.

The implication from the FAO modelling is that there is potential for markets to absorb New Zealand’s increased production, but less prospect for real price growth. The increase in production has been forecast under several scenarios (MAF 2009). Even under the conservative “late cut” scenario where the average clearfell age is 29-31 years, production is expected to increase by an annual 4.5% until 2010. Market development therefore will continue to be a critical factor influencing future log prices.

The NZIF Forest Valuation Standard for the Disclosure of Prices (NZIF 1999) requires the disclosure of the price sources and any assumed future real price changes (including zero change). The Guidance Notes on Log Prices in the Standard notes that it is important to provide details of the pricing philosophy. Typically valuers assume smoothed current prices (and forest costs) unless they have a reliable and objective reason to assume real changes in the future.

Short- to medium-term cashflows are of most significance in calculating net present values of forests and so price assumptions over this timeframe are important. The review of price trends has shown that there has been little evidence of sustained real price growth since 1987. Data is limited but it is more likely that prices to New Zealand growers have decreased slightly in real terms for some log grades and markets. Although it would be reasonable to expect that pruned logs have some prospect of a real price increase, this may be offset by static or declining real prices of the unpruned and pulp log categories, where markets will face greater competition.

Three suggestions are offered:
• Given the complexity of the factors affecting future prices, it would be speculative for a forest valuer to make assumptions about future real price movements. Accordingly the use of current price levels with a zero real price change scenario is justifiable.
• In order to remove the effect of short-term price volatility from the valuation, a commonly used and conservative approach is to use average log prices based on prices for the current quarter and the previous 8-12 quarters.
• It would also be realistic to recognise in a valuation that there is an equal possibility for a real increase or decrease in future prices, and that this should be modelled by sensitivity analysis.

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References
Regional variation in radiata pine sawlog prices in New Zealand

Mark Bloomberg, Hugh Bigney and Richard Sedcole

Abstract

There is regional variation in market structure and log quality for radiata pine sawlogs in New Zealand. This should be reflected in a corresponding variation in sawlog prices between regions. This paper presents a study of log price variation for three broad categories of domestic sawlogs in four wood supply regions in New Zealand. A survey of log producers was used to gather data on log prices and log attributes. A regression model was then used to estimate log prices that could be compared to actual prices received. The results show that there are significant price differences between some regions, and for some log grades, and that these differences can be explained by differences in log attributes.

Introduction

Estimation of log prices is an important part of forestry valuation. In New Zealand, the generally accepted method of forest valuation, discounted cash flow analysis, relies on estimates of future log revenues that would be received from harvesting a forest (NZIF 1999). When evaluating mature or near-mature forests, the estimated log revenue may be the single most influential variable. There is considerable heterogeneity in the radiata pine log resource throughout New Zealand. Important log characteristics, such as wood density and strength, vary markedly with climate and other site conditions (Cown 1999). Similarly, Bloomberg (2001) found that markets for radiata pine logs varied in structure between four New Zealand wood supply regions. The largest regional market for logs was the Central North Island, which still produces over 50 per cent of New Zealand’s total annual wood harvest (MAF 2000). Nelson/Marlborough was the largest and most well-developed wood supply region in South Island. Otago/Southland was expanding rapidly, with a large proportion of sawlog production being exported. Canterbury was smaller than the other regions, with a low concentration in sawmill ownership and a low proportion of sawlog production being exported.

Given regional variation in wood quality and log markets, one might expect this to be reflected by variation in prices paid for logs between different regions. An example of price differences due to variation in log quality can be found in the prices for different sawlog grades of radiata pine in New Zealand (Agri-Fax 1999; MoF 1996). However, only Agri-Fax publishes price data that also accounts for differences in regional prices.

Therefore, while regional differences in log attributes and market structure should be reflected in the variation in sawlog prices between regions, most evidence of any relationship is anecdotal, and regional variation in sawlog prices has never been formally studied in New Zealand. The purpose of this paper is therefore to examine if regional price differences can be explained by regional differences in sawlog and market attributes, for four New Zealand wood supply regions (Central North Island, Nelson/Marlborough, Canterbury and Otago/Southland). The results of this study can be used by forest valuers to establish appropriate regional prices for sawlogs.

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