Silva Fennica 1992, Vol. 26 N:o 4: 211–217

Profitability of forestry in jointly-owned forests of Northeastern Finland and Lapland

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TIIVISTELMÄ: METSÄTALOUDEN KANNATTAVUUS KOILLIS-SUOMEN JA LAPIN YHTEISMETSISSÄ

Penttinen, M. & Kinnunen, M. 1992. Profitability of forestry in jointly-owned forests of Northeastern Finland and Lapland. Tiivistelmä: Metsätalouden kannattavuus Koillis-Suomen ja Lapin yhteismetsissä. Silva Fennica 26(4): 211–217.

The profitability of jointly owned forest holdings in the two northernmost forestry board districts of Finland was studied by means of ratio analysis. A time series of profit and loss statements and balance sheets from 33 holdings covering the fiscal years ending 1981–1990 served as the database. The studied area was 348 038 hectares, the allowable cut 304 300 cubic metres per year and the average turnover, deflated by the wholesale price index, FIM 57.6 million per year. The key result obtained was that the average annual profit was FIM 107 per hectare and FIM 110 per cubic metre. The time series showed the ratios had increased significantly over the calculation period.

Koillis-Suomen ja Lapin metsälautakunta-alueilla sijaitsevien yhteismetsien kannattavuutta tutkittiin vuosina 1981–1990 päättyneiden tilikausien tilinpäätöksistä tunnuslukuanalyysin keinoin. Aineistoon kuului 33 yhteismetsää, joiden yhteispinta-ala oli 348 038 ha, hakkuusuunnite 304 300 kuutiometriä vuodessa ja tukkuhintaindeksillä deflatoitu keskimääräinen liikevaihto 57,6 miljoonaa markkaa vuodessa. Keskeiseksi tulokseksi saatiin keskimääräinen vuotuinen ylijäämä 107 mk/ha ja 110 mk/m^3. Aikasarjoista havaittiin tunnuslukujen nousseen merkitsevästi laskentakaudella.

Keywords: forestry, forest management, coownership, profitability.
FDC 651 + 924

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Accepted January 20, 1993

1 The necessity of profitability results

The profitability of individual forestry measures, such as fertilizing, has been studied quite extensively (e.g. Hämäläinen, Laakkonen and Kukkola 1989), while tax-deductible costs have been studied for a long time. In contrast, there has been virtually no profit and cost accounting of the forestry activities of individual holdings in Finland. The proportion of tax-deductible costs of stumpages in 1987 and 1988 was only 9 % in private forests, but 22 % in industry-owned forests and 23 % in state-owned forests (Lappalainen 1991).

After a long period of economic growth, the Finnish economy has entered a recession. Despite the rather poor outlook for the forest industries, their share in export earnings has not decreased. The share was 37.6 % in 1990 and 38.1 % in 1991 (Yearbook... 1991). As international competition in the end product market becomes more intense, there is a need for information on the true cost structure of forestry and the profitability of its various components. By applying information derived from research, it is possible to improve financial results. An introduction to single holding profitability analysis is offered by the jointly-owned forests (JOF's).

2 Material and methods

The monitoring of profitability in private forestry has been hampered by the lack of accounting data (see e.g. Penttinen 1991a). Recently, profitability studies covering farm-related forests in the area of two municipalities in eastern Finland have been published (Huovinen 1991). In central Europe, forestry accounting and profitability studies on JOF's have been carried out for decades (see e.g. Enk 1988). In Finland, within the private non-industrial forestry JOFs are an exception in that they are required by law (The law concerning jointly owned forests 1991) to employ accounting in order to determine the share of profits to be distributed to their owners. In addition, each JOF must have a valid forest management plan, which states the allowable timber cut. JOFs may depart from the plan only by permission of the local forestry board (The law concerning jointly owned forests 1991).

JOFs resemble the forestry activities of other private forests with respect to their cost structure and many JOFs do not have full-time employees. For the privately owned forests of Lapland, a share of the direct costs of the turnover of 37 % was reported by Simula and Keltikangas (1990) while in the JOFs studied the share was 34 %.

The data on JOFs in the forestry board districts of Northeastern Finland and Lapland have been utilized in a joint project between the Finnish Forest Research Institute and the forestry boards with the aim of developing the accounting and management of JOFs. The data concerns all those JOFs which have drawn up financial statements for a period of at least ten years. The data cover seven JOFs in the district of Northeastern Finland and 26 in the district of Lapland. Their respective areas of forest land were, on average, 162 867 and 74 113 hectares during the period examined, giving a total of 236 980 hectares. Forest land is defined as land on which timber production is at least one cubic metre per hectare per year. The largest unit, the JOF in Kuusamo, had a total of 63 837 hectares forest land. The JOF areas are shown in Table 1. while the allowable cuts and actual fellings per forest land hectare are given in Table 2.

The total amount of fellings exceeded the allowable cut by 350 521 cubic metres, or 11.3 per cent during the ten accounting periods. The main reason for the excess felling of the allowable cut was the reparation of storm damage.

Deviations from the allowable cut were taken into account in the profit calculation. For the overall analysis, all financial statements for each fiscal year were summed. The sums thus obtained were converted into real Finnish marks (FIM) using the wholesale price index as a deflator and then summed for the whole period.

This study is based on the forestry accounting systems developed by Penttinen (1992).

Table 1. The number of jointly-owned forest holdings and their areas in the forestry board districts of Lapland and Northeastern Finland, 1981–1990.

	Units	Average forest land hectares	Smallest, forest land hectares	Largest, forest land hectares
Lapland	26	2 851	214	18 202
NE Finland	7	23 267	1 783	66 583

Table 2. Allowable timber cuts and actual fellings in the jointly-owned forest holdings in the forestry board districts of Lapland and Northeastern Finland, 1981–1990.

	Allowable cut m^3/forest land hectare			Felling m^3/forest land hectare		
	smallest	largest	average	smallest	largest	average
Lapland	0.59	2.55	1.02	0.51	3.22	1.29
NE Finland	1.01	1.60	1.41	1.22	1.74	1.50
Total	0.59	2.55	1.28	0.51	3.22	1.43

3 Results

The total sum of the profit statements was divided by the number of years in the calculation period and by the total area to obtain the average annual profit statement per hectare:

FIM/ha	% of forest holding sales revenue	% of forest property turnover
Timber sales revenues	162.90	98.4	122.4
Forest holding sales revenues	165.59	100.0	124.5
– Harvesting costs	32.55	19.7	24.5
Forest property turnover	133.04	80.3	100.0
– Change in value of standing timber	11.70	7.1	8.8
– Variable costs	10.08	6.1	7.6
Gross margin on sales	111.26	67.2	83.6
– Fixed costs	12.57	7.6	9.4
Operating profit before depreciation	98.69	59.6	74.2
– Depreciation	1.77	1.1	1.3
Operating profit	96.92	58.5	72.9
+ Other income and expense	15.88	9.6	11.9
Profit before appropriations and taxes	112.80	68.1	84.8
– Increase in reserves	4.11	2.5	3.1
– Direct taxes	1.26	0.8	0.9
Profit for the period	107.43	64.9	80.8

The key results per cubic metre are timber sales revenues of FIM 167.30, operating profit before depreciation of FIM 101.35 and profit for the period of FIM 110.33.

The timber sales revenue includes all timber sold. The forest holding sales revenue includes all recorded sales. The forest property turnover is the correct basic level for comparisons between different holdings as it eliminates the contribution of work in delivery sales of timber. Note that in the case of a single holding the change in value of standing timber ought to be placed after the profit for the period.

The profit per hectare of forest land is 46.8 % higher than that per hectare for the total area; for example, a profit for the period of FIM 157.72 per hectare of forest land is obtained. Results per hectare of forest land are relevant because forest tax is paid on forest land only.

The rate of return on capital was calculated using two methods. In the first one, the measure of capital used was the sum of the sales price estimates calculated using the formula proposed by Airaksinen (1989) with the valuation items, reserves and capital items appearing in the balance sheet. In the second method, use was made of average prices for forestry land in the province of Lapland obtained from real estate sales price statistics. The prices for the years 1981–1990 were converted into 1991 FIMs using the wholesale price index as a deflator. These prices were used to calculate the average price weighted by areas sold annually. A price of 4 509 FIM per hectare was obtained. This was multiplied by the area of the JOFs studied, and to the product were then added the above-mentioned balance sheet items.

In both cases, the numerator of the formula for the rate of return was the profit for the period less the effect of the change in reserves. The rate of return obtained with the former method was

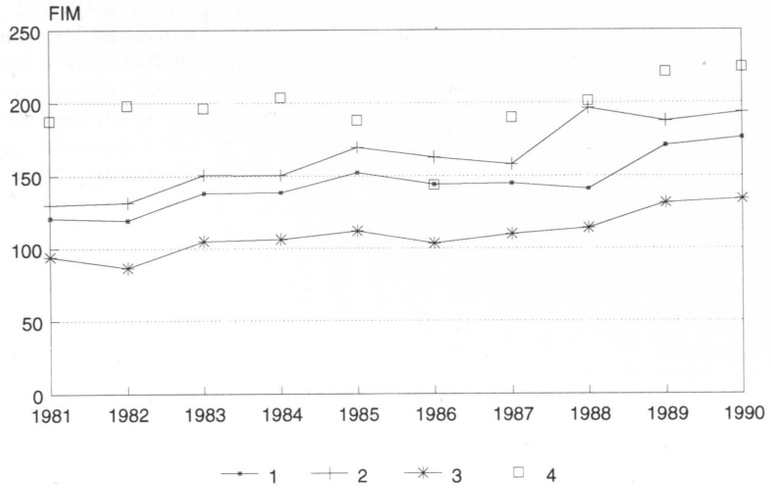

Fig. 1. Developments in the operating profit before depreciation per forest land hectare (1), the profit for the period per forest land hectare (2), the operating profit per cubic meter of timber sold (3) and the forest property turnover (4) per forest land hectare of jointly-owned forest holdings in the forestry board districts of Northeastern Finland and Lapland, 1981–1990.

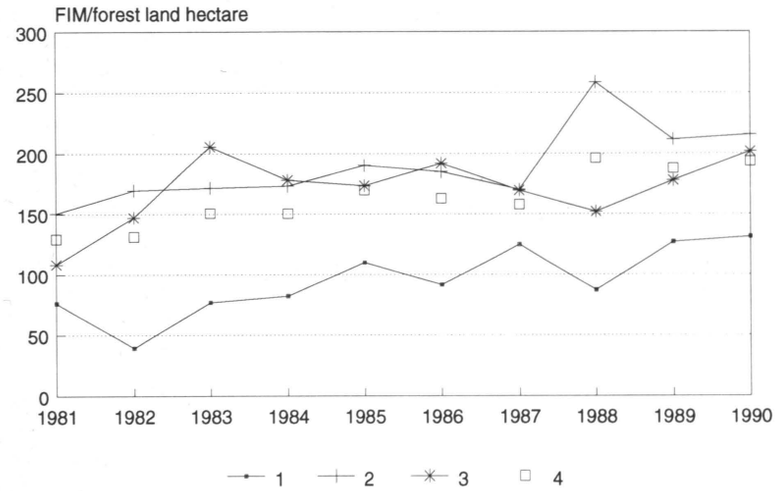

Fig. 2. Profit for the period per hectare of forest land in areas of temperature sums of less than 700 dd (1), 700–799 dd (2), over 800 dd (3) and on average (4) in the jointly-owned forest holdings in the forestry board districts of Northeastern Finland and Lapland, 1981–1990.

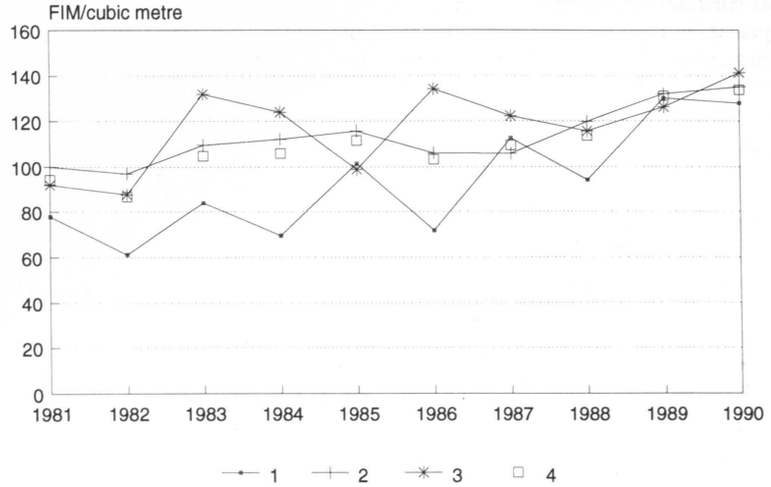

Fig. 3. Operating margin per cubic metre of timber sold in areas of temperature sums of less than 700 dd (1), 700–799 dd (2), over 800 dd (3) and on average (4) in the jointly-owned forest holdings in the forestry board districts of Northeastern Finland and Lapland, 1981–1990.

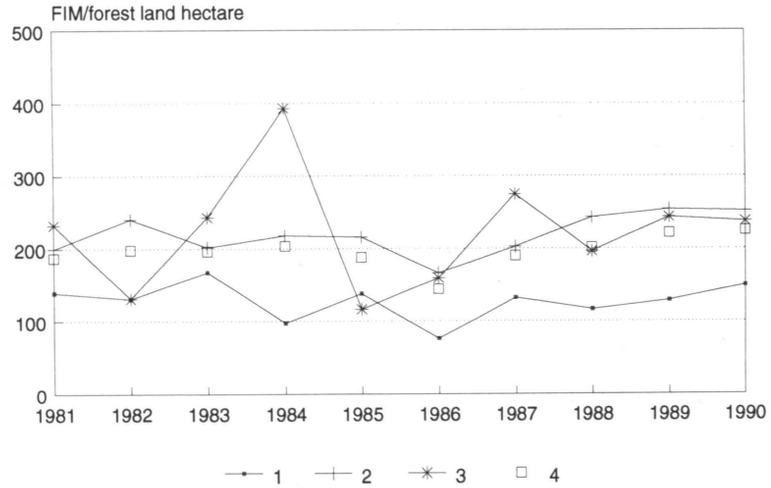

Fig. 4. Forest property turnover per forest land hectare in areas of temperature sums of less than 700 dd (1), 700–799 dd (2), over 800 dd (3) and on average (4) in the jointly-owned forest holdings in the forestry board districts of Northeastern Finland and Lapland, 1981–1990.

2.8 % and that with the latter method 2.4 %.

It was not possible to evaluate taxes or a large part of the financial assistance granted for forest improvement. Most of these items go directly to individual shareholders, without passing through the accounts of JOFs. The correct rate of return on capital can be obtained from the above rates only after forest taxes paid are deducted from the denominator of the formula. Financial assistance, e.g. for silviculture, was 33 FIM/ha/year in the studied area, and this would affect variable costs and other income in opposite ways, i.e. it would not affect the profit for the period.

A great number of factors influence the profitability of forestry, the most important being the volume of timber sales and the price level. On the basis of the data used, the profit for the period, converted into real FIMs using the wholesale price index, rose by approximately 4.6 % per year in the 1980s (Fig. 1).

The large profit in 1988 was due to the sale of the current assets of one large JOF. The linear regression of the profit for the period with respect to time is of the form $y = 129.14 + 7.44 \cdot (19xx–1981)$, which indicates a rise in the profit of over FIM 7 per year. According to the t-test, the regression coefficient differs very significantly from zero, i.e. the profit for the period can also be considered to have risen in the statistical sense. The 95 % confidence limit of the regression coefficient is 7.44 ± 2.38.

In Northern Finland, natural conditions vary in different areas, and the effect of this was analyzed by grouping the data according to temperature sum. The profit for the period, calculated per hectare of forest land, has risen in all groups (Fig. 2). The level of profit in the lowest temperature sum group is significantly lower than in the others. The hypothesis that it does not differ can be rejected at the 0.1 % risk level.

The operating margin calculated per cubic metre of sold timber (roundwood) also shows a rising trend, although there is considerable variation in the different temperature sum groups (Fig. 3).

The forest property turnover calculated per hectare of forest land has risen less than the various measures of profitability (Fig. 4), which is due to the concentration of excess cutting in the first half of the 1980s.

4 Discussion

JOFs have an advantage in the timber trade in that they are able to supply large quantities of timber, and they thus obtain better-than-average prices. There are also grounds for believing that, on average, JOFs carry out harvesting work more efficiently than private forest owners (Kolehmainen 1983).

The business surplus per hectare is of approximately the same magnitude as the net profit of FIM 96/ha in the private forests of Lapland as calculated by Simula and Keltikangas (1990). Using the wholesale price index as a deflator, this gives a value of FIM 103/ha in July 1991. If the cutting balance is ignored, as is done by Simula and Keltikangas (1990), the average business surplus obtained for the JOFs is FIM 109/ha.

When the location of JOFs is taken into account, their profitability is good. The average effective temperature sum during the growing season, 1931–1960, $\sum(t_m - 5\ °C)$ (meso-scale analysis of temperature sum), of the JOFs covered by the study is approximately 740 dd (National board of survey 1987). The 740 dd isopleth, with lower sums to the north, runs from the southern parts of the municipalities of Muonio, Kittilä and Sodankylä through Pelkosenniemi and Salla and via the northeastern part of Posio to Kuusamo. The northernmost large private forest areas are located close to this border. On average the temperature sum of the private forests in the areas of the forestry board districts of Lapland and Northeastern Finland is 850–900 dd.

Pre-tax net profits of 393 and 480 FIM/hectare for the privately owned forests in Juuka and Rantasalmi, respectively, were reported by Huovinen (1991). These municipalities are located in Southeastern Finland, where the effective temperature sum is around 1200 dd.

After adjustment for excess cutting and taking into account the above estimates, it can be argued that the profitability of JOFs is slightly better than that of private forestry estimated in the earlier studies carried out at the forestry board level (Simula and Keltikangas 1990).

According to the results derived from the JOFs, forestry has been profitable in Northeastern Finland and Lapland. The operating profit before depreciation was FIM 101.15 per cubic metre of timber sold. Even in the current depressed conditions, the operating margin obtained from timber sales would be clearly positive, signifying profitable operations. Viewing the situation in terms of alternative investments, forest owners in northern Finland would do well to consider selling timber even in the present situation, for example, to obtain funds with which to pay back their outstanding market-rate debts (see, e.g., Penttinen 1991b).

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