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## The Swedish Roundwood Market

Parties active on the market —  
wood price negotiations

*De svenska rundvirkesmarknaderna —  
parter och prispförhandlingar*

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## Abstract

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*There are 3 principal groups on the Swedish roundwood market: the suppliers, the intermediaries (vendors) and the buyers. The suppliers include private, public and company forest owners, whose shares of the total forest land area are 50 %, 25 % and 25 %, respectively. The main intermediaries are the nine forest owner associations in the country. About 70 % of the private woodlot owners are members of these economic associations. The buyers comprise two main groups: the pulpmills and the sawmills. The pulpmills are the predominate consumers of wood raw materials. Sawmills are far more numerous than pulpmills and there are a variety of cooperative agreements to which the two categories are party.*

*About 60 % of the total annual cut in Sweden is offered on the open market. Processing of the remainder of the wood is carried out by subsidiary or associated companies of the forest owner. Pricing of the wood is generally carried out during periodic negotiations. During the 1974/75 season, negotiations on the pricing of pulpwood were held in six different areas and, on the pricing of sawlogs, in twelve different areas. The parties to the negotiations are the forest owner associations and groups of buyers or buyers' representatives. The Swedish Forest Service, which manages a large proportion of the public forest land, negotiates directly with the buyers.*

*A disadvantage of the current system is that there is a tendency for wood prices to lag behind the trends in prices of processed products. This can have adverse economic consequences for the forestry sector, particularly during depressed market conditions. An advantage of the price negotiations is the consequent stability of the market.*

The author would like to emphasize that this report was written in 1975. Owing to subsequent developments, particularly those attributable to the current recession in Sweden, the situation now differs in some respects to that described.

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## Summary

The parties involved on the roundwood market are the *suppliers*, the *vendors* and the *buyers*.<sup>1</sup> The suppliers include private woodlot owners, the Swedish Forest Service and other public forest owners, such as the church, and to some extent the forestry companies. The principal intermediaries on the Swedish market are the forest owner associations. Pulpmills and sawmills are the main buyers. Since the buyers often own forests themselves, and as a result of various special agreements existing between suppliers and buyers, a significant share of the annual cut does not appear on the open market.

It is difficult to specify the magnitude of this share, one reason for this being that the percentage varies from year to year. Nonetheless, in 1971 such an estimate was made (*Svensk skogsindustri i omvandling*, 1971). It was found that 40 % of the available wood was processed by subsidiary or affiliated companies, and of this, forestry companies accounted for 60 %. The forest owner associations accounted for 26 % and the Swedish Forest Service/ASSI for 13 % (Fig. 1).

About 60 % of the wood undergoing further processing was offered on the open market. Of this, the forest owner associations accounted for around 45 %; the Swedish Forest Service for about 15 %, and other public forests (ecclesiastical, municipal, etc.) and forestry societies for about 10 %. The share of the forestry companies was around 6 %. The remaining 25 % was sold directly by the suppliers to the mills. This latter arrangement is very common in respect of the supply of sawlogs to local mills with which many of the private woodlot owners have agreements. It should be mentioned that sawlogs are usually sold on local markets while pulpwood often has

to be transported over fairly long distances. The relationship between wood supplier and buyer also differs since there are considerably more buyers of sawlogs than there are of pulpwood.

The objectives of this paper are to *present the various parties active on the Swedish wood market, to outline the channels existing for the sale of wood and to describe the type of relationships existing between the various parties*. In this way, it is hoped that the reader will form an understanding of the formal boundaries within which the market operates. Some supplementary information is also included towards the end of the paper concerning some of the factors influencing the prices and volumes agreed between the various parties. Some statistics illustrating the trends in prices and annual cuts are also included. Thus, the paper is intended in the first instance for those who are less familiar with the field.

The first *three chapters* deal with the various parties active on the wood market. The largest of these among the *suppliers* (chapter 1) are the *private woodlot owners*. Many of these are members of forest owner associations. Accordingly, the *forest owner associations* constitute the principal vendors (intermediaries) on the market (chapter 2). The Swedish state is the largest single owner of *public forest land* and the administration of such land comes under the auspices of the *Swedish Forest Service*. ASSI, the state-owned company, obtains a large proportion of its wood from the *Swedish Forest Service*. A few major forestry companies own most of the forest

<sup>1</sup> Here, *suppliers* are forest land owners. *Vendors* are synonymous with intermediaries. *Buyers* of roundwood refers to the forest products industry.

## Wood for further processing

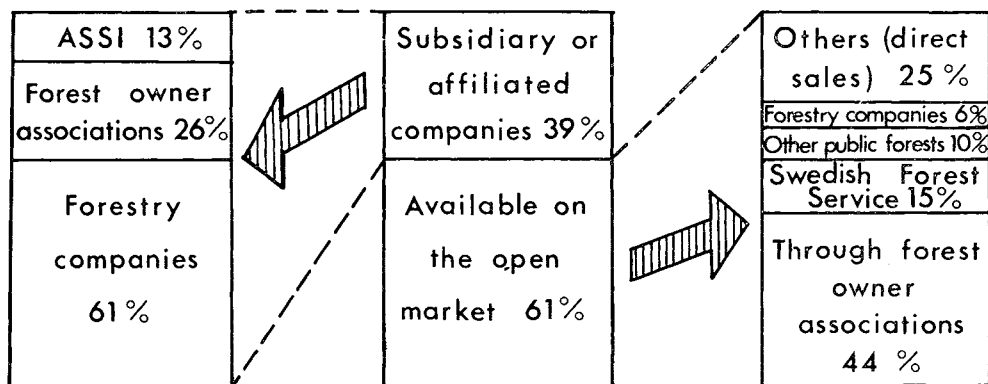


Figure 1. Shares of the wood market accounted for by various forest owner categories in the late 1960's.

land classified as company owned. The companies themselves are normally also responsible for conversion of the wood.

*Buyers* (chapter 3) can roughly be divided into two categories according to the type of wood they purchase, i.e. the pulp mills and the sawmills. Thus, two markets are really distinguishable here: the pulpwood market and the sawlog market. The *pulp mills* are the largest consumers of wood. The overwhelming majority of these are owned by private companies. There is extensive collaboration between the companies in respect of the acquisition of wood raw materials. The same applies to *sawmills*. However, the sawmills are much more numerous than the pulp mills. Most of these are private or "independent" sawmills.

*Chapter 4* deals with the forms of wood sales: sales under delivery contract, stumpage sales and sales under logging contract. The first form, whereby the wood is sold under a delivery contract, differs significantly from the other two forms in that the supplier is normally responsible for cutting. This form is often recommended by the forest owner associations.

*Chapter 5* deals with the annual *price negotiations*. The parties to the negotiations include the forest owner associations

on the one hand, the wood purchasing associations and the sawmill associations or other buyers' representatives on the other. The prices agreed at these negotiations will then be applicable in other agreements between buyers and suppliers. There is no single wood market serving the whole country. Six "markets" can be distinguished with respect to pulp and some twenty-odd regions for sawlogs. However, these markets should not be regarded as being entirely separate nor permanent.

Finally, in *chapter 6*, the various factors influencing prices and annual cuts in Sweden are discussed. The basic assumption here is that the prices and the volume of the annual cut will be determined by the points of intersection of the supply and demand curves. The demand for roundwood has been deduced, since it is dependent on the demand for processed products. With respect to the demand in the private sector or from the Swedish mills, this will also be affected by production and transport costs—i.e. their competitiveness. *The supply* of roundwood is influenced by the logging costs and the stumpage price required by the forest owner. The chapter also deals with actual developments in prices and annual cuts. In conclusion, an attempt is made to assess the outlook for the future.

In this context, it is important to bear in mind the shortage of wood fibre predicted by FAO, and also that Sweden is already facing a shortage of wood.

To supplement the description of the Swedish wood market, an account is given in an appendix of the different *types of markets*: perfect competition; monopoly; monopsony; and bilateral monopoly. A *monopoly* (one supplier) enables the sup-

plier to apply higher prices than in perfect competition. In a *monopsony* (one buyer), the converse is true. In both of these market forms, the annual cut will be less than in perfect competition. In a *bilateral monopoly*, the prices will be somewhere in between the levels prevailing in a monopoly and a monopsony. Where is a question of negotiation.

# Chapter 1: Wood suppliers<sup>1</sup>

## 1.1 Introduction

One half (11.8 million hectares) of the total forest land area in Sweden (23.5 million ha) is owned by *private individuals and estates*. Company-owned forests account for one quarter (5.9 million ha) and another quarter comprises *public forests* (5.8 million ha). However, the shares of the volume of wood (2.361 million m<sup>3</sup> gross volume) accounted for by the various owner categories is somewhat different. About 56 % of the volume is held by private woodlot owners. The share of the company-owned forests is roughly the same proportion as their share of the forest land area (24 %), while the share of public forests is smaller (Fig. 2).

The share of the forest land area accounted for by the various owner categories differs from region to region (Fig. 3). In Götaland, 81 % of the land (3.9 million ha) is privately owned. The corresponding figures for Svealand and Norrland are significantly lower (51 % and 39 %), with the shares of the other two owner categories being larger. Company-owned forests in these two regions account for a little more than 30 %. The share of public forests, on the other hand, increases the further north one goes.

## 1.2 Private woodlot owners

Private forestry is characterized by the large number of private owners. According to the agricultural survey of 1971, there are 247 415 private holdings with a forest area greater than 0.1 ha. However, most of these have only insignificant forest areas. For example, 56 % (138 127) of the holdings have a forest area of less than 25 ha. The share of the total forest land area accounted for by these holdings is small (14

%). The average area of forest land on a private holding is 43 ha.

Of the above holdings, slightly more than half either have no arable land at all or lease out the land in the form of "forest estates". These estates are dominated by small-scale farming (Fig. 4).

An estimate based on the particulars contained in "De privata skogsägarna" (Lönnstedt, 1974a) shows that about one-half of the forest estate owners (0—0.2 ha arable land) do not actually live on the estates.<sup>2</sup> The majority of these non-resident owners are gainfully employed elsewhere (59 % in Götaland and 73 % in Västerbotten); and 19 % and 9 %, respectively, of the owners in the same regions are old age pensioners. The situation is almost the reverse with respect to owners living on the estates.

The above particulars are important knowledge with respect to an assessment of the possibilities that the various forest owners have of providing their own resources for deployment in forestry work. This, in turn, is significant to the choice of buyer, since the buyers generally have established service organizations possessing the required logging resources.

It is clear from the information presented in "En gruppering av de privata skogsägarna" (Lönnstedt, 1974b) that, in the areas studied, the farmers generally carry out forestry work themselves, while this is less common in the case of forest estate owners. Independent operation is less common among farmers who are gainfully

<sup>1</sup> Unless otherwise stated, particulars are taken from the Forest Statistics Yearbook, 1973.

<sup>2</sup> In Götaland, the percentage is 52 %. In Västerbotten, the percentage is 43 % on the coast and 58 % inland. The survey only covered estates in Götaland with at least 5 ha of forest, and with 25 ha in Västerbotten.

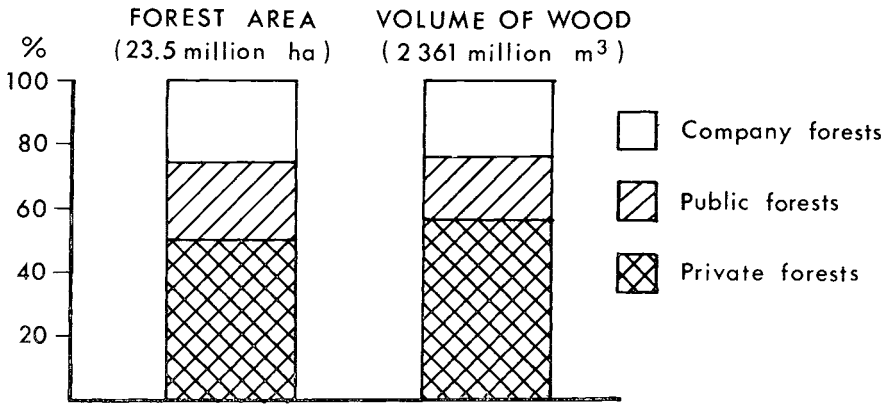


Figure 2. Breakdown of forest land area and wood volume by owner category.

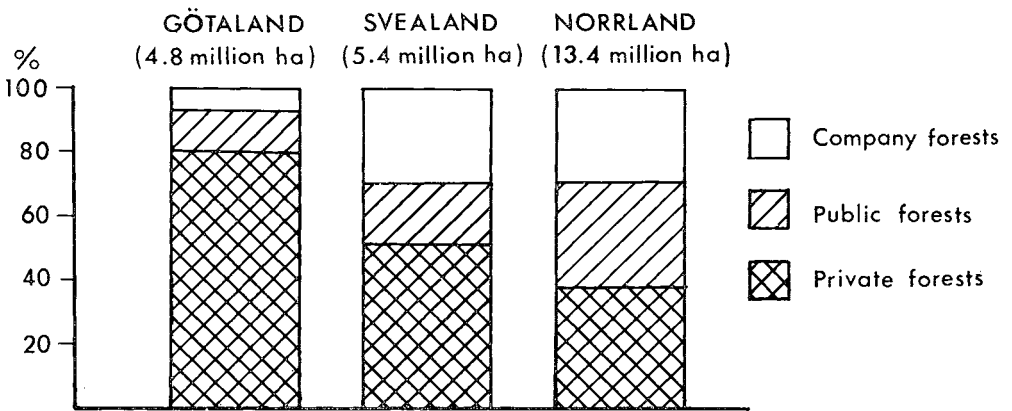


Figure 3. Breakdown of forest land area by owner category and region.

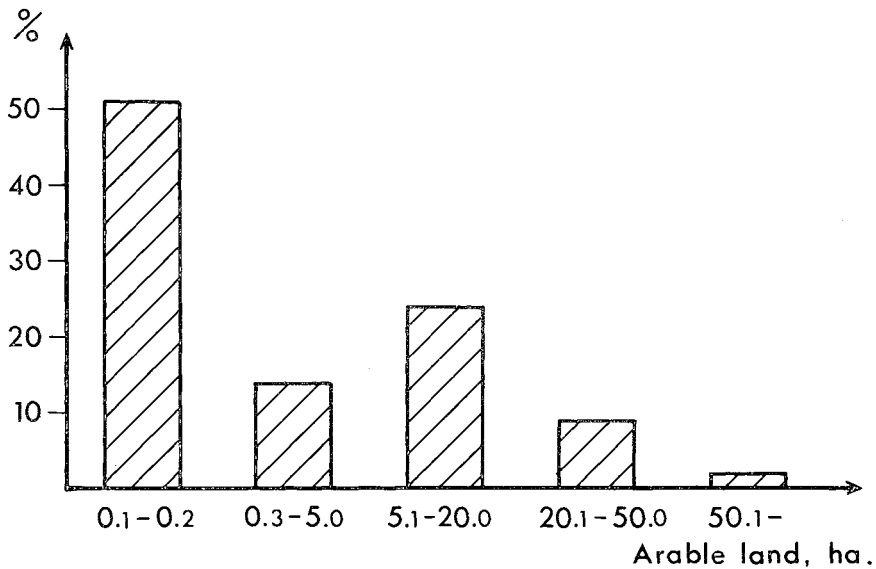


Figure 4. Relative breakdown of holdings by arable land area.



employed elsewhere, whose working capacity is diminished, on large farms (more than 20 ha of arable land) concentrating on cultivating crops, or on farms with a sizable herd of cows (24 or more). Independent operation by the forest estate owners tends to decrease with diminished working capacity and in the case of those not actually living on the estate.

There is a marked correlation between the extent of independent operation and the form of sale of the wood. The majority of farmers prefer to sell on a delivery contract basis and, in some cases, alternate this form with some other sales form. The forest estate owners on the other hand generally prefer stumpage sales.

### 1.3 The public forests

Public forests fall into two categories: state forests and other public forests. The state forests are managed by the *Swedish Forest Service*, a state-owned commercial enterprise responsible for forestry and related activities. The Service also manages some of the other public forests, such as reindeer grazing land leased to the Lapps, common land and national parks. These forests account for a total land area of 4.2 million ha, which is about 90 % of the total area of state forest and 72 % of the public forest area. As much as 43.3 % of the total area of forest land managed by the Service is situated in the county of Norrbotten. 25.2 % of the land is in Västerbotten, 15.1 % in the counties of Norrland and Kopparberg, and the remaining 16.4 % scattered among the other counties.

*AB Statens Skogsindustrier (ASSI)* is the largest customer of the Swedish Forest Service. Collaboration between the two is governed by a long-term general agreement, the main principles of which have been approved by the Riksdag (parliament). The Swedish Forest Service and ASSI were brought closer together by a resolution passed by the Riksdag in 1968. This included the drawing up of common goals for the two enterprises, namely, that they should work to achieve "the best possible

combined economic yield on a long-term basis and an annual profit that is reasonable from an economic point of view". In 1972, ASSI purchased sawlogs and pulpwood to a value of SKr 188.3 million from the Service, which corresponds to 31.4 % of the latter's total sales. In this context, it may be mentioned that sawmills run by the Swedish Forest Service are operated both by subsidiaries of the Service and by the Service directly.

In addition to its sales to ASSI, the Swedish Forest Service largely sells to company-owned mills situated on the Norrland coast. Fairly considerable quantities of wood are also supplied to private sawmills located inland and on the coast. In central and southern Sweden, where forestry is not tied to the same extent to particular regions, the customers are much more numerous. This is partially due to the well established sawmill industries in the area.

In the past, the sale of sawlogs on the open market was generally made through the invitation of tenders. At present, most bucked wood is sold following direct negotiations with individually selected forest product enterprises. The advantage to the Swedish Forest Service of this procedure is that it is possible to adapt to changing conditions with respect to technical advances in logging and also to the demands and reception facilities of the mills. The invitation of tenders is primarily employed in the sale of special assortments and in sales to small mills which are closely associated with a local area in which competition is high.

The management of *other state forests* is the responsibility of the Royal Fortifications Administration, the National Power Administration, the National Board of Agriculture and the National Administration of Shipping and Navigation, which together administer 0.5 million ha or 8 % of public forest land. *Other public forests* also include ecclesiastical forests. These are managed by diocesan boards which, in practice, normally implies a diocesan forest officer. Forestry itself is the responsibility of special departments. Exceptions to these

are the dioceses of Gothenburg and Strängnäs, where the forests are administered by the Forestry Society.<sup>1</sup> This Society is also responsible for the management of a relatively large number of common forests. Some municipalities employ a forest ranger, although it is unusual for municipalities to pursue forestry activities themselves.

#### 1.4 Company forests

The main feature of this category is that the overall number of owners is small. According to statistics compiled by the Joint Committee of the Swedish Forest Industries, 90 % of company-owned forest land is accounted for by the 23 major companies. In contrast to the other two owner categories, the cut from company forests is not normally made available on the open market but is processed in the pulpmills and sawmills owned by the companies. Of course, this is true to a certain extent of the Swedish Forest Service as well, since the Service has a contractual undertaking to supply ASSI with wood. Some of the wood supplied to the forest owner associations is also processed in mills owned by the associations. Thus, it is apparent that by no means all of the annual cut is offered on the open market. This may also be seen from the table in Figure 1.

#### 1.5 Summary

Most of the roundwood appearing on the open market comes from the private owners. Numerically, this category is very large, and it is also of diversified composition. However, there is a certain amount of coordination among the different owners

with respect to the sale of wood, owing to the majority of them being members of a forest owner association. The Swedish Forest Service is another supplier. However, a large proportion of the sales of the Service goes to ASSI in accordance with the agreement existing between the two organizations. Wood harvested in company-owned forests goes mainly to mills owned by the companies.

In Finland and Norway, the principal owner category is also that of private woodlot owners (Holopainen, 1969 and 1961). This category accounts for approx. 70 % of the forest area in Finland and of approx. 60 % in Norway. The share of company forests is much less than in Sweden, being 7 % and 9 %, respectively. The share of the total forest area accounted for by public forests amounts to 30 % in Finland and 18 % in Norway. Common to all three countries are the large number of private woodlot owners and the existence of forest owner associations. However, the involvement of the associations on the market is different. In Finland, individual contact between the wood suppliers and buyers is the dominating form, while, in Norway, most of the wood is sold through the forest owner associations. The situation in Sweden is somewhere between the two.

Another factor common to the Nordic countries is that the sale of roundwood from public forests is achieved through a state administration with the authority to determine prices and be responsible for deliveries.

<sup>1</sup> The Forestry Society is a non-profit making foundation aimed at increasing production and improving silviculture. Its operations also embrace administrative and advisory activities for some common forests and larger private forests.

## Chapter 2: The forest owner associations<sup>1</sup>

A wood supplier wishing to offer wood on the open market can choose between selling to an intermediary or directly to the forest products industry. As described in the summary, the intermediary is normally known as the vendor and the forest products industry as the buyer. This chapter deals with the forest owner associations, who are the main intermediaries on the market and also the representatives of the private woodlot owners at price negotiations (see Chapter 5).

Initially, the forest owner associations were organized on a *non-profit-making basis*. Their work concentrated on silviculture. However, the problems facing the private woodlot owners involving the sale of wood soon brought about a change in the emphasis of association activities. Work was then extended to include the total output of wood in order to obtain better prices from negotiations with the buyers. This is normally achieved by the associations buying the roundwood from the members at a pre-agreed price and then selling it to another buyer.

It is important to remember that it is the woodlot owner who takes decisions concerning whether or not wood is to be logged and, if so, the volume of the cut (within the limits prescribed under the Silvicultural Act). Thus, one of the difficulties with which the associations have to deal is that of acquiring the volume of roundwood that they promised to supply to the buyers during the price negotiations (see Chapter 5). (The situation may also be reversed, i.e. where the associations acquire too much wood.) However, the forest owner associations have a number of means of achieving a balance. One such means is to sign a *delivery contract*. So far, however, the associations have not

held the forest owners too closely to the conditions of such agreements. Other means include the *dissemination of information* to the forest owners and *personal contact*. The importance of these instruments to the achievement of a balance is underlined in another survey on the logging policies of private woodlot owners (Lönnerstedt, 1975).

The articles of association of the forest owner associations state that members may be obliged to meet certain requirements with respect to the supply of goods. Thus, a member may be obliged to give the association the offer of first refusal on forest that is for sale, or of the forest products produced from logging operations carried out by the owner, or by the owner in conjunction with the association. The association board also has the right to release an owner from this obligation. Hitherto (1975), no forest owner association has found it necessary to implement its right of first refusal.

When purchasing roundwood, the forest owner associations apply the *principle of equal prices*, i.e. the associations pay the same price for a given assortment to all suppliers. Thus, a supplier cannot negotiate individually advantageous terms with the association. However, consideration may be given to cost differences depending on the size of a consignment, the facilities at the landing, the turning space and the standard of roads. Different prices have also been applied depending on the time at which the forest owner has given notice of the delivery. In cases where the parties could not reach agreement during the price negotiations (see Chapter 5), guaranteed prices

<sup>1</sup> A more detailed report of the forest owner associations is contained in Lönnerstedt & Andersson, 1976.

have been employed. This implies that the forest owner associations will guarantee the supplier a minimum price. Additional payment may then be possible depending on the prices which the forest owner has been able to obtain from the buyers.

The objectives of the forest owner associations have subsequently been extended beyond that of merely acting as intermediaries for the disposal of members' wood. Consequently, the activities of the associations today also include the creation of conditions conducive to *efficient forestry*. One way in which this has been achieved has been through the creation of association forestry districts. These consist of geographical units with an integrated administration. The association undertakes to purchase the wood offered by the members within the district. For their part, the members undertake to consult the association in the first instance with respect to securing external services. As a result of the indirect collaboration achieved in this way, the associations have been able to engage forest workers and acquire modern logging machines.

Another field in which the forest owner associations have become active has been the establishment and management of *their own forest products industry*. There are presumably several reasons for this:

- a) The utilization of profits from wood conversion.
- b) Greater insight into operating costs which provides guidelines for negotiations.
- c) Less dependence on the buyers of wood which implies a stronger negotiating position on the part of the associations.

In 1973, the associations and the industrial enterprises owned by them employed 19 000 persons of whom 4 500 were forest workers. The turnover in the same year amounted to SKr 4 481 million (Skogsåret, 1973).

The forest owner associations are also active in matters of commercial policy affecting forestry. These include such matters as the use of DDT, forest conservancy laws,

nature conservancy versus forestry, and the defence of private ownership of forest land.

The number of forest owner associations belonging to the National Federation of Swedish Forest Owner Associations is currently nine.<sup>1</sup> There has been a rapid decrease in the number owing to mergers. For the sake of comparison, it may be mentioned that there were 29 associations in 1950 and 24 in 1960 (annual report of the National Federation of Swedish Forest Owner Associations, 1960). By far the largest association is Södra Skogsägarna in southern Sweden, whose membership (44 030 in 1973) and forest land area (2.0 million ha) are roughly twice those of the next largest association (Vänerskog).

The object of the National Federation of Swedish Forest Owner Associations (SSR) is to promote cooperation between the associations so that the total resources may be exploited and utilized in the most favourable way. One way in which this is achieved is by the SSR arranging discussions between representatives from the different associations. The function of SSR as a coordinating body is perhaps especially important shortly before price negotiations. During the actual price negotiations, however, SSR now plays a more subordinate role. Its influence at the negotiations has declined owing to the reduction in the number of associations and the growth of those remaining. The Federation is also involved in sales activities, which, in practice, involves the coordination and centralization of the member associations' exports.

*The number of members* in the forest owner associations in 1973 amounted to 133 634, accounting for a total forest area of approx. 7 million ha (Skogsåret, 1974). Another survey (Lönstedt, 1974a) established that the majority (approx. 80 %) of farmers covered by the survey (more than 5 ha of arable land) belonged to a forest

<sup>1</sup> Three of the associations cooperate in Norrskog. A number of other associations also exist but these are not members of the National Federation. However, these are small and are only active on a local scale (Värmland and Örnköldsvik).

Table 1. Number of owners belonging to a forest owner association.

		FOREST AREAS GÖTALAND			VÄSTERBOTTEN				
		0	5-20	>20	ON THE COAST			INLAND	
forest	arable land	0	5-20	>20	0	5-20	>20	0	5-20
	5-50		59	74	81	51	80	80	36
50-100		60	82	86	57	76	86	50	68
100-200		60	79	86	60	×	×	55	×

Table 2. The number of owners belonging to an association forestry district.

		FOREST AREAS GÖTALAND			VÄSTERBOTTEN				
		0	5-20	>20	ON THE COAST			INLAND	
forest	arable land	0	5-20	>20	0	5-20	>20	0	5-20
	5-50		14	26	42	5	27	45	2
50-100		25	44	51	13	20	45	9	16
100-200		23	45	62	22	×	×	10	×

owner association and, above all, to Södra Skogsägarna in southern Sweden and to the association in Västerbotten. The majority (approx. 60%) of forest estate owners also belonged to a forest owner association, even if the proportion of owners who are not members is considerably larger than in the case of farmers (Table 1). The situation varies from region to region. The situation as regards the forest areas in Götaland and the coastal areas in Västerbotten is fairly similar. Membership is not quite so usual in the inland areas of Västerbotten.

In 1973, the number of owners belonging to an association forestry district was 65 000 (Skogsåret, 1973). This included a total forest land area of 3.5 million ha. The above project also established that the extent of membership in an association forestry district varied much more according to the area of arable or forest land and the region than was the case within a given forest owner association (Table 2).

# Chapter 3: Buyers

## 3.1 Introduction

As shown in Figure 5, in 1973 the sawmills purchased approx. 26 million m<sup>3</sup> solid wood (38 %) of the total cut and wood released from storage (total of 69 million m<sup>3</sup>), and of this 8.5 million m<sup>3</sup> was used by the cellulose industry in the form of wood chips. 34 million m<sup>3</sup> (49 %) of roundwood was used by the cellulose industry. The most notable among the other buyers was the fibreboard industry, which accounted for 6 million m<sup>3</sup> (9 %). Roundwood exports—largely to Norway and Finland—amounted to 3 million m<sup>3</sup> (4 %) (Stener, 1975).

Since the late 1950's, the proportion of the total wood used accounted for by pulp-

wood has increased considerably. However, owing to the sensitivity of the pulp and paper mills to trading conditions on the international market, annual cuts varied considerably during the 1960's and earlier decades. In contrast, the logging of sawlogs varied much less from year to year, although there has been an upswing in the early 1970's owing to the favourable marketing conditions for sawmill products. The importance of firewood and other types of wood has gradually declined. Roundwood consumed by the forest products industry in 1972 accounted for 90 % of the total cut in Sweden (Forest Statistics Yearbook, 1973).

In general, the pulpmills receive the small-dimension assortments. Owing to the

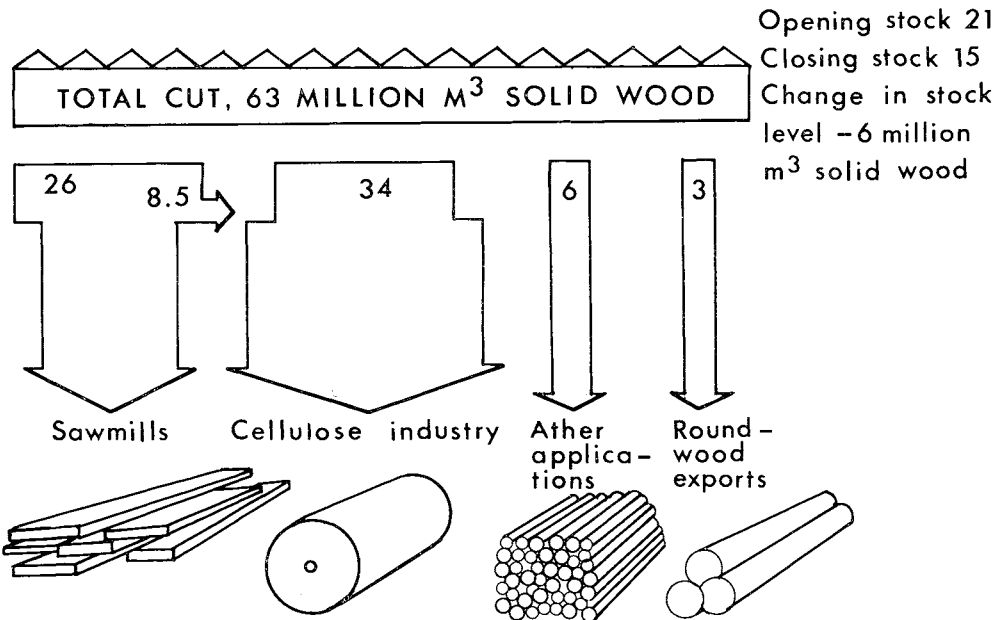


Figure 5. Utilization of the wood 1973.

combination of the demand for large quantities of sawlogs, the rising prices of sawnwood and to technical development at the sawmills (e.g. handling of small-dimension sawlogs), in recent years, the mills have been able to acquire increasing volumes of small-dimension roundwood of good quality—small-dimension sawlogs. The price per unit volume of sawlogs during the early 1970's was roughly 4 % higher than that of pulpwood, and the price relative to pulpwood has also tended to increase at a faster rate. It should also be borne in mind that the logging costs of sawlogs are generally lower than those of pulpwood, and the logging of spruce is also considerably more labour-intensive than that of pine (Svensk skogsindustri i omvandling, 1971).

Nearly 70 % of the wood raw materials used by pulpmills comprises coniferous species. By the end of the 1960's, the hardwood share of the total of wood raw materials had risen to 15 %, but has successively dropped to just over 10 %. The share accounted for by chips and other by-products gradually increased, accounting for about 20 % of the total of wood raw materials used in 1973. In addition to paper pulp, recovery paper is now also an important raw material in the papermaking industry. The amount of recovery paper now being recycled corresponds roughly to 25 % of the total paper consumption: 385 000 tons in 1972 (Massa och papper i Sverige, 1974).

The quality of sawnwood products, which is decisive to their competitiveness and the prices that can be obtained for them on different markets, is largely governed by the type and quality of the raw material. Pinewood harvested in southern Norrland and Dalarna is regarded as the highest quality wood. As regards spruce, the raw materials supplied from Värmland and Hälsingland are regarded as being of top quality. Wood products from southern Sweden—in the first instance spruce—are largely used in the building industry and the export prices are normally somewhat lower than those of wood from Norrland (Svensk skogsindustri i omvandling, 1971).

The following is a more detailed report of the various buyers and of exports and imports.

### 3.2 Pulpmills

There are more than 70 pulpmills in Sweden. The mills are divided fairly evenly with respect to the production of mechanical pulp, sulphite pulp and sulphate pulp. However, the sulphate mills account for about 55 % of production. The largest and most modern mills are to be found in this category. The number of business enterprises or companies, on the other hand, only amounts to about 20. In 1973, the annual production from these mills was 8.3 million tons. The pulpmills are largely to be found along the coast of Norrland, in the region around Lake Vänern and in the province of Småland (Massa och papper i Sverige, 1974).

State-owned enterprises account for only a small portion of the total production of pulp: approx. 6 %. The private sector accounts for the remainder. Generally speaking, most of the production is at mills owned by the larger companies. However, the forest owner associations are by no means insignificant producers. Forest owner association mills account for about 16 % of the production of pulp (Fig. 6).

Most of the pulp produced (57 %) is processed further by the companies. 90 % of all pulp sold is exported while a smaller proportion (but increasing in recent years) is supplied to independent paper mills in Sweden and to other mills which cannot produce certain grades economically, e.g. cellulose grades (Svensk skogsindustri i omvandling, 1971).

To gain a perspective on the pulp industry as a buyer of wood and a party to price negotiations, it is important to understand the forms of *collaboration* existing. For instance, *wood purchasing associations* have been formed primarily to protect the interests of the pulpmills<sup>1</sup> with respect to

<sup>1</sup> The activities of the two northernmost associations also embrace sawlogs.

economic aspects and matters of wood policy (Skogs- och träindustrins karteller — omfattning och ekonomisk betydelse, 1968).

Thus, the main duties of the associations are the following:

- To coordinate and investigate technical aspects of wood, such as assortments, delivery terms, wood measurement, etc.
- To coordinate the exchange of wood between association members.
- To conduct price negotiations on a regional basis on behalf of the pulpmills with the forest owner associations, SSR and with the Swedish Forest Service.

Practically all of the pulpmills owned by the companies are members of a wood purchasing association within the respective region.

There are currently two wood purchasing associations:

1. *SVF in southern Sweden*, which includes the region around Lake Mälaren and southern Sweden. Fifteen pulpwood-buying companies are currently members of the association. These include Holmens Bruks och Fabriks AB—the major buyer within the association—Fiskeby AB and Papyrusgruppen. The association has its own administrative office.
2. *NVK in northern Sweden*, which includes Norrland as far south as Ljungan (price region 1). The members of this association include Svenska Cellulosa AB and Mo och Domsjö AB. The association has a liaison officer responsible for the routine activities.

In 1976, Industriskog AB—another collaborating body—was established. The objectives of the organization are to coordinate the purchase, transportation and supply of wood between its principals: Iggesund, Kopparfors, Stora Kopparberg and Bergvik och Ala AB. This organization covers price region 1 and part of the region around Lake Vänern.

In the regions which are not covered by the wood purchasing associations, there are

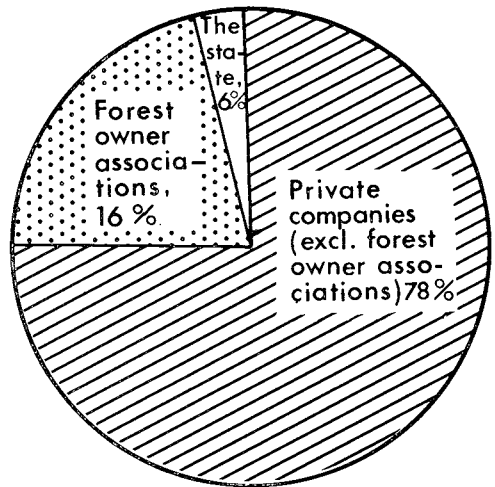


Figure 6. A breakdown of pulp production by owner category.

no other buyers' associations. However, the companies concerned in the forest products industry nonetheless collaborate in activities such as the purchase of wood in much the same way as companies which are members of an association.

In addition, the company-owned sector of the industry has established an organization known as the Joint Committee of the Forest Products Industry. The purpose of this organization is to provide a forum for discussions on purchasing quality and guidelines concerning pulpwood matters. The Committee comprises two buyers' representatives from each price region (*Svensk skogsindustri i omvandling*, 1971).

In addition to the above coordinating bodies, there are numerous other organizations whose primary objective does not concern the purchase of wood. One example is the Joint Committee of the Swedish Forest Industries, the main objectives of which are the coordination of matters concerning the fields of activity of the association of common interest to the forest products industry. The Committee comprises the Swedish Pulp and Paper Association, the Swedish Association of Wallboard Manufacturers and The Association of Swedish Sawmills and Wood Exporters (*The Forest Statistics Yearbook*, 1972).



### 3.3 Sawmills

Production at Sweden's 530 largest sawmills in 1973 accounted for about 90 % of the total of coniferous sawlogs (*Virkesbehov och virkestillgångar*, appendix 3, 1975). Eight years earlier, the production at the 950 largest sawmills was of the same order. This development is also reflected in the following: between 1953 and 1973, the number of sawmills in operation decreased by nearly half—from 6 980 to 3 567. (This does not include an additional 450 sawmills closed down in 1973.)

In 1973, the production of sawnwood was a little more than 14 million m<sup>3</sup>, of which 13.8 million m<sup>3</sup> comprised coniferous wood. Production had been doubled in the 20 years prior to 1973. The largest increase occurred during the latter half of the period. This development is also reflected in the consumption of wood raw materials, which has increased sharply. In 1965, an average of 1.87 m<sup>3</sup> (solid wood i.b.) was needed to produce one m<sup>3</sup> of sawnwood. Only 8 years later, 1.99 m<sup>3</sup> was required. This was caused by a number of factors, including a decrease in the diameter of sawlogs, a smaller slab yield, an increasing proportion of spruce and the demand for square-edged boards.

The share of total sawmill production accounted for by the state through ASSI, the largest producer of wood products in the country, is about 6 %. The share accounted for by the forest owner associations is about 12 %. Forest companies account for about 20 % of the production. As much as 62 % is accounted for by independent sawmills having to purchase their raw materials. With respect to the geographical distribution of the various owner categories, ASSI is predominant in the far north and Bergslagen, and the forest companies predominate in central and southern Sweden and inland Norrland (Fig. 7; source: Sägverken Riksförbund AB Sägverksintressenter, report to the AGM, 1973).

In common with the pulpmill industry, there are numerous forms of collaboration between private sawmills. As mentioned

above, the wood purchasing associations in the north also deal with sawlogs. Throughout the country are to be found sawmill associations organized on a regional basis and formed by the independent purchasing sawmills. These are largely sawmills which do not possess any significant areas of forest land and which are not associated with the forest owner associations.

The five regional organizations are the following:

ABSI—based in Skellefteå

Nedre Norrlands Sägverksförening—based in Östersund

ABSI—based in Falun

Mellan-Svenska Sägverksföreningarnas Samarbetsorgan—based in Karlstad

ABSI-SÄBI—based in Jönköping.

The five regional organizations, which together embrace 460 sawmills with an annual production of sawnwood of 5.5 million m<sup>3</sup>, have established a mutual raw materials association with a service company (AB Sägverksintressenter — ABSI) to deal with matters concerning the raw materials used by the sawmills.

The objectives of the raw materials association are to present the views of the sawmills:

- to government bodies and authorities
- at sawlog price negotiations
- on wood measurement and occupational safety in the industry
- on research and development aspects in the forestry sector.

The most important activities carried out by the organizations are negotiating with the forest owner associations with respect to sawlog prices, and with the cellulose and fibreboard industries with respect to chip and sawdust prices. Owing to the large number of independent purchasing sawmills existing and their scattered geographical location, the price negotiations are normally conducted on a more local level than is the case with respect to pulpmills (see Chapter 5).

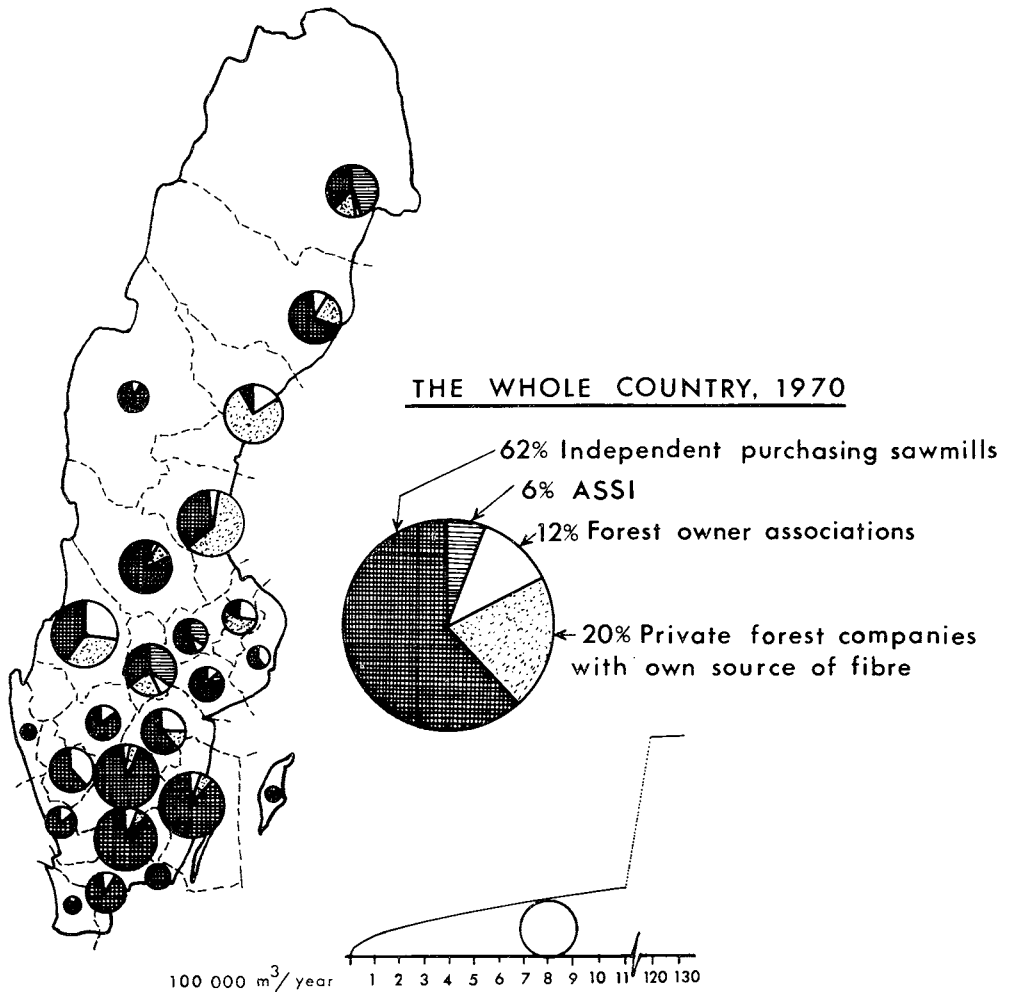


Figure 7. Breakdown of sawmill production in 1970 by 4 owner categories.

### 3.4 The board industry

In common with other board materials, wood-based *board materials* are being used to an increasing extent, largely as a result of changes in building activities throughout the world. An increase in demand is also forecast for the future. The majority of wood-based board materials in Sweden are used in the production of fibreboard, although consumption in Europe as a whole—in 1965 for example—was fairly evenly divided between the three main board types: particleboard, 39%; plywood, 31%; and fibreboard, 31%. The development of these three main products in Sweden during the

post-war years has varied considerably. The most recent product, particleboard, has undergone the most rapid development. Consumption increased by nearly 400% between 1960 and 1969. Development was less marked in the case of fibreboard and plywood, consumption of these increasing by 160 and 180%, respectively, between 1950 and 1968. However, the increasing consumption of plywood in Sweden has not resulted in a corresponding increase in domestic production, the additional demand being totally satisfied by steadily increasing imports (Svensk skogsindustri i omvandling, 1971).

According to the Swedish Particleboard

Association, the total consumption of wood in 1973 for the production of particleboard amounted to approx. 1 million m<sup>3</sup> solid wood i.b. About one-half of this was in the form of roundwood, the other half comprising sawdust and chips (Forest Statistics Yearbook, 1973).

### 3.5 Export and import of roundwood

In 1973, Swedish *exports* of roundwood amounted to about 3 million m<sup>3</sup>. This was a marked increase over 1960 (776 000 m<sup>3</sup>). This development continued up to 1970 (4 273 million m<sup>3</sup>), after which exports declined. Pulpwood constituted the principal export (85 %). Norway was the major importer, accounting for about 50 % of the total of sawlog exports from Sweden and about 60 % of the total pulpwood exports.

In the early 1960's, *imports* of roundwood amounted to about 1 million m<sup>3</sup>. The imports decreased considerably in 1963 and levelled out at a little more than 0.6 million m<sup>3</sup>. Imports subsequently decreased even further. However, in 1970 and 1971 they increased, but dropped again to 373 000 m<sup>3</sup> in 1972. A sharp upswing, largely accounted for by sawlog imports, was noted in 1973 (650 000 m<sup>3</sup>). Thus, the share of total imports accounted for by sawlogs increased sharply from the previous marginal level to a figure of 42 % in 1973. The two principal exporting countries in the same year were West Germany and the USSR (59 % and 38 %, respectively, of the total volume of imports). The major pulpwood exporting countries were Finland and Norway accounting for 61 % and 33 %, respectively.

### 3.6 Summary

Two main user categories may be distinguished with respect to wood products: the pulpmills and the sawmills. There are only a small number of pulpmills and the number of owners is even smaller. Moreover, the mills are geographically concentrated. In contrast, the independent sawmill sector

comprises around 900 companies which are scattered over a number of regions. A number of different forms of cooperation exist between the pulpmills and between the sawmills.

In the same way, the number of buyers in Finland and Norway is small compared to the number of suppliers (Holopainen 1969 and 1961). This is especially true in all three countries as regards the cellulose industry with its large production units. As in Sweden, the number of companies is considerably lower than the number of production units. In addition, the cellulose industry is the largest consumer of raw materials. Similarly, the number of sawmills in Finland and Norway is considerably greater than the number of cellulose plants. However, in common with Sweden, the major part of the production is accounted for by a relatively small number of major production units.

Another trait which is characteristic of all of the countries is the horizontal integration occurring among the buyers, reducing the number of buyers on the market even further. Thus, a given buyer may require several different assortments of roundwood, e.g. sawlogs, pulpwood and veneer wood.

Collaboration between the forest industries occurs in Finland and Norway as well as in Sweden. Each branch has its representatives. The representatives may be either on a regional or a national level. Their initial purpose was to achieve uniform pricing policies between the members. Consequently, they also represent the buyers at price negotiations with the forest owner associations.

One group of buyers that has not been dealt with, largely owing to the absence of published information on their activities, are the "*outside buyers*". This category embraces various types of wood dealers, presumably mainly exporters. These buyers are not tied by price agreements existing between forest owner associations and the pulpmills and sawmills. However, the activities of this group probably have a certain influence on the negotiations and the agreements reached.

# Chapter 4: Wood sales

## 4.1 Introduction

The preceding three chapters have been devoted to describing the various parties active on the wood market: The suppliers, the vendors and the buyers. This chapter will deal with the ways in which a supplier can dispose of his wood to a forest owner association or the forest products industry. The volume and quality of a consignment of wood are decisive to the price. Accordingly, this chapter starts with a description of wood measurement practise. The following chapter will deal with the regular annual price negotiations.

## 4.2 Wood measurement

Important aspects of the sale of wood are the assortment, quantity and quality of a consignment, which determine the price paid by the buyer to the supplier; the determination of assortments and quantities, which affect the pricing of felling and extraction work; and secondary and long-distance transport in accordance with collective agreements (Svensk skogsindustri i omvandling, 1971). The first law governing wood measurement came into force in 1936.<sup>1</sup> This prescribed that wood to be sold should be measured by an organization in which the supplier and the buyer had the same degree of influence. Hence the formation of the *wood measurement societies*. These societies are non-profit-making organizations. The purpose of the societies is to implement positive, objective and uniform wood measurement with consideration to the requirements emanating from developments in forestry and the forest products industry. There are currently eight measurement societies in Sweden. These are organized under a central body, The

Timber Scaling Committee. In the event of a supplier considering the measurement to be erroneous, he can request a new scaling of the wood. If the error is then found to be greater than 5 % of the value, the supplier will not incur the cost of the scaling.

Most of the wood passing through the market is scaled by the measurement society—about 70 %. However, there is a considerable difference between the assortments: about 90 % is pulpwood as against 45—50 % sawlogs. The main reason for this is that the smaller sawmills, especially in southern and central Sweden, to a large extent carry out the scaling themselves.

During the 1971/1972 logging season, 76 % of the wood was scaled at the mill and 11 % at the truck road (Stener, 1975). The rest of the wood was either scaled at the railway or at the driving course. During the 1972/73 logging season, the measurement societies scaled 65 million m<sup>3</sup> of wood at the mill (Forest Statistics Yearbook, 1973). The most common methods were:

- Measurement of stacked or loose wood (45 %)
- “TF” scaling<sup>2</sup> (23 %)
- Measurement of solid wood (18 %)

## 4.3 Methods of sale

### *Sales under delivery contract*

Delivery contract sales refer to processed assortments which are delivered at a given time, a given place and in a given form as

<sup>1</sup> In 1967, the old Royal Ordinance was superseded by much simplified legislation on wood measurement.

<sup>2</sup> Measurement of solid volume of stacked wood where the solid volume of certain logs selected at random is used to obtain a conversion factor for the whole stack.

specified by the contract. The agreement also governs price, measurement, processing to be carried out, etc.

The wood buyer can either reach agreement directly with the supplier, or with a forest owner association or other intermediary. The most usual way is for the wood supplier to sign an agreement with the buyer. The cruised area of forest is then logged by the supplier or by labour hired by him. The logged wood is extracted to the forest truck road, from where it is transported to the mill.

### *Stumpage sales*

Stumpage sales imply that the forest owner transfers the exploitation rights to a third party. The volume of stumpage is specified in the contract. Logging generally becomes the responsibility of the buyer and the forest owner merely signs the contract. However, the forest owner may retain the right of conducting the logging work himself and/or the transportation.

Stumpage sales, which are governed by special legislation, imply a low degree of risk for the forest owner since the right of possession of the land is transferred on the signing of the contract. Any subsequent losses arising have to be borne by the buyer. Most stumpage sales are based on a list of marked trees drawn up by the appropriate forestry board.

### *Sales under logging contract*

As is apparent from the name, sales of this type are in a form which lies somewhere between stumpage sales and sales under a delivery contract. In this form, a logging organization undertakes to log the wood at a price corresponding to the logging costs, and to pay the prices agreed for the various assortments for the season in question. The contract may (unusual) or may not include a guarantee for the logging costs and gross prices per unit. However, the buyer and the logging contractor need not be the same organization (hence the name of this form of sale), although this is generally the case.

This form of sale is primarily utilized by members of forest owner associations who are either not equipped to carry out the logging themselves or who prefer not to. It is also becoming increasingly common for companies to use this form of sale when purchasing roundwood.

### *The exchange of wood*

The exchange of wood should also be dealt with in this context since this formally implies the purchase and sale of wood. The exchange of wood has long been a means of reducing the acquisition cost of raw materials. The principal reasons for the common employment of this procedure are the increased cost-awareness and the organizational changes taking place within the industry; the implications being that the demand for wood in each region is mainly created by large units with specialized assortment requirements.

## **4.4 Advantages and disadvantages of the various methods of sale**

The forest owner associations recommend sales under delivery contracts. From the point of view of the sawmills, stumpage sales are important to meeting their raw material requirements. There are numerous arguments for and against the various forms of sale. In general, these depend on the party concerned. Some of the advantages and disadvantages of the various forms of sale are presented in Table 3. (Olika leveransformer för virke, 1973; Schotte 1973; Sågrevyn 1973: 3, 1972: 4 and 1, 1971: 3 and 1969: 3.)

An advantage of a sale under a delivery contract for the supplier is that the sale may provide him with work. In contrast, this is a disadvantage to non-independent-operating woodlot owners; stumpage sales being advantageous. With this form of sale, the forest owner also knows—at the time the contract is signed—how much he will receive. One of the disadvantages to the buyer of sales under delivery contracts is that the supplies will be irregular during

Table 3. Advantages and disadvantages of different forms of sale.

<i>Form of sale</i>	<i>Wood supplier</i>		<i>Buyer</i>	
	Advantages	Disadvantages	Advantages	Disadvantages
Under delivery contract	Usually most profitable for independently operating woodlot owners.  Logging may be carried out at a time suitable to owner.	For non-independent operating owners, may be difficult to secure logging help.	Relatively cheap sales administration.  Possibility of varying size of delivery to suit variation in requirements from year to year.	Deliveries uneven during the year and from year to year, which gives rise to storage costs or costs of downtime.  Size of quantities delivered not clear until late juncture.  Limited scope for obtaining wood bucked to special lengths.
Stumpage sales	At the time of sale, the supplier knows the exact sum he will obtain and when he may expect to receive it.  The need of the buyer for a rapidly accessible supply of wood may give rise to high prices.	Costs incurred in marking and evaluation.  The supplier does not know when logging will be carried out, which makes planning of silviculture difficult.  Not so suitable for thinnings.	Standing stock can be maintained to meet fluctuations during the year and from year to year, and to make bucking to special lengths possible.  Non-standard lengths go to buyer.	Difficulty in correctly assessing value of stumpage.
Under logging contract	Supplier avoids all work.	Supplier not certain of profit at time of sale.	Deliveries will be regular and logging can be coordinated.	The buyer must pay new prices during upswing in economy and old prices during downswing.

the year and that the size of the quantities delivered during the season will not be known until a fairly late juncture. On the other hand, such sales are fairly flexible and can quite easily be adapted to suit variations in demand from year to year. The above constitutes both advantages and disadvantages as regards stumpage sales. It is also characteristic of stumpage sales that competition between the buyers may sometimes force the prices up. This can partially be explained by the fact that special requirements concerning length and dimen-

sions can quickly be met by the sawmill from its standing stock, which may provide high marginal revenues.

In common with stumpage sales, sales under logging contract are advantageous to non-independent-operating forest owners owing to the latter not having to secure resources for logging. However, at the time of the sale, the forest owner does not know what his stumpage price will be. An advantage to a buyer who carries out the logging himself and has several operations within a given area is that he can plan and coordi-

Table 4. Percentage annual cut accounted for by various sales forms (Luhr 1971).

Wood supplier	Stumpage	Processed wood	m <sup>3</sup> million gross volume
The Swedish Forest Service	15 %	85 %	7.8
Other public forests	55	45	4.2
Forest companies	—	100	15.0
Other private forests	30	70	33.0
TOTAL	22	78	60.0

nate the logging to ensure regular deliveries. A disadvantage is that he must pay new prices during upswings in the economy and old prices during downswings.

#### 4.5 Volumes accounted for by various sales forms

No statistics are available on the share of the annual cut accounted for by the respective forms of sale. One of the difficulties in compiling statistics is that a large proportion of the cut goes directly to the pulp mills and sawmills. The volumes of roundwood supplied by the forest owner associations to their own mills, in effect, are sold under a delivery contract, but such sales are usually not included in the statistics published. Furthermore, the share of the various sales forms varies from year to year according to the buyers' roundwood requirements.

Having taken the above difficulties into account, Luhr (1971) presents a breakdown of the annual cut by stumpage sales and sales of processed wood (Table 4). Accordingly, stumpage sales account for 22 % of the cut. The table also shows that the shares of the various forms vary depending on the supplier category. The forest companies deal only with processed wood, which is also largely true of the Swedish Forest Service. Stumpage sales are most significant in the category "other public forests".

It is interesting to note that, if the share of the cut accounted for by the forest companies is disregarded, stumpage sales account for about 30 %. However, the table does not provide a breakdown of the sales forms by pulpwood or sawlogs, nor by region.

According to the internal statistics of a forest owner association in southern Sweden (Södra Skogsägarna), *sawlogs* are mainly sold by stumpage sales. On average, about 45 % of the wood was sold by this form in the 1967/68, 1968/69 and 1970/71 seasons.<sup>1</sup> 15 % of the cut was supplied through concessionaires. Thus, the share of the cut supplied under delivery contracts was 40 %. More than 60 % of this was sold directly to purchasing sawmills. These figures may be compared with particulars published in Sägrevyn No. 1 which states that 5.0 million m<sup>3</sup> of wood was sold in the form of stumpage in southern Sweden. This corresponds to about 40 % of the total cut in the area. The share in northern Sweden is considerably lower.

Figures published in the annual report of ABSI-South and ABSI-Southwest make it possible to calculate the form in which the ABSI sawmills purchase their sawlogs. In the ABSI-Southwest region, about 60 % of the wood purchased from private wood-

<sup>1</sup> The figures for 1969/70 are abnormally high owing to windthrown wood.

lot owners during the 1960's was in the form of stumpage. (An exception to this was the 1969/70 season, when the figure was 28 %.) The percentage of the ABSI-South region is somewhat lower.<sup>1</sup> Sawlogs supplied directly from private woodlot owners (under delivery contract) amounted to nearly 30 %, while a little more than 20 % was supplied by Södra Skogsägarna (purchased under logging contracts and under delivery contracts). About 70 % of the total demand of the ABSI sawmills is met by supplies from the private forestry sector.

A nationwide survey of small-scale forestry (Drakenberg & Höök, 1975) revealed that the share of the total cut for the 1972/73 season accounted for by stumpage sales amounted to about 40 %. The percentage for forest estates is slightly higher than that for private farm holdings: 51 % compared with 32 %. Stumpage sales are also much more common in conjunction with final felling (53 %) than with thinning (19 %).

A survey carried out jointly by the author and Ekholm (Lönnstedt & Ekholm, 1975) shows the sales form *preferred* by private woodlot owners in the regions of Götaland and Västerbotten. Accordingly, *sales under a delivery contract* are preferred by the majority of *farmers* (approx. 60 %). The percentage is slightly higher in Västerbotten than in Götaland. The corresponding figures for *stumpage sales* in the respective regions are 12 % and 17 %.<sup>2</sup> Considerably fewer *forest estate owners* prefer sales under *delivery contracts* than do farmers. The percentage is still slightly greater in Västerbotten (43 %) than in Götaland (32 %). In the latter region, the percentage of forest estate owners preferring *stumpage sales* is greater (41 %). The converse is true of Västerbotten, where the percentage of forest estate owners preferring stumpage sales is 32 %. One explana-

tion for this may be the greater abundance of sawmills in Götaland than in Västerbotten.

A breakdown of the material by characteristics of the holding and of its owner established that the percentage of forest owners preferring sales under a delivery contract increases with an increasing forest area. The percentage of non-resident owners preferring stumpage sales is greater than the corresponding percentage for owners resident on the estate. For both forest estate owners and farmers, this percentage is greater than the corresponding percentage for owners resident on the estate. For both forest estate owners and farmers, this percentage is greater among those with a diminished working capacity or who are not members of a forest owner association. This also applies to elderly farmers. It is interesting to note that many of the forest estate owners who declared themselves indifferent to collaboration prefer stumpage sales.

#### 4.6 Summary

Sales of roundwood are affected in a variety of forms. The majority of farmers prefer sales under delivery contracts. This type of sale is also recommended by the forest owner associations. However, the percentage of forest estate owners who prefer stumpage sales is of roughly the same order as those preferring sales under delivery contract. Most of the wood supplied by the Swedish Forest Service is processed before being sold and is generally purchased by established customers.

<sup>1</sup> The annual report of ABSI-South provides figures only as far back as 1967/68.

<sup>2</sup> The large difference in the above results may possibly be explained by a different formulation of the questions and different methods employed in the surveys. It should be noted that the first survey refers to the percentage of the annual cut while the latter refers to the percentage of forest owners.



# Chapter 5: Price negotiations

## 5.1 Introduction

Every year, the appropriate forest owner association conducts price negotiations with the buyers or their representatives. The negotiations, which normally commence in the early autumn, are for the period up to the end of July or the end of August, depending on the regions involved. Technical matters as well as marketing aspects are discussed at the negotiations. The purpose of the negotiations is to agree on

prices, commission rates, supplementary quantities, measurement rules, delivery regulations (dimensions and price calculations), delivery times, methods of payment, etc. In northern Sweden, the prices normally refer to extracted wood or apply free at mill; in southern Sweden, the prices generally apply free at truck road. Prices for a given assortment also vary. Within price region 1, pulpwood is normally supplied in random lengths, although standard lengths are normally supplied elsewhere in

Table 5. Pulpwood—negotiating parties in the different regions, 1975. (The regional boundaries are presented in appendix A.)

<i>Region</i>	<i>Party negotiating for suppliers</i>	<i>Party negotiating for buyers</i>
Norrland down to Ljungan in the south (price region I)	SSR Ncb	AB Bowaters Skogsförvaltning Nordsveriges Virkesköpare
Hälsingland and Härjedalen (price region II)	Mellanskog	Hälsinglands Virkesförening
Dalarna and Gästrikland (price region III)	SSR Mellanskog	Representatives of woodpurchasing mills in the region (Kopparfors AB, Korsnäs Marma AB, and Stora Kopparbergs AB)
The Väner region	Vänerskog	Representatives of wood purchasing mills in the region (Billeruds AB, Billingsfors Bruks AB, Fiskeby AB, Holmens Bruks AB, Munksjö AB, Saugbrugsföreningen, Uddeholms AB, Örebro Pappersbruk AB)
The Mälars valley	The Västmanland, Uppsala and Östra Sveriges forest owner associations <sup>1</sup>	Representatives of mills in Gävle—Dala region (Kopparfors AB, Korsnäs Marma AB, and Stora Kopparbergs AB)
Southern Sweden	Södra Skogsägarna Skåneskog	Sydsvenska Virkesföreningen

<sup>1</sup> These three forest owner associations merged in the latter half of 1975. The associations will therefore negotiate jointly with respect to the 1975/76 season.

Table 6. Sawlogs—negotiating parties in the different regions, 1975. (The regional boundaries are presented in appendix A.)

<i>Region</i>	<i>Party negotiating for suppliers</i>	<i>Party negotiating for buyers</i>
Norrland down to Ljungan in the south (price region I)	SSR Ncb	AB Sågverksintressenter Överbotten and Nedre Norrlands Sågverksförening Nordsveriges Virkesköpare AB Bowaters Skogsförvaltning
Hälsingland and Härjedalen (price region II)	Mellanskog	Hälsinglands Virkesförening AB Jon Jonsson & Co
Dalarna and Gästrikland (price region III)	Mellanskog	AB Sågverksintressenter, Centrala regionen
S-county	Vänerskog	Värmlands Sågverksförening
T-county	Vänerskog	Närke—Västmanlands Sågverksförening ASSI
R-county	Vänerskog	Skaraborgs Sågverksförening
Bohuslän and Dalsland	Vänerskog	Bohus—Dals Sågverksförening ASSI
U-county	The Västmanland forest owner association <sup>2</sup>	Skultuna Bruk Surahammars Bruk AB Karl Hedin
C-county	The Uppsala forest owner association <sup>2</sup>	
B-county	The Östra Sveriges forest owner association <sup>2</sup>	Upplands Sågverksförening
D-county	The Östra Sveriges forest owner association <sup>2</sup>	Sörmlands Sågverksförening
E, F, G and K, parts of N and P counties	Södra Skogsägarna	ABSI/SABI

<sup>2</sup> See the footnote, table 5.

Sweden. The regulations governing sawlogs also vary from region to region. For instance, in some regions length multiples of 30 cm are used, whereas other regions employ multiples of 10 cm. The volume of wood to be supplied to the respective buyers is generally agreed upon under delivery contracts between the wood supplier and the buyer. However, the form of the negotiations varies in different parts of the country and generally applies to different assortments (Tables 5 and 6).

The idea of the current negotiating system came after the second world war with the cessation of the restricted period, and at a time when a functioning wood market which would guarantee the raw material requirements of the forest products industry was urgently required. The establishment of the negotiating system is related to the structure of the forest products industry. In northern Sweden, a small number of large companies have traditionally constituted the major source of demand.

Further south, on the other hand, the buyers are not generally major consumers of pulpwood. The trends of recent years would suggest that the customary method of setting wood prices is undergoing a reassessment. The market has become much more of a "suppliers' market" with wide price fluctuations and with different parts of the country becoming much more interdependent. As a result, the forest owner associations are less ready to fix the price of wood supplied under delivery contracts other than for relatively short periods.

## 5.2 Pulpwood

In the *northernmost regions of Sweden* (Norrland down to Ljungan in the south), negotiations on sawlogs and pulpwood prices are carried out on the same occasions and by the same negotiating parties. Up to now, conventional marketing agreements have been reached every year. This also provides a pricing basis for the extensive exchange of wood. In such exchanges between SCA, Ncb and Mo och Domsjö, the wood is normally directed to the nearest mill.

*South of Jämtland—Medelpad*, four different price regions existed over a long period of time, separate marketing agreements for pulpwood being decided for each region. However, as from a few years ago there has been a move away from this form of pricing of pulpwood in southern Sweden as far north as the Mälär valley. The respective forest owner associations negotiate with individual, or groups of, cellulose producers. In cases where agreement could not be reached, the forest owner associations themselves determined prices and delivery conditions on behalf of their members. Thus, in some cases the prices paid by the wood-purchasing industry were lower, although in most cases the industry was charged corresponding prices for delivery-contract wood.

Some cellulose companies purchase pulpwood quite a long way from their mills. Many active buyers are to be found in the Mälär valley, in particular. Certain com-

panies established in Norrland also purchase pulpwood in southern Sweden, which is then transported north to the mills. Similarly, Norwegian mills purchase pulpwood in west Sweden and Finnish mills in the Mälär valley. Companies purchasing wood a long way from their own mills are normally not included in the local marketing agreements.

## 5.3 Sawlogs

As mentioned earlier, considerable volumes of sawlogs are purchased in the form of stumpage sales, particularly in southern and central Sweden. Such purchases are not covered by the agreements. It should also be noted that sawlog price lists are differentiated widely.

*In Norrland down to Ljungan in the south*, sawlog price negotiations are conducted concurrently with the pulpwood negotiations. Nordsveriges Virkesköpare and Bowaters Skogsförvaltning participate in both the sawlog and pulpwood negotiations, while AB Sägverksintressenter, and Överbotten och Nedre Norrlands Sägverksförening only participate in the sawlog negotiations.

*In Hälsingland and Härjedalen*, where pulpwood and sawlogs are negotiated separately, the same parties nonetheless participate in the negotiations—with the minor exception of during the sawlog negotiations, when AB Jon Jonsson complements the buyers' representatives.

*Of the other regions*, the buyers in Dalarna and Gästrikland are represented by ABSI, in the Mälär—Väner counties by local sawmill associations, and in southern Sweden by ABSI/SÅBI. ASSI participates on the buyers' side in the counties of Örebro and Västmanland.

## 5.4 The Swedish Forest Service

Since the mid 1950's, the Swedish Forest Service no longer participates in the forest owner associations' negotiations with the forest products industry. A probable reason for this is the industrial involvement of the forest owner associations which has to be

taken into account in the negotiations. The Swedish Forest Service normally negotiates separate prices with companies selected individually. (Negotiations with conglomerates are only conducted in exceptional cases.) In some cases, the prices are agreed before the end of the negotiations and in other cases at a later date. Quantity contracts are signed in several cases and so, too, are sales contracts.

### 5.5 Summary

Pulpwood and sawlog prices are set by annual price negotiations. The forest owner associations constitute an important representative of the suppliers. The buyers are represented by wood purchasing associations, sawmill associations or the like. The prices agreed at the negotiations will also be determinative for the Swedish Forest Service and other sales.

Prices are arrived at differently in Fin-

land, Norway and Sweden (Holopainen 1969 and 1961). With only a few exceptions, the price of roundwood in Finland is determined by the buyers either individually or together. However, negotiations between a buyer and a private woodlot owner and the pricing controls drawn up by the forest owner organizations do exert some influence on the market. In Norway, the price is agreed at central negotiations between the buyers and representatives of the forest owner associations. As has already been seen, the procedure in Sweden lies somewhere between the two; perhaps slightly closer to the Norwegian system. However, Holopainen points out that the trend in Finland is towards the Norwegian form of price negotiation. He adds that the trend on the roundwood market in Norway is towards a bilateral monopoly in respect of pricing, and increased activity on the part of the wood suppliers in respect of marketing.

# Chapter 6: Conclusion

## 6.1 Introduction

The Summary established that the open market for wood in Sweden only accounts for a part of the annual cut. The parties active on the wood market were then presented in the next three chapters: the suppliers in Chapter 1; the forest owner associations—in their capacity of intermediaries as regards roundwood supplied by private woodlot owners—in Chapter 2; and the buyers in Chapter 3. The various forms of sale available to the wood suppliers were dealt with in Chapter 4. The last chapter, Chapter 5, dealt with the annual price and quantity negotiations between the forest owner associations and the buyers.

In conclusion, some supplementary information is presented which deals with:

- a) Factors affecting the price negotiations.
- b) Results of the negotiations with respect to agreed cuts and prices.

The first section is based on the results of Finnish and Norwegian research (e.g. Palo and Tervo 1973, Seppälä 1974, and Saether and Veidahl 1973 and 1975). The last part is largely based on the Forest Statistics Yearbook. Finally, some thoughts are presented on the influence of various factors on future wood prices.

## 6.2 Factors affecting roundwood prices and annual cuts

The reasoning is based on the supply and demand curves for roundwood, whereby the annual cut and the price are determined by the point of intersection of the two curves. It is therefore of interest to discuss the various factors affecting the position and appearance of the supply and demand curves (Fig. 8).

It is desirable to return to the above statement and show that the supply and demand, and also the price and cut, are influenced by the prevailing *market conditions*. As was made clear earlier, the wood suppliers, through the forest owner associations acting as buyers, have fairly extensive control over supply and demand, which undoubtedly is distinctive of the wood market and the price negotiations. By means of an economic model, the effect of the prevailing market conditions on the price and annual cut is developed further in appendix B.

*State policy towards forestry* is yet another variable influencing supply and demand and thus the price and annual cut. A tax levied on every cubic metre of the cut would cause a rise in the marginal logging costs, and, accordingly, with the same demand, the price would rise and the annual cut decrease. In a similar manner, a forest owner can take his own tax situation into account, i.e. how much of the revenue he retains after tax. An example of a political measure influencing demand would be the limitation of expansion plans for the forest products industry.

Wood is the raw material which the forest products industry converts. This means that the *demand* for wood is *governed* by the demand for the end-product. Thus, to plot the demand curve for wood, one must have knowledge of the demand curve for the end-product, i.e. what the buyers are prepared to pay for various quantities, the costs of the production factors included in the conversion, and the transport costs. The quantity of the end-product demanded and the price the buyer is prepared to pay in turn depend on the number of buyers, their economy, and the availability of alternative products. Again,

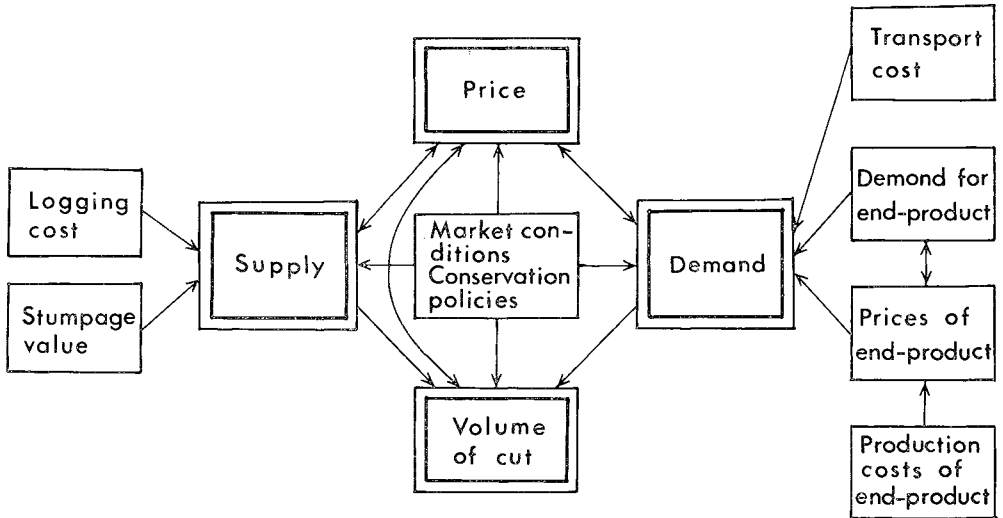


Figure 8. Factors affecting prices and annual cuts.

these factors are influenced by the prevailing market conditions and the economic policies being pursued in consequence.

Thus, having assessed the above factors, a given forest products company can estimate the *total* demand for a given product. To determine the size of its *own share* and thus its roundwood requirement, the company must also take its production capacity and competitiveness into account. The latter is related to the production and transport costs incurred by the company but, in the case of exports, also by the amount of duty to be paid.

Logging costs and the stumpage price required determine the *supply* of roundwood. *The stumpage price required*, which varies from supplier to supplier, is determined not only by the state of the stand but also by the purpose for which the forest is managed, the requirements concerning when the trees are to be cut and by price fluctuations.

It follows that a forest owner utilizing the forest largely for recreational purposes has a totally different requirement concerning the stumpage price than those of forest owners concentrating on the production of wood. Presumably if the forest owner is in urgent need of capital, he will

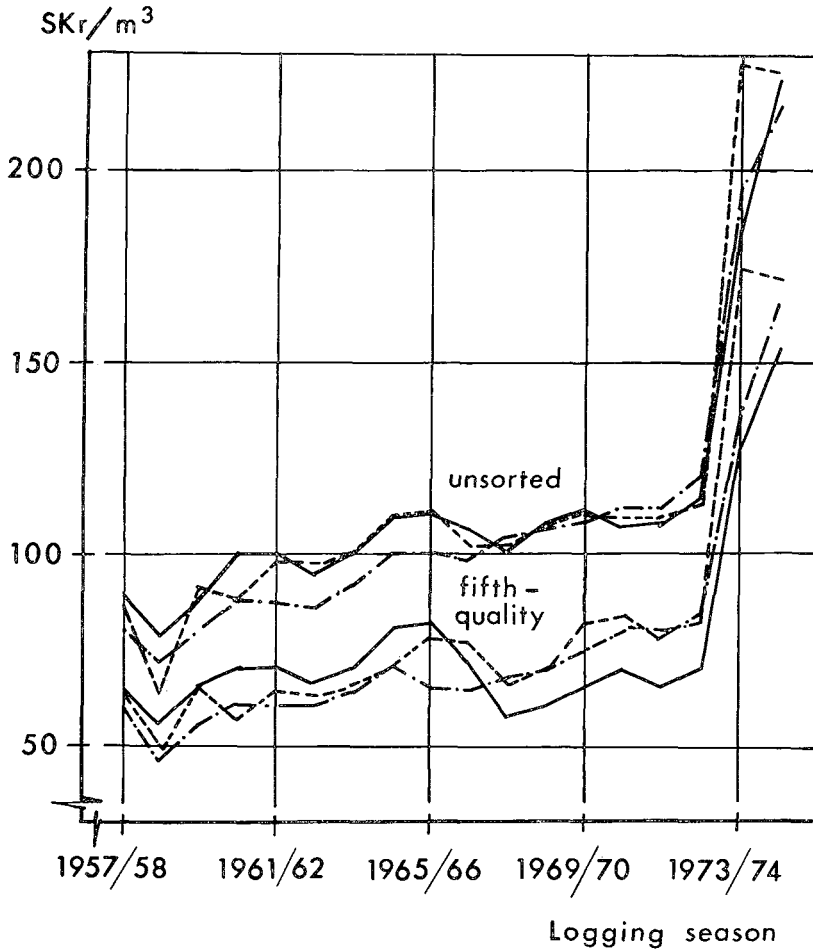
apply a high rate of interest for calculation purposes and thereby obtain a completely different assessment of the stumpage value than will the forest owner with little need of capitalizing his assets and therefore employing a low rate of interest. The requisite price is also influenced by earlier wood prices as well as by predicted prices.

*Logging costs* are influenced by the *scale of the forestry work, its characteristics and organization*, a discussion of which may be found in "Fakta och synpunkter kring skogsbrukets strukturproblem (1973)". The scale of the forestry work is reflected by the forest area and the stand volume, while its characteristics and organization are determined by the distribution of cutting classes (age class distribution), tree species composition, terrain conditions, the road network and the concentration of stands. The biological conditions and thus the geographical locations are indicated by the site quality class.

### 6.3 Roundwood prices and annual cuts

#### *Development of sawlog prices*

As discussed earlier, there are two principal roundwood assortments: sawlogs and pulp-



—.-.— Norrbotten county  
 — Kopparberg county  
 - - - - Jönköping county (1974/75 SSSF guaranteed prices)

Figure 9. Delivery prices (SKr/m<sup>3</sup>) of 20-cm top-diameter unsorted and fifth-quality pine sawlogs in Norrbotten, Kopparberg and Jönköping counties from 1957/58 to 1974/75. (Forest Statistics Yearbook, 1974; Skoglig statistikinformation, 244.)

wood. These two groups can then be further subdivided according to tree species, diameter and quality. Numerous different assortments are to be found, especially in the case of sawlogs. The price also varies between the different price regions, and the delivery conditions also vary. Thus, it is difficult to present an unequivocal roundwood price for Sweden. Instead, *examples*

of prices existing in various regions and for various qualities are shown.<sup>1</sup>

<sup>1</sup> A detailed report of trends concerning stumpage value and prices of forest products may be found in Streyffert (1960). Svendsrud (1975) presents a report of the development of sawlog prices in Norway. A comparison of price developments in Finland, Norway and Sweden may be found in Heikenheimo, Paananen and Vehviläinen (1969).

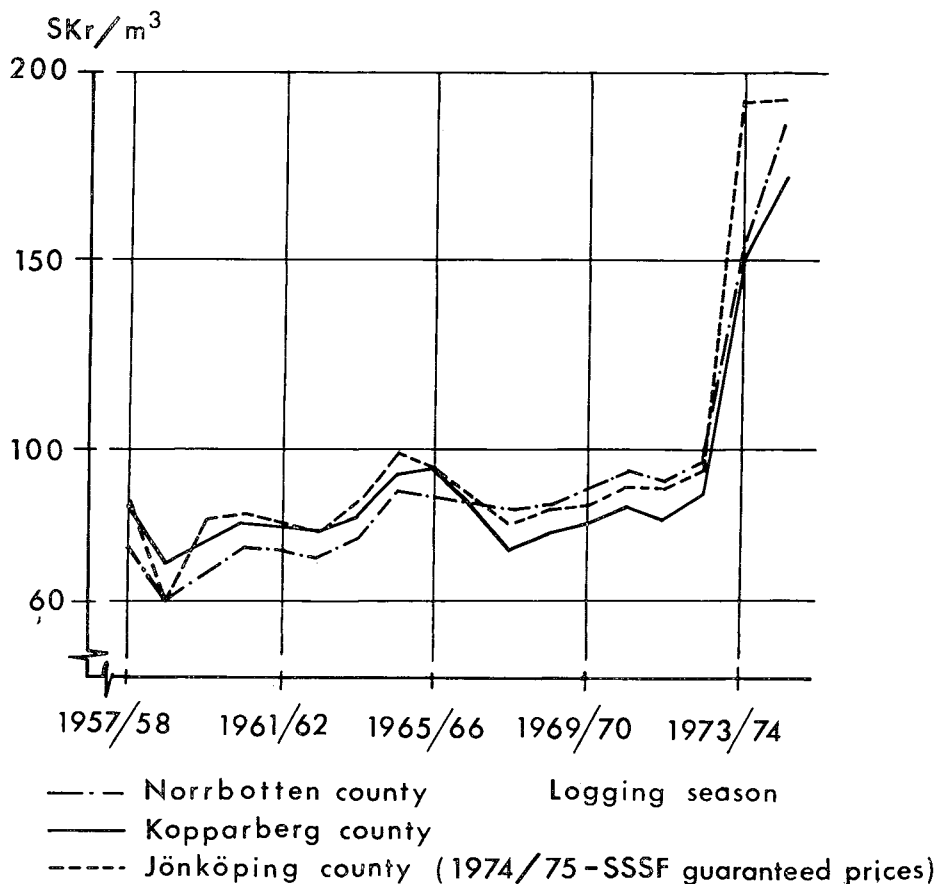


Figure 10. Delivery prices (SKr/m<sup>3</sup>) for 20-cm top-diameter unsorted spruce sawlogs in Norrbotten, Kopparberg and Jönköping counties between 1957/58 and 1974/75. (Forest Statistics Yearbook, 1974; Skoglig statistikinformation, 244.)

The development of *delivery prices*, expressed in current prices of pine and spruce sawlogs with a top diameter of 20 cm and of unsorted and fifth-quality grades in the counties of Norrbotten, Kopparberg and Jönköping, is shown in Figures 9, 10 and 11. The figures show a slight upward trend up to the 1973/74 season, after which the prices increase sharply. This trend was still maintained during the 1974/75 season.

With 1968 as the base year (=100), a negative price trend for sawlogs will be observed up to 1973/74. The price increases introduced in the 1973/74 season resulted in the relative prices in Norrbotten and Jönköping being higher than the price level of the base year. It may also be noted that

the relative price increases were somewhat higher for pine sawlogs than for spruce. Of the different sawlog qualities, unsorted logs had a higher relative price increase than fifth-quality logs.

The different price trends in the three counties studied may be explained by the influence of the supply and demand of sawlogs in the respective regions. Another factor influencing price trends, particularly in respect of smaller dimensions and the poorer sawlog qualities, were the marketing conditions within the sawmill and pulpmill sectors. The different organizational structure of the sawmills in the three counties probably also affected the prices.

On a comparison of price trends with



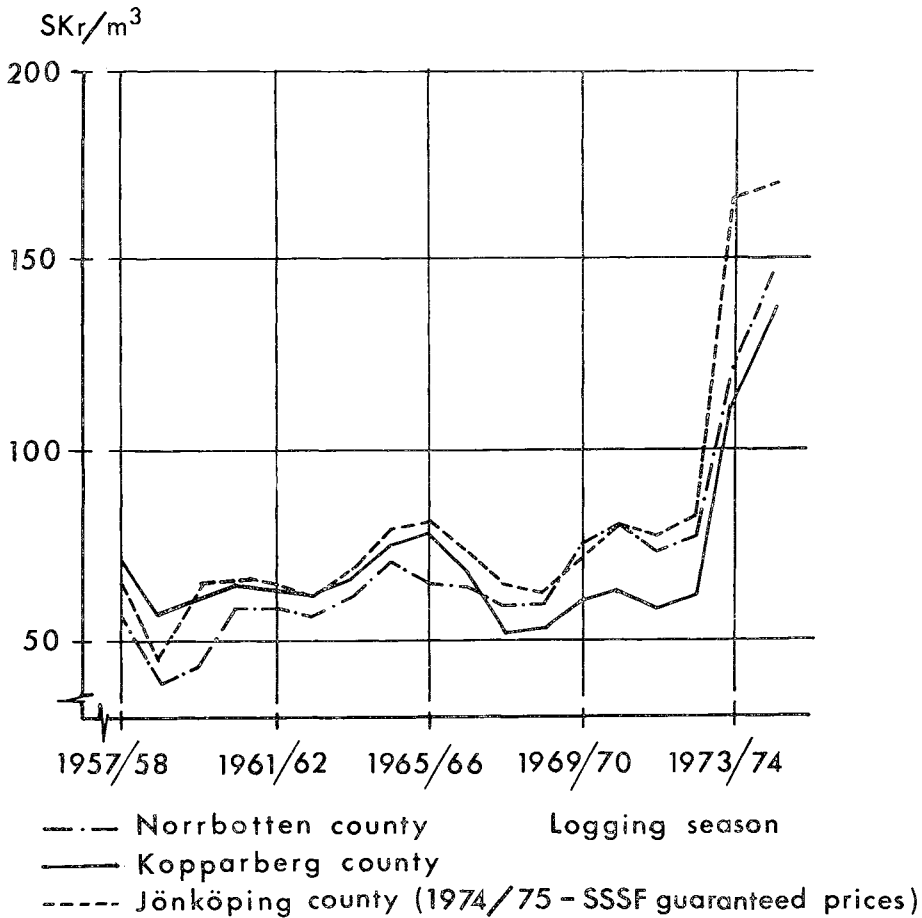


Figure 11. Delivery prices (SKr/m<sup>3</sup>) for 20-cm top-diameter fifth-quality spruce sawlogs in Norrbotten, Kopparberg and Jönköping counties between 1957/58 and 1974/75. (Forest Statistics Yearbook, 1974; Skoglig statistikinformation, 244.)

respect to *sawnwood products*, a slight upward trend in nominal prices was evident in the 1960's, which prevailed until 1973. However, the variations from year to year are less pronounced than those of sawlog prices. In a similar manner to the trend in sawlog prices, sharp increases in the price of sawnwood products occurred during 1973 and 1974.

#### *Development of pulpwood prices*

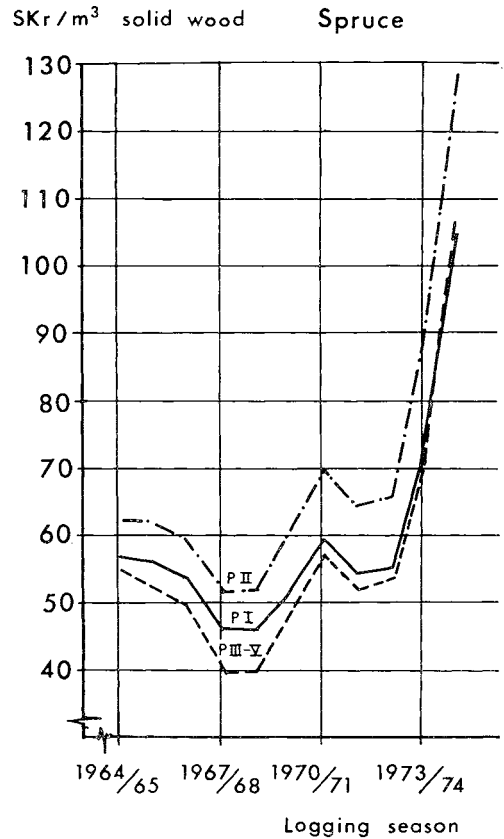
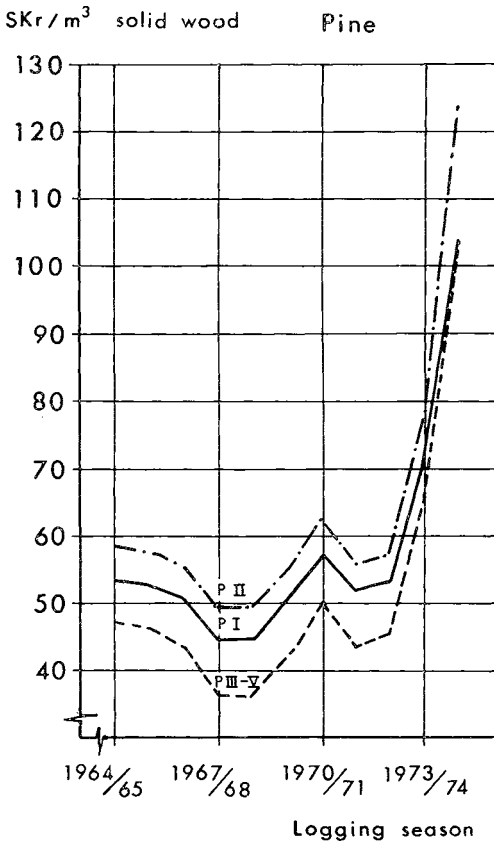
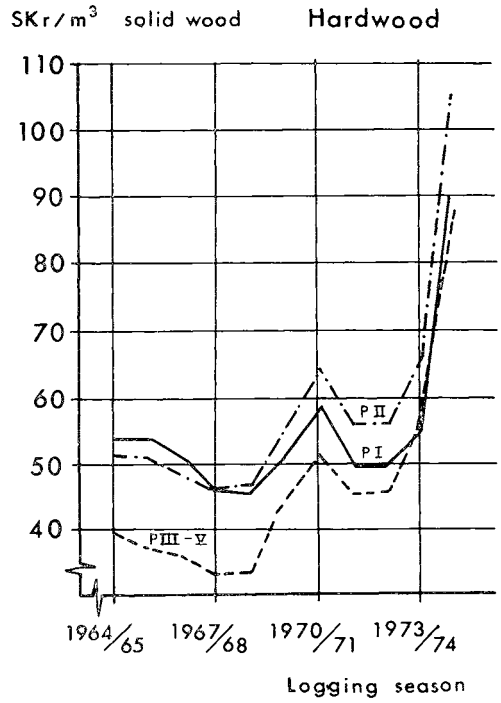
*The delivery prices of prime pulpwood of unbarked pine, spruce and hardwood between 1963/64 and 1974/75 in the various*

price regions are presented in Figure 12.<sup>1</sup> One striking feature is the wide fluctuation in prices occurring during the latter half of the 1960's, as well as the positive price trend in the early 1970's.

Considerable caution should be employed in a comparison of the prices of the dif-

<sup>1</sup> Since the variations in the prices in price regions III—V were very small, only average prices are shown for these regions. Price region I embraces Norrland down to Ljungan in the south, price region II, Hälsingland and Härjedalen; price region III, Dalarna and Gästrikland; price region IV, Värmland, Dalsland and Bohuslän; and price region V, the rest of the country (see Table 5).

Figure 12. Delivery prices (SKr/m<sup>3</sup> solid wood) of unbarked pine, spruce and hardwood pulpwood between 1963/64 and 1974/75 in different price regions. With the exception of price region I, in which pulpwood is reported in random lengths and only one quality class, the prices refer to 3-m pulpwood of prime quality. The designations with the prefix P refer to the price region and the geographical region. (Forest Statistics Yearbook, 1974; Skoglig statistikinformation, 244.)



ferent regions, owing to the varying methods of volume determination used in different parts of the country and the fact that no breakdown by quality is made in price region I. Another factor making such comparisons more difficult are the different delivery places included by the various agreements (see Chapter 5).

A comparison of the trends in the prices of *paper pulp* reveals that large variations also occurred here. From the prices point of view, the 1968 and 1972 seasons were poor years for paper pulp compared with the respective preceding years. This also applies to pulpwood. On the other hand, 1971 was a good year with respect to raw material prices and the prices of converted products. The price rises occurring in 1973 and 1974 with respect to paper pulp are also evident in respect of pulpwood. It is therefore readily apparent that a strong *price correlation* exists. In some years, however, the wood prices may be seen to lag behind the trend in the prices of processed products. This applied in 1971, for example, when, despite a decreasing demand from the mills, the wood prices rose by about 11 %. The subsequent decrease in prices introduced with effect from the autumn of 1971 should have occurred six months earlier. The explanation for this time lag in the movement of wood prices should be sought in the way in which the roundwood market operates. The price negotiations largely follow the principle that wood prices should be adjusted to the current profit situation in the processing industries. The problem inherent in this is that the negotiations tend to be based on the development in profits during the *previous* season. The main purpose of the pricing machinery should instead be to steer the return from the *coming* season. The difficulty involved in the parties making a correct assessment of developments should be emphasized in this context. Since the agreements are binding for the next year, a reversal in the forecast trends will not be reflected in the prices before a certain period of time has elapsed.

### *Annual cuts*

A slight upward trend in the annual cut during the 1950's may be distinguished in Figure 13. However, the volume of the cut varies considerably from year to year. This is also true of the 1960's, although the main feature of this period is the significant increase in the volume of the cut: from about 54 million m<sup>3</sup> gross volume in 1960 to 74 million m<sup>3</sup> in 1970. The increase in the annual cut continued in 1971, although the curve levelled out in 1972 (Forest Statistics Yearbook).

The changes in the *roundwood stocks* carried by the forest products industry are of interest here. A study of the statistics reveals strong fluctuations in stock levels. There is obviously a strong correlation between these and the specific pricing system of the wood market (see above). A considerable portion of the stockpiles in 1971 and the appreciable decrease in the cut in the 1972 season could have been at least partially obviated if the roundwood price had been adapted sooner to the decreasing demand from the mills.

As discussed earlier in Chapter 3, the cellulose industry is Sweden's major consumer of roundwood. This was true during both the 1950's and the 1960's. In 1950, the cellulose industry consumed approx. 10.3 million m<sup>3</sup> solid wood i.b. (8.9 million); in 1960, approx. 20 million m<sup>3</sup> (13.3 million); and in 1970, which was a peak year, 28.3 million m<sup>3</sup> (22.2 million). (The figures within brackets are the corresponding figures for the sawmill industry.) Consumption of roundwood by the cellulose industry during the 1950's increased much more rapidly than did that of the sawmill industry. In the early 1960's, the increase was of roughly the same order in both industries. In the late 1960's, the rate of increase in the cellulose industry slowed down but that of the sawmill industry persisted.

Consumption of roundwood by the board-mills increased rapidly during the 1950's and early 1960's. Thereafter, consumption dropped considerably and in 1972 amounted to approx. 0.2 million m<sup>3</sup> solid wood i.b.

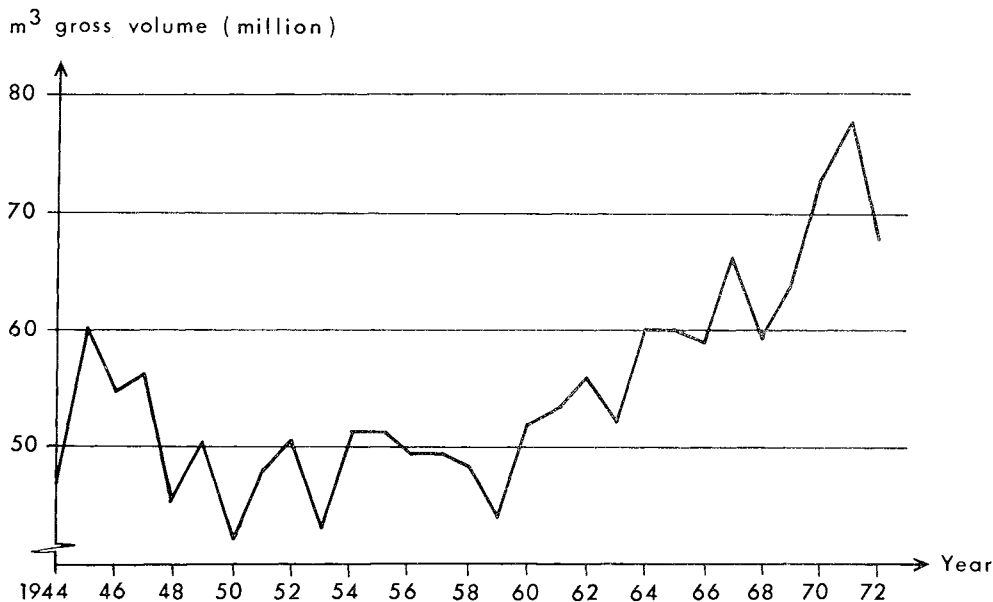


Figure 13. Total annual cut.

Consumption by veneer and plywood mills, which was at a low level throughout the 1950's and 1960's, increased during 1971 and 1972 to approx. 0.3 million m<sup>3</sup>.

#### 6.4 Future development

No attempt will be made here to forecast future roundwood prices nor will any attempt be made to predict annual cuts; instead, the factors influencing future development—in the first instance, the appearance and position of the supply and demand curves—will be discussed.

##### *Shortage of wood*

A much-debated fact is that the *annual cut* at the beginning of the 1970's reached the calculated net increment level (just over 70 million m<sup>3</sup> gross volume). Thus, any additional increases in the annual cut will constitute a direct threat to the concept of sustained forestry. A committee has been appointed to find ways in which this problem may be overcome (see "Virkesbehov och virkestillgång", Ds Jo 1975: 1). A reme-

dy involving the limitation of the annual cut to about 70 million m<sup>3</sup> would make the supply curve inflexible at this level. The result of a continued increase in demand would be considerable price increases, although these would have no significant effect on the cut. However, there are other ways to come to grips with the shortage: to increase utilization of marginal raw materials. This means increased efforts to exploit the existing raw material capacity (approx. 13–15 million m<sup>3</sup>). New logging techniques (chippers in the stands) make it possible to utilize some of the tops, butt-offs and whole trees left in the stand. However, this may well prove to be excessively costly. The possibilities to better utilize natural wastage are limited. In fact, there is a tendency for such wastage to increase as a result of longer periods between cutting (Janz, 1974).

The annual cuts reported only include the stem volume outside bark and above the normal stump height. This is natural in the light of the present situation, since techniques to utilize branches and stumps are still only in the experimental stage. The

technical and economic problems involved are considerable. Moreover, it is difficult to find applications in which needles and bark can be utilized. In the first instance, they will probably be used in the production of particleboard and fibreboard.

Another solution in time would be to increase the supply of raw materials by extending the primary wood production. Added emphasis can be given to stand establishment and silviculture, for instance, through the establishment of plantations using specially cultivated plant material. Another possibility concerning plant material is the cultivation of seedlings. Drainage and fertilization produce short-term effects since they influence the existing stands. Artificial regeneration on other land classes is yet another example. It is also possible to import some raw materials.

#### *Logging costs*

The effect of such measures in time will be to increase the practicable annual cut. This will cause a displacement of the inflexible part of the supply curve which will occur at a greater cut than is the case today. This may cause a reduction in the price of roundwood. However, there is also a cost-increasing factor to be considered. As discussed earlier, an increase in the annual cut will give rise to higher costs, and it is doubtful whether these can be compensated for by means of rationalization measures.

Rationalization in forestry so far has made rapid advances. During the period from 1955 to 1970, the average man-day consumption decreased by 75 %, which corresponds to an annual increase in productivity of more than 9 % (Palm, 1975). The reasons behind this development are many but the more important ones include:

- a) Operations have been mechanized and simplified.
- b) Seasonal workers have become, or have been replaced by, better trained and year-round employees.
- c) The proportion of final felling in which the manpower requirement is lower than

that of thinning has increased considerably.

- d) Operational planning has been improved and the logging units are now larger.

With respect to the development of costs in recent years, the picture is not so bright. In the 1965/66 logging season, the average logging cost per m<sup>3</sup> at nominal prices amounted to SKr 24: 30. The logging cost then fell during the period up to 1968/69 (22: 10 SKr/m<sup>3</sup>). Subsequently, however, the costs rose sharply and, in 1972/73, amounted to an average of 27: 00 SKr/m<sup>3</sup>. The costs also vary widely throughout Sweden. Generally speaking, logging and transportation costs are lower in the south than in the north, owing to larger dimensions and shorter transport distances.

Thus, at the same, or increased, demand for roundwood, a slower increase in the annual cut and higher logging costs imply an increase in prices. The ability of the forest products industry to pay such prices depends on the conversion costs and the price which can be obtained for the processed forest products.

#### *Processing costs and shortage of fibre*

The forest products industry is characterized by the significant advantages intrinsic in large-scale production, which is particularly true of the pulp and paper industry. The ever larger industrial plants imply a steadily increasing level of productivity. The increase in productivity—especially during the last ten years—has been much faster than the increase in production, with the result that there has been a reduction in employment in the industry. The advantages inherent in large plants have tended to concentrate production to a small number of mills.

However, every juncture in time has its own optimum scale. Since technology and economic conditions are constantly changing, the optimum production volume is also steadily increasing. The evidence suggests that this development will prevail in the future.

Hitherto, the strategy of the forest products industry in Sweden seems to have been to increase its competitiveness compared with foreign producers by means of a reduction in costs (Stenberg, 1975). But the possibility of the Scandinavian forest products industry to exploit the advantages of large-scale production will become more limited in the future, since the total production of the industry will not be able to continue to increase owing to the limited supply of wood raw materials. This means that the conversion costs in Scandinavia will fall at a slower rate than those of competitors abroad.

The argument assumes that the industry's competitors abroad will have access to a sufficient supply of roundwood at a cost not exceeding that in Scandinavia. However, it is already common knowledge that FAO has predicted a general shortage of fibre on the basis of the development in demand. Consequently, some people believe that the development in costs in the industry in Scandinavia in relation to those of

competitors abroad will not be so significant—at least not in Europe. This may be true in the short term and in the very long term. The unbalance on the market with a strong demand for forest products on the one hand and limited production because of the fibre shortage on the other, means that it will also be possible for the Scandinavian industry to sell its more expensive products while retaining a certain profit margin. However, as regards the competitors, their margins will increase with an increasing disparity in the production costs. This will stimulate expansion of forest products industries in the other countries. During the transitional stage, this expansion may be limited by the supply of wood. However, the profit margin in the forestry sector will make the utilization of hitherto unexploited resources an attractive proposition; for instance, exploitation of the naturally regenerated forests of South America, the utilization of tropical mixed forests for pulpwood, and the establishment of plantations.

## Sammanfattning

Parterna på virkesmarknaden utgörs av *leverantörer, säljare* och *köpare*.<sup>1</sup> Bland leverantörerna ingår enskilda skogsägare, Domänverket och övriga allmänna skogsägare såsom kyrkan samt i viss utsträckning även skogsbolagen. Den dominerande mellanhanden på den svenska virkesmarknaderna är skogsägareföreelsen. Exempel på köpare är massa- och sågverksindustri. Genom att köparna själva bedriver skogsbruk eller beroende på speciella samband mellan leverantörer och köpare går dock bara en del av det avverkade virket via marknaden.

Det är svårt att i detalj ange hur stor denna andel är, bl.a. därför att andelen varierar från år till år. I Svensk skogsindustri i omvandling 1971 görs dock ett försök till uppskattning. Det framgår att ca 40 % av det totala virkesutbudet förädlas i "egna eller närstående företag". Ca 60 % av denna virkeskvantitet svarar skogsbolagen för. Skogsägareföreningarnas resp. Domänverkets/ASSI:s andel är 26 resp. 13 % (fig. 1).

Av det virke som vidareförädlas utbjuds ca 60 % på den öppna marknaden. Andelen som går genom skogsägareföreningarna uppgår till omkring 45 %. Domänverket svarar för ca 15 % samt övriga allmänna skogar (stifts- och kommunsskogar, allmänningar) och skogsallskapet för ca 10 %. Skogsbolagen svarar för en andel om ca 6 %. Resten, dvs. ca 25 %, försäljs huvudsakligen direkt från leverantörerna till industrin. Det sistnämnda är speciellt vanligt vad gäller sågtimmerleveranser till den lokala industrin med vilken många småskogsägare har upparbetade kontakter. Nämnas kan att sågtimret har en regional marknad medan massaved till viss del fraktras lång väg. Förhållandet mellan virkesleverantör och köpare är även olika, det

finns betydligt fler köpare av sågtimmer än av massaved.

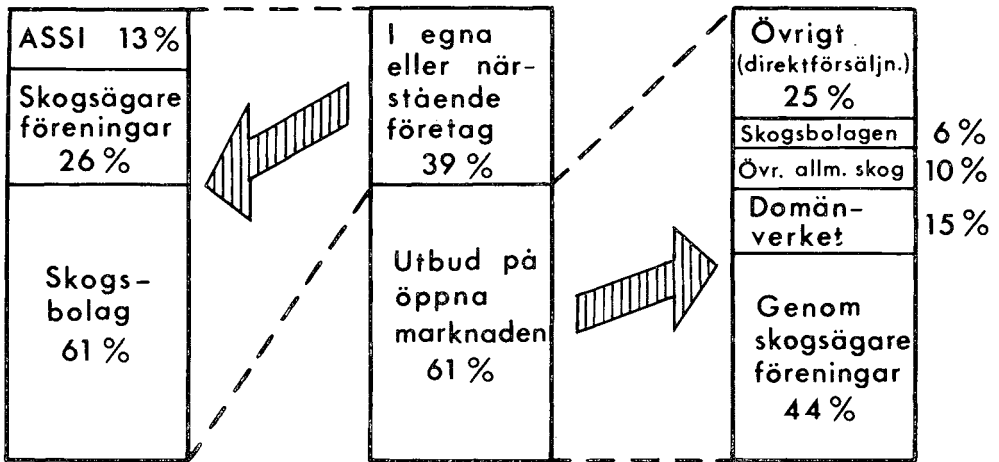
Avsikten med föreliggande arbete är att *presentera parterna på de svenska virkesmarknaderna samt vilka vägar som finns för försäljning av virket samt kontakter mellan parterna*. Läsaren får därigenom en uppfattning om de formella ramar under vilka virkesmarknaderna fungerar. För att komplettera denna framställning redogör jag avslutningsvis för några faktorer som påverkar de priser och avverkningsvolymen som överenskomms mellan parterna. Jag presenterar även en del statistik över utvecklingen av priser och avverkningsvolymen. Skriften vänder sig således i första hand till den på detta område oinitierade.

I de *tre första kapitlen* redogör jag för virkesmarknadernas parter. Störst bland *leverantörerna* (kap. 1) är *de enskilda skogsägarna*. Flertalet av dessa är anslutna till en skogsägareförening. *Skogsägareföreningarna* kommer därigenom att bli den alldeles dominerande säljaren (mellanhanden) på marknaden (kap. 2). För att fortsätta med leverantörerna kan konstateras att den största ägaren av de *allmänna skogarna* är staten. Dessa skogar förvaltas av *Domänverket*. De statliga skogsindustrierna (ASSI) får en stor del av sitt virke från Domänverket. *Bolagsskogarna* ägs av ett fåtal företag. Det avverkade virket vidareförädlas i regel av företagen själva.

*Köparna* (kap. 3) kan, grovt sett, grupperas efter det virkessortiment de efterfrågar: massaindustrier resp. sågverk. Detta medför att man bör tala om en marknad för massaved och en för sågtimmer. Största förbrukaren av virke är *massaindustrierna*.

<sup>1</sup> Ägare av skogsmark kallas här *leverantörer*. *Säljare* är synonymt med mellanhand. Skogsindustrin benämns som *köpare* av rundvirket.

## Virke till vidareförädling



Figur 1. Olika skogsägarekategoriers ungefärliga andel av virkesmarknaden i slutet av 1960-talet.

Dessa utgörs till alldeles övervägande delen av privata bolag. Mellan bolagen finns ett väl utarbetat samarbete i samband med virkesanskaffningen. Det samma gäller för *sågverken*. Antalsmässigt är dock sågverken betydligt fler. Majoriteten utgörs av privata s.k. enskilda sågverk.

I *kapitel 4* behandlar jag *överlåtelseformer* för rundvirke: leveransvirke, rotposter och avverkningsuppdrag. En påtaglig skillnad mellan leveransvirkesförsäljning och de båda övriga försäljningsformerna är att virkesleverantören i det förstnämnda fallet i regel själv svarar för avverkningen. Leveransvirke förordas av skogsägareföreningen.

*Kapitel 5* avhandlar de årligen återkommande *prisförhandlingarna*. Parter är därvid skogsägareföreningarna resp. virkesföreningar, sågverksföreningar eller liknande köparrepresentanter. De priser som blir resultatet av dessa förhandlingar blir normgivande även för övriga avtal mellan köparna och andra virkesleverantörer. Någon gemensam virkesmarknad för hela landet finns inte. Vad massaveden beträffar kan sex "marknader" urskiljas och ett 20-tal områden vad gäller sågtimmer. Dessa mark-

nader får dock ej betraktas som helt skilda eller permanenta.

I det *sista kapitlet*, nummer 6, tar jag bl.a. upp frågan om faktorer som inverkar på det pris och den avverkningsvolym som kommer att gälla i Sverige. Min utgångspunkt är därvid att pris och volym bestäms av efterfråge- och utbudskurvornas skärningspunkt. Vad efterfrågan på rundvirke beträffar är denna härledd, dvs. den är beroende av efterfrågan på de vidareförädlade skogsprodukterna. Vid bedömningen av det enskilda eller de svenska skogsindustriföretagens efterfrågan på virke blir denna även beroende av produktions- och transportkostnader, dvs. av konkurrensförmågan. *Utbudet* av rundvirke påverkas av drivningskostnaderna samt skogsägarens krav på rotnettot. I *kapitel 6* redogör jag även för den faktiska prisutvecklingen samt avverkningsvolymen. Avslutningsvis gör jag ett försök att blicka in i framtiden. Därvid anser jag det viktigt att hålla i minnet att en fiberbrist är prognostiserad av FAO samt att vi i Sverige redan står inför en bristsituation på virke.

I en *bilaga* redogör jag, som ett komple-

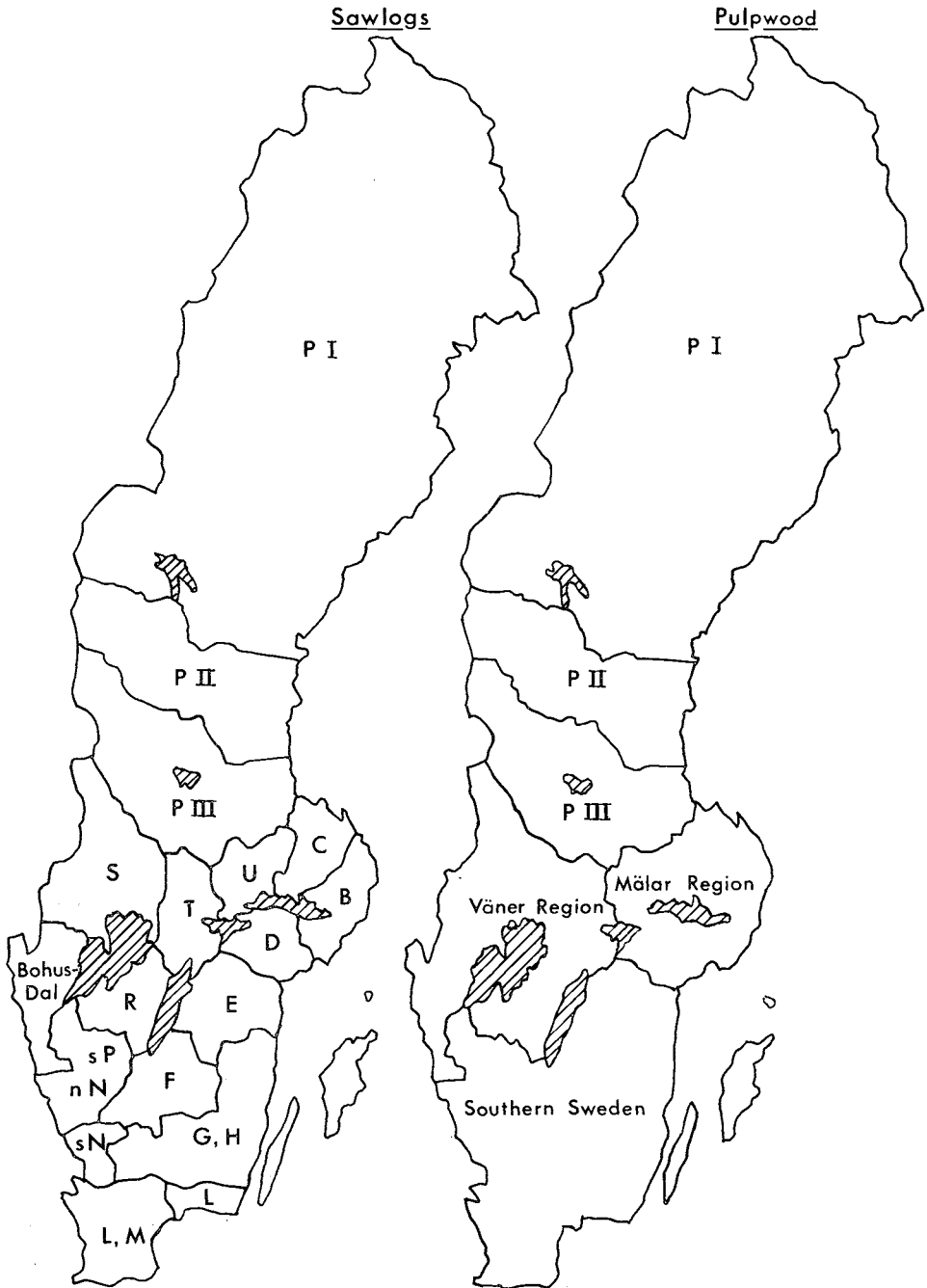


ment till beskrivningen av de svenska rundvirkesmarknaderna, för olika *marknadsformer*: perfekt konkurrens, monopol, monopsoni och bilateralt monopol. *Monopolet* (en virkesleverantör) ger virkesleverantören ett högre pris än vid perfekt konkurrens. Vid *monopsoni* (en köpare) gäller det mot-

satta förhållandet. Vid båda dessa marknadsformer blir avverkningsvolymen lägre än vid perfekt konkurrens. Vid *bilateralt monopol* kommer priset att ligga någonstans emellan det pris som råder vid monopol resp. monopsoni. Var är en förhandlingsfråga.

## **APPENDICES**

# Appendix A: Price regions for sawlogs and pulpwood



Note: The letters refer to county designations. Price regions are indicated by P.

## Appendix B: Different market situations

### B.1 Introduction

Four different market situations will be discussed: perfect competition; a monopoly (one wood supplier); a monopsony (one buyer); and a bilateral monopoly (see further Lipsey & Steiner 1972, Wohlin 1970). In reality, none of these market forms fits the situation prevailing on the Swedish wood market. However, the development has been towards a bilateral monopoly owing to a high degree of concentration and collaboration in the buying and selling sectors.

The market situations of perfect competition, monopsony or monopoly form the basis of an understanding of pricing when the situation is a bilateral monopoly. The latter market form describes the limits on annual cuts and prices, between which the real situation is to be found. An interesting question in this context is to what extent imperfections on the wood market cause the non-optimum utilization of the supply of raw materials and also what significance the conditions as regards competition have to the rate of expansion in the forestry sector.

In a description of the situation regarding competition on the wood market, consideration must be given to transportation costs since these constitute a major part of the total cost of the wood. It is therefore assumed that the Swedish wood market can be divided up into a number of regions, each of which may be regarded as being somewhat isolated from the others. It is also assumed that the forest products industry within a given region is only to be found in one place. This implies that the influence of competition on the siting of mills is not discussed in any greater detail.

Initially, the analysis will refer to the

short term, i.e. the buyers have a certain fixed number of mills; there is a given volume of wood; and the logging organization employs certain types of equipment. Since the report on the different market forms is based on the supply and demand curves these will be discussed first.

### B.2 Supply and demand curves

#### *The supply curve*

The supply curve for roundwood reflects the marginal cost and shows the volume of roundwood available at different price levels. On the basis of the supply curve, it may be suitable to distinguish between the logging cost and the required stumpage price (Gregory 1972).

*The logging cost* comprises the cost of logging and extraction and of secondary transportation. The two former costs are governed by wage rates and the type of logging system employed. The costs of the logging system are related, in turn, to a variety of factors, such as the size of the logging area, the number of logging units and the distance between them, the tree species composition, the volume of wood, terrain conditions, etc. The cost of transporting personnel from their homes to the logging area must also be taken into account (Ekonomiska effekter av arronderingsförändringar i skogsmark, 1972). The cost of secondary transportation largely involves the distance, the mode of transport and the number of times the load is transferred. Road haulage is normally cheaper over shorter distances while railways prove cheaper when the transport distance is long.

Numerous factors affect the *stumpage price required* by the forest owner. A forest owner who expects the price of

roundwood to go up will set a higher stumpage value than a forest owner who expects the price to fall. The period of time which the forest owner takes into account (the interest rate for calculation purposes) is also significant as, too, is the purpose of the forestry enterprise. Thus, the ownership structure of the forest can also affect the appearance of the supply curve.

The exploitation cost and the required stumpage price may jointly be referred to as the *stumpage value*. The lower the roundwood price, the fewer will be the number of stands with a stumpage value below that price. The consequence will be a “low” total annual cut.

#### *The demand curve*

The demand curve for roundwood may be regarded as having its derivation in other forest products. Wood is needed for timber, pulp, plywood, and so on. People need houses, houses need timber, and building timber creates a demand for sawlogs. A similar chain links paper to pulp and pulp to pulpwood. In an attempt to explain the roundwood price, none of these steps can be ignored. The following describes how it is possible to obtain a demand curve for sawlogs (Gregory 1972).

The starting point is the demand curve for sawnwood products and the marginal costs curve for all of the factors other than sawlogs affecting the sawmill in question. The demand curve is presumably fairly flexible in view of the relatively large number of saws. However, there is probably a tendency for the marginal costs curve to be inflexible, largely because additional labour is required to increase production and this may create problems during a period of general expansion. The sawlogs demand curve is obtained by “subtracting” the marginal costs curve from the demand curve for sawnwood products.

Three points should be noted here. Firstly, in the determination of the demand curve, each tree species must be considered separately. Secondly, consideration must

also be given to quality. Thus, a whole “family” of demand curves is obtained. Finally, time constitutes a problem since delivery contracts are signed before the mill has received any orders. This means that the demand curve is derived from the expected demand for forest products. This implies the involvement of a subjective element which may well lead to much greater fluctuations in the demand for sawnwood than in the demand for converted forest products.

### **B.3 Different market forms**

#### *Perfect competition (numerous wood suppliers, numerous buyers)*

For a market situation to be described as perfect competition, the following conditions must be satisfied:

- a) The wood suppliers provide homogeneous products, i.e. there is no reason for buyers to prefer the products of one supplier to those of another.
- b) The number of buyers and the number of suppliers are both large and action taken by any of these individually will not have any overall effect on the market.
- c) There is perfect information, in the sense that all wood suppliers and all wood buyers have complete information on the market and use this to improve their own situation.
- d) Both the wood suppliers and the buyers may freely enter or leave the market. All products and all production factors may be transported from one part of the market to another without economic cost.
- e) There are no agreements between the wood suppliers, between the vendors or between the parties. Nor is there any intervention on the market on the part of the public sector.

These conditions obviously do not exist on the real market. However, a situation of

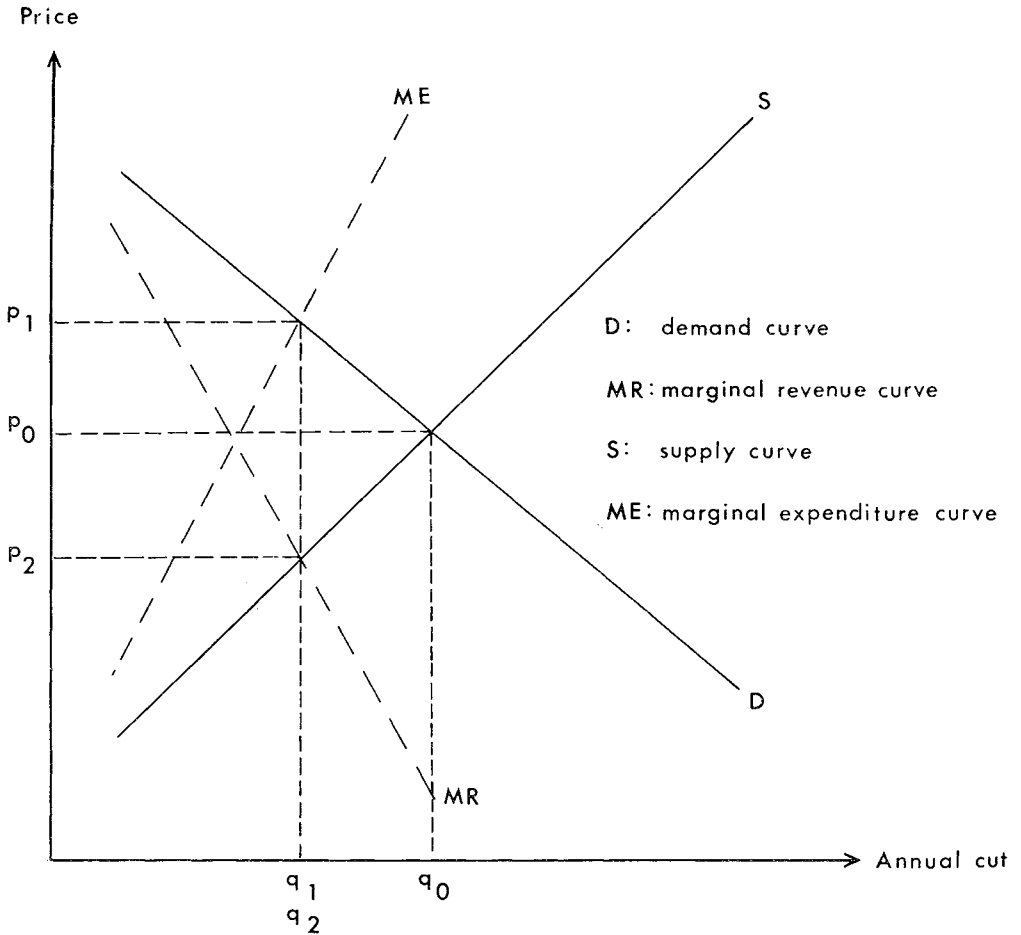


Figure 14. Prices and cuts in different market situations.

perfect competition is an ideal criterion on which to base comparisons of different market situations. Nonetheless, perfect competition does not necessarily result in an optimum utilization of the resources. This assumes that the situation is not affected by external effects and that there are no advantages inherent in large-scale operation. Nor can it be taken for granted that perfect competition implies long-term and general equilibrium on the market.

In a situation of perfect competition, the wood price and the total annual cut are determined by the point of intersection of the supply curve and the demand curve. Thus, in the example presented in Figure

14, the price may be read from  $p_0$  and the annual cut from  $q_0$ .

The implications of perfect competition for the individual supplier are that the price is fixed and that logging will be pursued until the marginal cost is equal to the price. It would be unprofitable for the supplier to continue logging thereafter, since the marginal cost of this increase in the cut would exceed the price obtained. In the same way, he would lose by logging less, since the price obtained would then be higher than the marginal cost, with the result that increased logging would imply a greater overall surplus (total revenue—total cost).

*Monopoly (one supplier, many buyers)*

In a monopoly situation, there is either one supplier or all suppliers have formed a mutual marketing organization. A large number of buyers is also assumed. There is no collaboration between the buyers, their dealings being the same as in perfect competition.

The cost to the wood supplier increases with increasing annual cut. Thus, the marginal cost is rising. Conversely, the price he obtains will be lower as a result of the larger volume of wood available on the market. If the supplier increases the supply of wood, it is not only the price of the additional quantity that will be lower but the price of the entire cut. His marginal revenue is lower than the price. An example may better illustrate this correlation.<sup>1</sup>

Assume that a buyer pays a price of 100 for a quantity of 500. The total revenue of the supplier will then be 50,000. If the supplier increases the cut by one unit to 501, the price will drop—let us assume to 99.9. Consequently, the total revenue from the original cut of 500 will fall by 50 ( $500 \times 0.1$ ), but, at the same time, the additional unit will provide a revenue of 99.9. Thus, the total revenue will be 50,049.9. The marginal increase in revenue will be 49.9. As long as the marginal revenue is greater than the marginal cost, the supplier will profit by increasing the cut. Accordingly, in the example presented in Figure 14, the cut will amount to  $q_1$  and the price to  $p_1$ .

On a comparison with perfect competition, it may be said that the price of the wood will be higher ( $p_1 > p_0$ ) and that the cut will be smaller ( $q_1 < q_0$ ). The smaller cut will adversely affect the buyers, since the total production capacity cannot be utilized. Moreover, the higher roundwood price gives rise to reduced profitability. The consequences may be the closure of certain mills, which will cause a drop in the demand for wood and thus a reduction in the price. This illustrates the importance of a dynamic approach to the pricing of wood.

As mentioned earlier in connection with

the demand curve, the roundwood price is derived from the price of the converted products. Therefore, to maximize profits in the long term, the wood supplier must consider the danger of forcing the buyers off the market. The supplier must also consider the contingency whereby the buyers will obtain their wood from another region if the price becomes so high that the difference between this price and the price in the other region would cover the cost of transportation.

As far as the suppliers are concerned, a smaller annual cut reduces the manpower requirement and also the degree of utilization of the machinery. This need not constitute a problem in the long term as it is possible to reallocate the resources. Furthermore, there will be a greater return on resources still employed in the logging operations.

If the supplier represents many individual forest owners, the unity between them is of major importance. Significant here is how the profit, if any, is divided by the cartel. As shown earlier, a cartel can only achieve an increase in the price of the entire cut by regulating the total supply of wood to a greater degree than that to be found in perfect competition ( $q_1 < q_0$ ). The most sensible solution in such cases is that the forest owners with the highest logging costs refrain from cutting, to be economically compensated instead by the forest owners with lower logging costs. The latter will receive a higher stumpage price owing to the absence of cutting by the former, which thus achieves diminished supply. If the organization is not sufficiently strong for such a course of action to be feasible, it can arrange instead for each forest owner to hold back a part of his cut. However, this solution does not maximize the profit of the cartel and, at the same time, the overall logging costs will be higher than necessary.

$$\begin{aligned} {}^1 P &= a - bq \\ TR &= pq = (a - bq)q = aq - bq^2 \\ \frac{\partial TR}{\partial q} &= MI = a - 2bq \\ \therefore MR &< P \end{aligned}$$

*Monopsony (numerous suppliers, one buyer)*

Let us assume that the number of wood suppliers is large and that they are well organized. Conversely, the number of buyers is small; in fact, they are so few in number that each individual buyer considers it possible to influence the price by the quantity he buys. For the sake of simplicity it will be assumed that these buyers collaborate with each other and participate jointly on the market.

In this situation, the buying organization can offer to buy what it considers to be the most suitable quantity of wood and pay the price determined by the supply curve. For their part, the suppliers can choose between accepting this price or refraining from cutting. For the buyer, the supply curve will be equivalent to the average cost curve of the wood. But the buyer is interested in the marginal expenditure curve (ME), since he is conscious of the fact that he can push the price up in conflict with his own interests. This situation may best be illustrated by means of an example.<sup>1</sup>

If the supply curve for wood slopes upwards, the marginal expenditure required to purchase an additional cubic metre of wood will be higher than the average cost. If for example, 500 m<sup>3</sup> is purchased at a price of 100 SKr/m<sup>3</sup> and a total cost of SKr 50,000, the average cost will be SKr 100. If 501 m<sup>3</sup> wood is purchased, the price per m<sup>3</sup> will increase; for instance, to SKr 100: 10. Thus, the total cost will now be SKr 50,150: 10. Although the average cost only amounts to SKr 100: 10, the total cost has increased by SKr 150: 10 because an additional cubic metre of wood has been purchased. Accordingly, the marginal expenditure for this additional quantity amounts to SKr 150: 10. As observed before, this amount is greater than the price paid, since the price increase necessary to obtain this additional cubic metre of wood must be paid for the entire volume of wood purchased. Consequently, the buyer in a monopsony will continue to purchase wood until the marginal cost incurred is equivalent to the marginal value of his products (i.e. the demand curve). In

Figure 14, this quantity of wood is indicated by  $q_2$  at a price of  $p_2$ .

A comparison with a situation in which there is perfect competition will establish that the price of the wood is lower ( $p_2 < p_0$ ) and that the annual cut will also be smaller ( $q_2 < q_0$ ). The implications of the smaller annual cut to the buyer in a monopsony and to the wood suppliers are that capacity utilization will be lower than in perfect competition. The lower price of wood implies wider margins for the mills. This improves the competitiveness of the mills compared with those abroad, if the price of the roundwood they use is higher. However, in common with the monopoly situation, the advantages of a monopsony may well only be short term, since a low wood price may discourage the suppliers from investing in forestry. Natural regeneration may replace artificial regeneration and a backlog of silvicultural work may be allowed to accrue. Even if the rotation cycle of the forest is long, the interdependency of the wood suppliers and buyers is again clear, as, too, is the importance of the dynamic approach to pricing.

In a comparison of a monopoly with a monopsony, the price of the wood will be found to be higher in the former than in the latter ( $p_1 > p_2$ ). In a monopoly situation, the supplier can limit the supply to  $q_1$  and thereby obtain the price  $p_1$  that the buyers are prepared to pay to obtain this quantity. In the case of a monopsony, the buyer acquires a quantity of wood,  $q_2$ . From the supply curve it will be seen that he can attain this quantity at the price  $p_2$ .

It is not possible to determine whether the annual cut will be greater or smaller in a monopoly or a monopsony. The results that can be obtained from Figure 14 depend entirely on the way in which the demand and supply curves have been plotted. However, in both cases the annual cut will

<sup>1</sup>  $P = a + bq$   
 $TR = pq = (a + bq)q = aq + bq^2$   
 $\frac{\partial TR}{\partial q} = a + 2bq$   
 $\therefore MR > P$



be smaller than in a situation of perfect competition ( $q_1 < q_0$ ;  $q_2 < q_0$ ).

*Bilateral monopoly (one supplier, one buyer)*

In a situation of bilateral monopoly, one monopoly supplier sells to one monopsony buyer. From the above analysis it will be seen that the supplier would like to sell the quantity of wood,  $q_1$ , at a price of  $p_1$ . Similarly, the buyer would like to purchase a quantity of wood,  $q_2$ , at the price  $p_2$ . But in a bilateral monopoly, neither party can count on fully exploiting the other. Thus, the wood supplier and the buyer have to *negotiate*.

During such negotiations, the parties specify simultaneously both the price and the quantity, thereby threatening to prevent the other party from obtaining anything if the offer is not accepted. The negotiations consist of an exchange of such a series of offers. The results of such negotiations are uncertain and depend on the relative negotiating strengths of each party. This is largely determined by which party can present the most serious economic threat with the greatest credibility. Let us assume for the sake of argument that the parties agree on a cut of  $q_1$  ( $=q_2$ ). The buyer will not accept a price exceeding  $p_1$  and the supplier will not accept a price below  $p_2$ . All price levels between these two limits will be more to the advantage of the two parties than if no agreement were reached and no wood cut. Thus, it may be concluded that the price in a bilateral monopoly will lie somewhere between those prevailing in a monopoly or a monopsony situation.

#### **B.4 Long-term competitiveness**

A solitary buyer on a market with many wood suppliers will continue to expand his production capacity until the curve determined by the function for the long-term marginal value of the wood intersects the long-term marginal costs curve for the wood (i.e. the buyer's). If, instead, the mill owned the forest, expansion would continue

until the marginal value curve intersected the marginal logging costs curve. Compared with the first case, this would allow for a larger cut and thus greater processing facilities also. This implies that a buyer, who is the predominant buyer in the region but who has no forest of his own, will probably build a smaller new mill than would be the case if he owned all the forest himself.

One can also speculate on the implications of this dependency of the forest products industry to purchase wood. To start with, it has already been established that the possibility that a dominant wood supplier has to exploit any advantage he may have over the buyer only applies in the short term. In the long term, the supplier can never increase the price above the long-term equilibrium price of the wood, since this would create problems for the survival of the forest products industry. Thus, the long-term marginal revenue curve of a wood supplier does not become reality until a buyer has invested in new plants. This means that a dynamic theory of competitiveness is needed to determine the strategies followed by the parties.

The knowledge of a buyer considering expansion with respect to the risk of his being the subject of a supply policy may discourage him from investing. This also applies if there is free competition between the wood suppliers when the project is in the planning stage. This is because there is a danger that the suppliers may collaborate in order to obtain higher prices after the new mill has been built. However, so long as only a smaller part of the merchantable forest resources is being utilized, such development is unlikely. But the greater the degree of exploitation, the greater will be the dependency of the buyer on the wood suppliers, and the greater will be the temptation for the suppliers to unite in their dealings. There is therefore a risk that the expansion of the capacity of the forest products industry will come to a halt until such a time that the marginal logging cost has reached the long-term equilibrium price level.

A vital question when the forest and the forest products industry are under separate ownership, and when the concentration of the suppliers and the buyers increases, is how optimum utilization of the forest resources can be assured. One way would be for the *wood suppliers to invest in conversion facilities* themselves or for the *buyers to acquire their own forests*. Another way would be for the buyers to sign a *long-term contract* with the wood suppliers. The contract would then have to be sufficiently propitious for the forest products industry

to be able to count on recovering its initial investment together with an acceptable return on its capital. If the price agreed is equivalent to the long-term equilibrium price, the term of the contract must be equivalent to the calculated depreciation time. To make the long-term contract more attractive in the eyes of the wood suppliers, clauses could be inserted whereby the price of the wood would be allowed to fluctuate within certain limits in line with the movement of the prices of forest products on the international market.

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