

Effects of Permanent and Non-permanent Forest Policy Means on Timber Supply

Karl Gustaf Löfgren

To conduct an efficient forest policy, both a normative and a positive theory are necessary. In addition, however, the explicit intertemporal considerations in natural resource economics demand that it is made crystal clear which means are permanent and which are nonpermanent. The permanent case is far from easy to solve.

That the theoretical problems have practical relevance is shown by Swedish experience. A practical course of action is to weigh possible positive effects from a permanent subsidy against possible deleterious outcomes. It is also desirable to avoid jerkiness in forest policy, which is likely to create uncertainty about the permanence of permanent means.

Law may sometimes be more efficient in creating "credibility" than economic incentives. Regeneration has been mandatory in Sweden since 1903, and nobody refrains from cutting because he believes that the regeneration duty will be abolished in some near future.

There are reasons why the social net benefits from forestry may deviate from the corresponding private net benefits. The forest farmer's estimates of the values of future rotations are likely to be downwardly biased in relation to society's "true valuation" of future stands. In Sweden, this would be due to the long rotations of the domestic coniferous species in combination with an imperfect capital market and a heavily regulated market for forest land. Since regeneration is mandatory according to the silvicultural law, it may well be the case that standing timber, which cannot pay for the investment in a new stand, will never be cut. Alternatively, the harvest and/or silvicultural measures may be unduly delayed in spite of the fact that the new investments are profitable from society's point of view.

There are also reasons to believe that this problem is more severe in the northern part of Sweden. In the first place, the site indexes are on the average considerably lower than in the southern parts of Sweden. This means that an approximate 10 % downward bias on the value of the future stands is more likely to cause the forest farmer in the north to refrain from cutting an arbitrarily chosen stand. Stands in the north are much closer to the "zero profit border" than in the south.

Secondly, the unemployment rate is higher in the north than in the south. A high unemployment rate means that the opportunity cost of labour is lower than the ruling wage rate. Hence, calculations for the social proceeds from final fellings are underestimated and regeneration costs are overestimated because of a wage rate that is higher than the

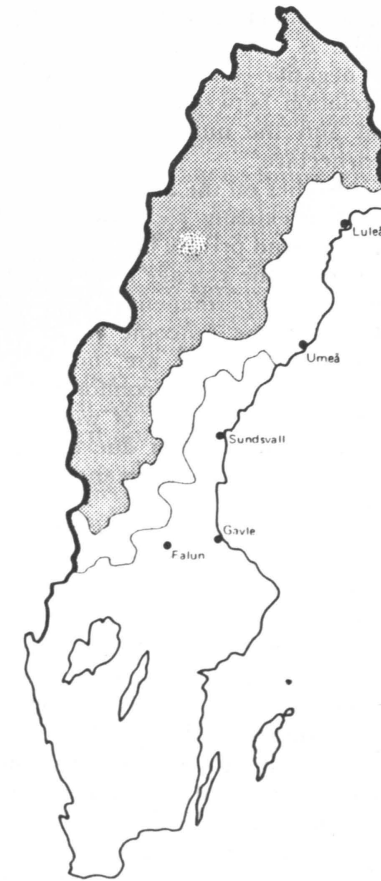


Figure 1. The forestry subsidy area.

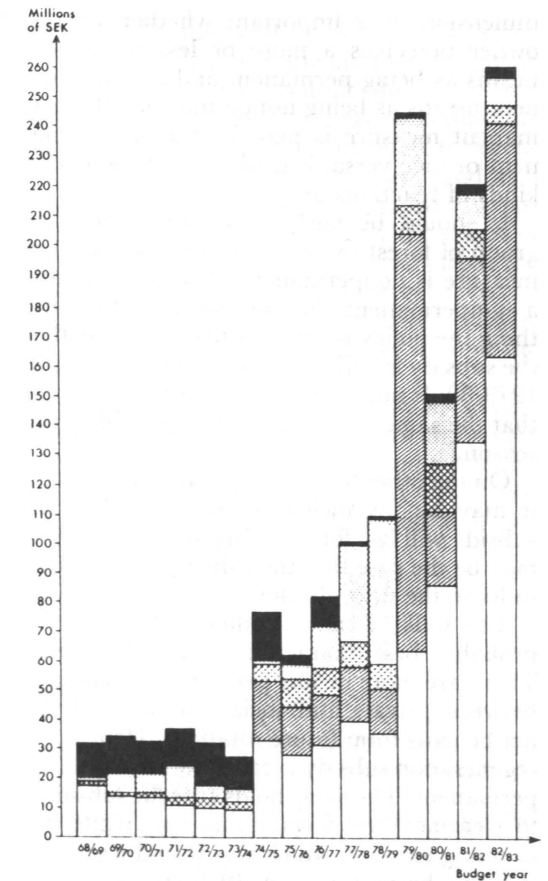


Figure 2. Real outlays on different kinds of subsidies.

socially optimal wage rate. Both deviations tend to favour too low a level of both thinnings and final fellings.

Although a high unemployment rate suggests a general wage subsidy in the northern region, unemployment is not the only imperfection. A wage subsidy would not take care of the deviation between the true value of future stands and the downward biased estimates of the forest owners. It could therefore be argued that subsidizing regeneration measures, clearings, thinnings and forest drainage could also be effective.

The latter technique has been used in Sweden. The subsidies have been paid to both large-scale and small-scale forestry enterprises within what is called the "forest subsidy area" (see Figure 1). The level of subsidization within and between certain measures

has varied a lot. The real outlays on different kinds of subsidies are found in Figure 2.

As can be seen from the diagram, the heaviest subsidies have been paid during the second half of the 1970's and the beginning of the 1980's. Subsidies to regeneration measures, clearings, and thinnings have been the dominant means.

Successful economic policy requires, in general, that the following two requirements are fulfilled: In the first place we need a positive theory of how forest owners react to different kinds of economic and non-economic stimuli. In the second place, we need a normative theory which tells us what to aim for.

However, when conducting forest policy a third requirement is critical. Since forest management has an important intertemporal

dimension, it is important whether a forest owner perceives a more or less permanent means as being permanent and a nonpermanent means as being nonpermanent. If a permanent measure is perceived as nonpermanent or vice versa, it is likely that the wrong kinds of reactions are induced.

It should be fairly easy to convince the group of forest owners that a certain kind of measure is nonpermanent. Take for example a nonpermanent thinning subsidy; the only thing the policy maker has to do is to say that the subsidy is valid only for the cutting season 1979/80. It might be very expensive to believe that the same rules will hold for the following season.

On the other hand for a permanent subsidy it may be insufficient to promise that the subsidy will last for ever. In particular since it may be the case that the ruling party is likely to lose the next election.

The bulk of the subsidies in Sweden are probably best characterized as permanent. There are more or less permanent deviations between private and social estimates of the net benefits from future rotations. Hence, if a regeneration subsidy is called for, it should be permanent. The same holds true for subsidies to clearings and forest drainings, while the thinning subsidy, which was introduced during the harvest season 1979/80, was of a nonpermanent nature.

An attempt to estimate the impacts of the aggregate level of subsidization on the short-run supply of wood in Sweden is reported in Brännlund, Göransson and Löfgren (1985). We found that the subsidies seem to have had a significant negative effect on sawtimber supply and a negative but insignificant effect on pulpwood supply. Most foresters would say that this is an unexpected result. It can be shown, provided that the forest management problem is separable so that it can be treated stand by stand, that present value maximization implies that a permanent decrease of regeneration costs will shorten the optimal rotations and hence increase short-run timber supply. (See Johansson and Löfgren (1985) chapter 4.)

The interpretation made by me and my colleague is that the subsidies have created an intertemporal substitution in favour of stands with lower stocking levels. The reason being that the subsidies have been perceived as

being of a nonpermanent nature. This interpretation is supported by the fact that there is a negative (but statistically insignificant) correlation between the degree of subsidization and the number of cubic meter harvested/hectare.

If the subsidies on the average were meant to correct for existing short-run deviations between social and private benefits, and if the forest owners on the average perceive that the subsidies are nonpermanent and react accordingly, then the outcome may well be socially desirable. There are, however, too many ifs for me to feel comfortable. The decreased short-run supply of wood is very likely an unintended effect due to "wrong" expectations about the permanence of the subsidies.

The thinning subsidy on the other hand, was explicitly said to be valid only for one harvesting season. It would therefore be very interesting to know whether it had the intended short-run effect. Luckily, there are data in terms of an interesting questionnaire prepared by an official Swedish investigation "Virkesförsörjningsutredningen" SOU 1981:81, where nonindustrial forest owners were asked about the cutting behavior during the harvesting seasons 1975/76–1979/80; the last season being the season of the thinning subsidy. A "statistical analysis" of this material reveals that the thinning subsidy seems to have had a considerable positive impact on wood supply. (See Carlén and Löfgren 1986). In particular it is shown that otherwise inactive forest owners are responsible for the lion share of the increased supply. In other words, the subsidy seems to have worked to the extent that the subsidy stimulated cuttings, which clearly was one of the intentions. There is quite another thing that it may have favoured the pulp and paper industry at the cost of the sawmill industry.

Conclusions

The points I have been trying to make are the following: To conduct an efficient forest policy, both a positive and a normative theory are necessary. This is true for any kind of economic policy. However, the explicit intertemporal considerations in natural re-

source economics and in forestry in particular demand that it is made crystal clear which means are permanent and which are nonpermanent. The permanent case is far from easy to solve, since a time consistent economic policy, in the sense that no future government will find it profitable to change it, is sometimes a theoretical feasibility, but lacks practical relevance. And even worse, if practically feasible you have to convince the nonindustrial private forest owners that the policy is permanent and indeed time consistent. The last caveat may require advanced courses in optimization over time and public policy to be conducted under the regime of the Forest Service!

That the problem may have practical relevance is shown by the above mentioned study of Swedish forest policy. The best practical thing to be done is probably to be aware of the problem, and weigh possible positive effects from a permanent subsidy against possible deleterious outcomes. This evaluation may result in a decision where the implementation problems induce us to refrain from subsidies or other policy means, which from strict theoretical considerations are socially desirable. It is also desirable to avoid jerkiness in forest policy, which is likely to create uncertainty about the permanence of permanent means.

On the whole, it seems to be the case that law often is more effective in creating credibility to permanent means than economic incentives. Regeneration has been mandatory in Sweden since 1903, and nobody refrains from cutting because he believes that the

regeneration duty will be abolished in some near future. There is quite another thing that the regeneration duty is a bit blunt, and that this bluntness is one of the reasons behind the existing, not too effective, subsidies to regeneration measures. Today these are paid as a share of total regeneration cost. An alternative design would be to pay only the excess of regeneration cost over the proceeds from the final felling. This would, however, create a "moral hazard problem" since there would be no incentives for the forest owner to limit the excess part of the cost.

Similar problems would apply if society found the mandatory clearing law unreasonable from a private economic stand point and paid the whole clearing cost. From a *cost efficiency standpoint* it would be better to pay only a share of the cost.

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