Market analysis of harvesting services engaged by private forest owners in Sweden

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Abstract

The forest industry in several Nordic countries is heavily dependent on the timber supply of the non-industrial private forest owners. This study focused on the behaviour of forest owners on the timber market when they chose a timber procurement organization. The study was made with a survey among forest owners that during the year 2011 notified the Swedish Forest Agency that a final felling would be performed on their forest property by way of their timber procurer. The survey was answered by 418 forest owners (79% male and 21% female). It was found that there was no difference in age distribution between the forest owners in the sample compared to the total age distribution of forest owners in Sweden. Harvesting was more common on large properties. Half of the forest owners had made timber deals with other timber procurement organizations before. Earlier research suggested that forest owners do not analyse the market, but this study suggest that a change may have occurred. Although a majority of the timber deals were made on the initiative of the forest owner, 17.2% of the deals were based on a tender of the forest owner and this concerned mainly large timber deals. One in four of the forest owners experienced problems, mainly related to how the harvesting operation was performed. Female forest owners, absentee owners and share owners experienced significantly more problems. The results indicate that the forest industry may need to intensify their efforts to learn and understand forest owners better, especially with the new generation forest owners, to maintain their level of timber procurement from the private forest sector.

Keywords: timber procurement, customer relations, harvesting services, loyalty

Introduction

In several Nordic countries, the forest industry is dependent on the supply of timber from non-industrial private forest owners (NIPF owners). In Sweden 59.6% of the gross fellings were harvested on forest land belonging to NIPF owners during the period 2010 – 2012. In Finland 78.2% of the timber harvested came from private owned forest land (Finnish Forest Research Institute 2012).

A lot of research has therefore been made on factors affecting the forest owners' willingness to perform a harvesting operation and sell timber to the industry. The timber price has been identified as the most important factor influencing the willingness to deliver wood to the industry but ownership characteristics as well as forest characteristics have also been identified as influencing variables (Favada et al. 2009). According to Kuuluvainen and Salo (1991) the willingness to harvest decreases as the age of the forest owner increases. Older forest owners have according to Kuuluvainen and Salo (1991) less loans that need repayment and require therefore less income which may according to them at least partly explain the difference in behavior between older and younger forest owners. Conway et al. (2003) found that debt was a strong motivator for harvesting. Another explanation for the age given by Törnqvist (1995) and Lönnstedt (1997) is the bequest motive or the planning for intergenerational transfer of the property to the next generation. According to this perspective, the older generation would like to save older stands for harvesting for the next generation. According to Conway et al. (2003) absentee forest owners are less likely to harvest than landowners living on their property and according to Lidestav and Berg Lejon (2012) female forest owners are less inclined to perform a harvesting operation than male forest owners. Activity levels at joint owned properties were also lower than on single-owned properties (Lidestav and Berg Lejon 2012). As the structural change

in the Swedish private forest sector shows that the average age of the forest owners, the share of absentee owners, the share of joint-owned properties, as well as the share of female forest owners are all increasing it seems necessary for the forest industry to increase its efforts to secure its raw material supply in the future.

Although forest owners are suppliers of timber to the industry, they can also be regarded as customers of harvesting services as they often sell their timber on root and let the timber procuring organization perform the harvesting operation. The large majority of the NIPF owners do not perform the harvesting operation themselves anymore. According to the Swedish Forest Agency (2013) the volume that forest owners harvested in final fellings themselves in 2012 was only 3% and in thinnings 16%. The decision to supply is therefore in most cases closely connected with a choice of timber procurement organization and subsequent customer expectations on the quality of the services provided. These aspects have so far only limited been studied. The timber market in Sweden consist of a number of different types of organizations that procure timber from NIPF owners and supply harvesting services, such as: a) large (multi)-national forest companies, owning several forest industries in the country as well as forest resources, which buy timber from private forest owners to complement the timber supply to their industry coming from their own resources, b) forest industries that totally rely on procuring timber from private forest owners and have their own timber procurement organization, c) forest owners' associations, cooperative organizations owned by the forest owners themselves which sell round wood of their members to forest industries but a majority also own industries, d) forest management organizations that provide total management of the forest property, including administrative services not only to private forest owners but also to public forest owners such as municipalities, and e) forest service companies that provide all kind of services to the forest owner and trade the timber that is produced to other forest companies. The differences in business objectives of these organizations may affect the prerequisites of the potential timber deal they can make with the forest owners. For forest industries for example it is important to limit the costs of the timber and therefore like to keep the price down. Quite the reverse is the objective of the forest owners associations who want to pay well for the timber delivered by its members. How forest owners behave on the timber market when the decision to sell their timber has so far not been evaluated other than by the companies themselves. Neither has it been evaluated if the forest owners' characteristics influence their behavior on the timber market, how versatile their behavior is and how satisfied they are with the service provided.

In interviews made approximately 20 years ago, forest owners said that they most often do not do market research before contacting a timber procurement organization (Lönnstedt 1997). They often contact the timber procurer they have dealt with before unless they were dissatisfied with the previous services of the organization (Lönnstedt 1997). But the structural changes in the forest owner population and the strong competition for timber among the forest industries may have changed this situation. As the knowledge about forest owner behavior on the timber market is limited, the objective of this study was to describe and evaluate the present market for harvesting services in Sweden and to analyze the forest owners' behavior when choosing a timber procurement organization.

Material and methods

Principal of selection

When planning a final felling on an area larger than 0.5 ha, all forest owners need to notify the Swedish Forest Agency at least 6 weeks in advance. If the final felling is to be performed by the timber procurer it is customary that they submit this notification on behalf of the forest owner. For this study, the Swedish Forest Agency was asked to take a random sample among the notifications submitted by agents to private forest owners during the year 2011. The total number of notifications submitted to the Agency in 2011 was 33714. The Agency took a sample of 1025 cases and after removing cases that were duplicates, cases that did not concern private forest owners' land, cases with incomplete addresses on the forest owner and cases where the forest property belonged to an estate of a deceased person, the final sample used in this study was 973 cases. The information received from

the Swedish Forest Agency was personal information of the contact person to the forest property, the property id, the name and address of the timber procurer organization and the size of the property (if this was available in the data base of the Agency).

Questionnaire

A questionnaire was constructed and sent to the 973 forest owners. The complete questionnaire consisted of 60 questions divided over 5 sections. Section 1 and 2 consisted of questions concerning service quality and will be reported on in another article. Section 3 concerned questions about the contacts the forest owner had with the timber procuring organization such as how often they had sold timber to this timber procurer, who made the first contact to initiate the timber deal, how often they had been in contact, if the forest owner experienced any problems during the process and the size of the timber deal. In section 4 the forest owner was asked questions about his/her relations towards the timber procurement organization, and in section 5 further background information about the forest owner was asked such as the age, gender, education and ownership constellation. As the purpose of this article is mainly descriptive, the answers given in section 3 and 5 were used for this article. The questionnaire was sent by mail in November 2012. After one reminder sent two weeks after the first dispatch in total 418 answers were received, which gives a response rate of 43%. The drop-out analysis showed that the average age of those that responded was slightly higher than those that did not respond (60.8 respectively 58.2 years old) and that men had responded more frequently than women (45% respectively 36%). No difference was found in the distribution over the property size classes between forest owners that had answered compared to those that had not answered. There was a tendency ($p=0.08$) that forest owners living in Götaland and Norra Norrland had answered more frequently than forest owners living in Svealand and Södra Norrland.

Analysis

To determine statistical differences the chi-square test was used on the frequency tables.

Results

Of the 973 final felling cases, 79% were conducted on land where the contact forest owner was a man and 21% were conducted on land where the contact forest owner was a woman. The average age of the forest owners that performed a final felling was 59.3 years old. Figure 1 shows that the age distribution of the sample was very similar to the age distribution of the Swedish private forest owners in total (Swedish Forest Agency 2013). In the sample 21.5% of the forest owners were 70 years old or older.

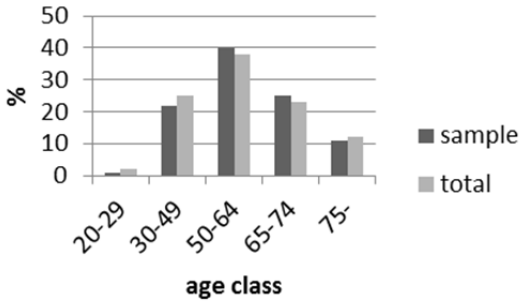

Figure 1. The age distribution of the sample compared to the age distribution of the total population of private forest owners (Swedish Forest Agency 2013)

Of the 973 properties that were subjected to a final felling, information about the size of the property was available for only 865. The average size of those 865 properties was 136.6 ha. No statistical differences were found between the size of the female forest owners and the size of the male forest owners in the sample. Figure 2 shows that the large properties (51 ha and more) are more frequently represented in the sample than the small properties (less than 20 ha) when comparing the sample with the distribution over all forest properties in Sweden (Swedish Forest Agency 2013). Figure 3 is based

on the answers received on the questionnaire and reveals that the intensity of the harvesting operation expressed in m^3 is larger on the large properties compared to the small properties ($p<0.000$). Figure 4 shows that single owners on large properties are relatively more active than share owners.

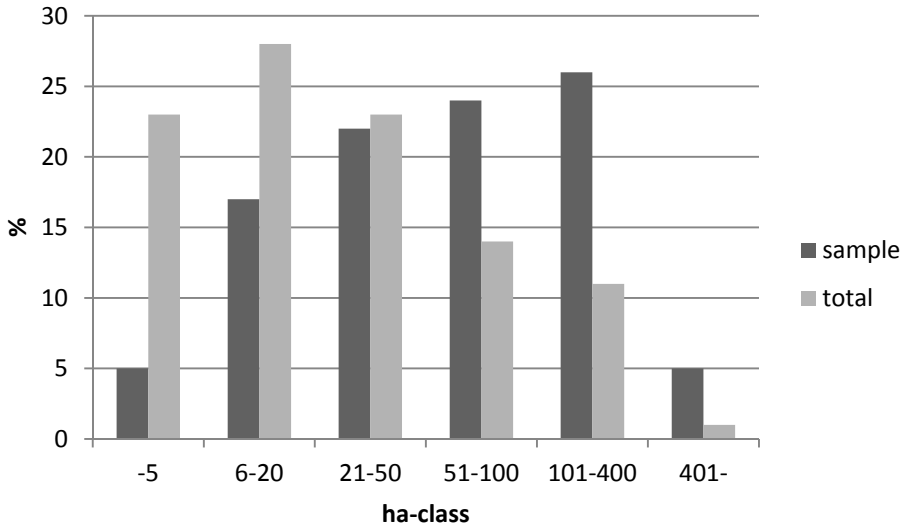

Figure 2. The distribution of the properties according to size in the sample (865) compared to all forest properties owned by private forest owners (Swedish Forest Agency 2013).

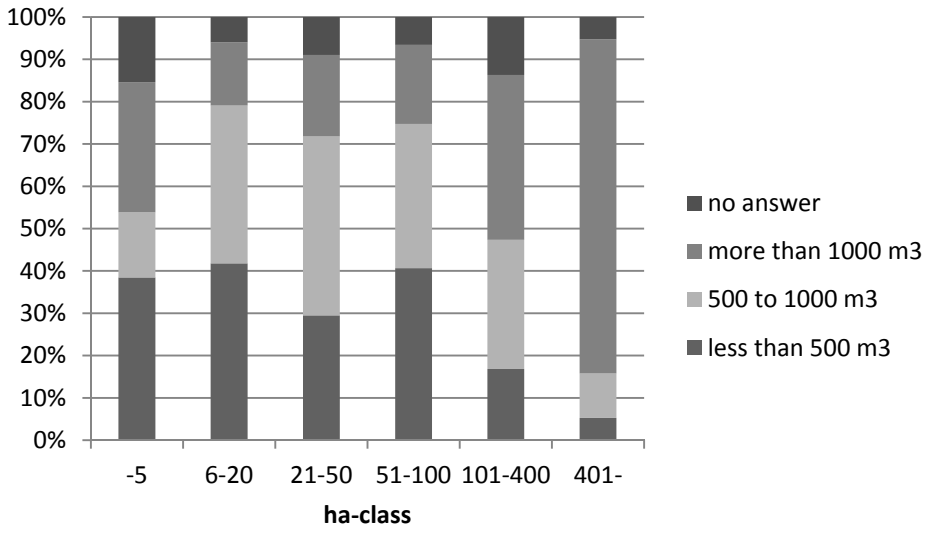

Figure 3. The harvesting intensity on the properties according to property size.

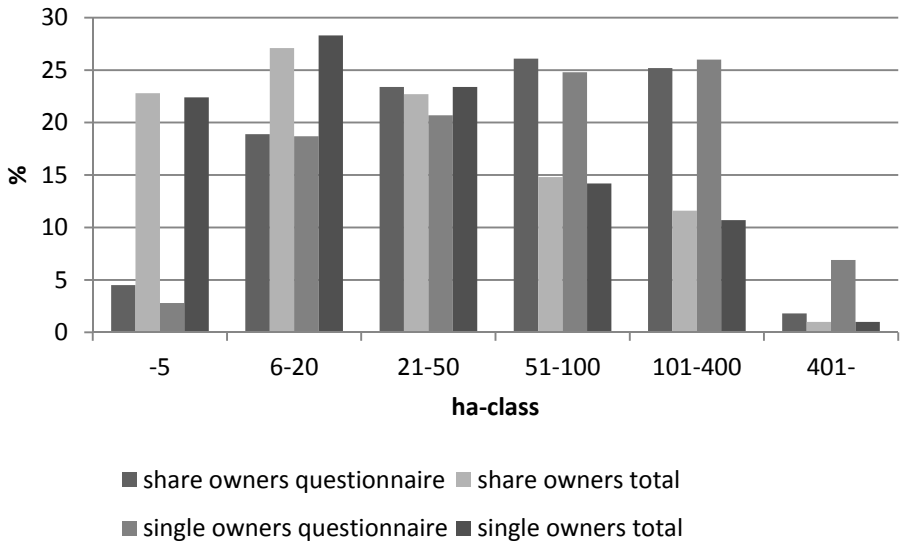

Figure 4. Comparison between the proportion of single and share owners that have been harvesting and in the total population of forest owners in Sweden according to the size of the property (Swedish Forest Agency 2013).

A majority of the forest owners that answered the questionnaire were single owners to the forest property (59.8%). There were no significant gender or age differences in ownership form. Nor were there any significant difference found between single owners and share owners in the size of the properties they owned. 75% of the forest owners had owned the property more than 10 years and 78% of the forest owners were living in the municipality where the property was situated. Although not significant, there was a tendency that more female forest owners than male forest owners were absentee owners ($p=0.1$). The female forest owners were significantly higher educated than the male forest owners ($p= 0.0001$) while it was significantly more frequent among male forest owners to have a loan on their property ($p=0.0009$) compared to female forest owners. It was also found that the younger forest owners (less than 50 years old) were significantly higher educated than the older forest owners ($p < 0.000$) and that the younger forest owners more frequently had a loan on the forest property ($p<0.000$). Forest owners to larger properties (51 ha or larger) were significantly more frequent a member of a forest owner association ($p=0.0067$) than forest owners with properties of 50 ha or smaller.

It was found that 91% of the forest owners that made a timber deal with a forest owner association also were members. However, only 62% of forest owners that were members of a forest owners' association had made their timber deal with a forest owners' association. Half of the forest owners (50%) had made previous deals with other timber procurement organizations than the one they were dealing with in 2011. No significant differences could be found between the forest owners that had changed between timber procurement organization and those that had not changed based on their personal characteristics. But forest owners that made their deal with a forest owners' association or a forest management organization were significantly less inclined to change between timber procurement organization ($p<0.000$). In table 2, the reasons that were mentioned for changing are compiled. The most common reason for changing was economical as the price offered by another company had been better (17% of those who changed). Dissatisfaction with a former timber procurement organization was the reason for 11% of those who changed while 10% found something offered by the other timber procurement organization that they esteemed and were devoid of by the former company. This could be good relation with the timber procurer, service level, or vague descriptions such as better feeling. 3% acted on an opportunity like a planned harvesting in the area by another company, while 4% simply wanted to test another company. Most forest owners that had changed did however not give a reason.

Table 2. Reason given for changing to another timber procurement organization

Economic reasons (better payment)	35 (17%)
Organizational reasons (changes in the timber procurement organizations)	11 (5%)
Dissatisfaction	23 (11%)
Offer service that suits better	22 (10%)
Opportunity	7 (3%)
Wanted to test another company	9 (4%)
Other / Do not know	7 (3%)

For only 2% of the forest owners the timber deal in 2011 had been the first one and 42.3% had done 5 timber deals or more. A majority of the timber deals (59.6%) had been initiated by the forest owner, while 11.5% had been initiated by the timber procurer and 17.2% was based on a tender from the forest owner. Timber deals that concerned more than 1000 m3 were significantly more based on tender ($p<0.000$). Although not significant ($p=0.09$) it was found that timber deals based on tender were more common on large properties (101 ha or more) and that timber deals initiated by timber procurers were more common on properties in the size class 51-100 ha.

24.2% of the forest owners experienced problems in relation to the felling operation and of those only 54.7% were of the opinion that the problem had been resolved satisfactorily. The share of female forest owners that experienced problems during the felling operations was significantly higher than the share of male forest owners (38% versus 21%, $p=0.015$). Also significant more share owners experienced problems compared to single owners (27.3% versus 22.4% $p=0.028$) and there was a tendency that absentee owners experienced more problems compared to resident owners (31.0% versus 22.6%, $p= 0.072$). Relatively more forest owners with a university degree indicated that they had experienced problems compared to forest owners with basic education ($p=0.0007$). The problems that were experienced by the forest owners concerned mainly the way the harvesting operation had been performed (41% of those that reported a problem) which in the opinion of the forest owner either had caused damage to the remaining forest land or lead to reduced revenues. Administrative problems were experienced by 12% of the forest owners, when payments had been delayed, miscalculations had been discovered or similar type of problems. Very few problems concerned the relation with the timber procurer (2%).

Discussion

The sample taken for this study had a similar age distribution when compared to the age distribution of all forest owners in Sweden (Swedish Forest Agency 2013). This indicates that contrary to a number of other studies (Kuuvulainen and Salo 1991; Løyland et al. 1995; Bolkesjø and Baardsen 2002; Størdal et al. 2008; Joshi and Arano 2009; Joshi et al. 2013) age did not influence the harvesting behavior of the forest owners. In this study it was more common among the younger forest owners to have a loan on their property which according to Kuuvulainen and Salo (1991) should increase their willingness to perform a harvesting operation while older forest owner would not have the same economical need to do a harvesting operation. Interest levels on loans have however been moderate in Sweden during the recent years which may have subdued the need for harvesting among those with loans on their property. Bolkesjø and Baardsen (2002) found that in Norway on average only 10% of the total income came from timber sales which shows the limited economic need harvesting operations have for the family income today. Neither does the pattern found in this study fit to the explanations given by Törnqvist (1995) and Lönnstedt (1997). Their explanation was that

older forest owners like to save mature forests for the next generation as resources were needed to meet the costs of taking over by the next generation forest owners. Sweden abolished inheritance tax in 2005 which has reduced the costs of a take over. Also the practice of siblings taking over the property together has increased which will have subdued the need for capital to compensate family members by the new owners. But at the same time these changes in taxes and intergenerational transfer norms do not explain completely why older forest owner would increase harvesting or younger forest owners reduce.

The fact that the size of the property matters for the inclination to do a harvesting operation as shown in figure 2, was also found in studies by Kuuvulainen and Salo (1991), Bolkesjø et al. (2007) and Størdal et al. (2008). According to Størdal et al. (2008) forest owners with a management plan are more inclined to do a harvesting operation and it is more common among large forest owners to have a management plan than among small owners. Figure 2 showed that large properties also made more intensive harvesting operations. Størdal et al. (2008) found that education level had a positive effect on the decision to make a harvesting operation and more weakly on the intensity of the harvesting operation. Their explanation was that higher education may give the property owner more insight in the possibilities of the forest resources and that they also might be burdened with more debts. In this study there was a positive tendency ($p=0.09$) that owners with a high education had more intensive harvesting level compared to owners with a low education while there was no significant relation between the size of the property and the education level. Størdal et al. (2008) also found that properties close to urban areas had a low harvesting intensity, a factor that was not considered in this study. Vokoun et al. (2006) found that the harvesting intensity decreased with increasing property size. Besides that, the intensity of harvesting was also affected by the length of the ownership as well as the fact whether or not the owner was an absentee owner (Vokoun et al. 2006). No such relations could be found in this study. Figure 3 showed that the ownership form influence the decision to harvest which was also found by Lidestav and Berg Lejon (2012). Interesting is though that share owners to small properties are more active than single owners to small properties, while single owners to large properties are more active than share owners of large properties. One possible explanation may be that single owners to large properties more often have focus on the economic objectives of ownership (Ingemarson et al. 2006).

If we would compare the share of female forest owners in our sample (21%) with the total share of female forest owners in Sweden (38%, Swedish Forest Agency 2013) it would appear that gender has a major impact on the decision to perform a final felling. However, it is important to keep in mind that the forest owners' gender in our sample concerns the contact person for the property and that this may underestimate the share of female forest owners to a property where a final harvesting activity had been performed (Lidestav 1998). This is strengthened by the fact no significant gender differences were found in ownership form or age while the studies made by Lidestav (1998) that female forest owners in Sweden are more often share owners than male forest owners and on average younger.

Members of forest owners' associations had significantly larger properties than non-members which is consistent with earlier findings of Berlin et al. (2006). They appear also to a high extent chose to sell their timber to the forest owners' association as 91% of their customers were members. However it must be kept in mind that membership is often established in connection with a timber deal (Kronholm and Staal Wästerlund 2013), so to what extend the forest owners already were members when deciding to make the timber deal with the association cannot be determined based on this data. It was however found that members had not changed timber procurement organization as much as non-members and as such seem to some extent acknowledge the expectation that membership implies, which is to deliver their timber to the association. Enander and Melin (2008) found that forest owners reasoned more business like if the timber deal concerned relative large amount of timber. This was also found in this study as large timber deals more frequently were put out on tender.

Half of the forest owners that had made timber deals before had changed timber procurement organization. This is not consistent with the findings of Lönnstedt (1997). One possible explanation might be the difference in questions ask between the two studies. Lönnstedt (1997) asked for

hypothetical reasons to change, while this study asked if they had changed. Another explanation might be that the concept of loyalty in doing business has changed. Hakelius (1996) found that younger farmers did not perceive the need to be loyal to their farmer cooperative in the same way as the elder generation farmers perceive this and she explain this by the change in society and the growing need among people for individualism.

Approximately one out of five forest owners experienced problems with the timber deal. The results showed also that the growing category of female, share and/or absentee owner have experienced more problems than traditional owners. There may be a difference in expectations what a timber deal implies which the industry need to understand and address. Kindstrand et al. (2008) pointed out that forest officers do not always understand the forest owner's objectives and management ideas. Communication about the activity to be performed may also be hampered as younger forest owners might not be as familiar with the forest terminology as the elderly forest owners (Sjödin 2010). To establish long-tern customer relations it is imperative for the companies to have knowledge about and understanding for the forest owners' reasoning with regards to their property (Peelen 2005).

For only 2% of the forest owners it was the first time they sold timber. This low number may be caused by the response rate to the questionnaire which was higher among the elderly forest owners. It may also be the result of the low share of take overs of forest properties which made it possible for timber procuring organisations to rely on experienced business contacts. However as the average age of the forest owners' population is increasing, it may imply that the take over frequency will increase in the future. Our study indicates that timber procuring organisations may need to invest in quality measures as well as consumer relations to ensure timber supplies from loyal forest owners in the future.

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