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New Forest Owners: Change and Continuity in the Characteristics of Swedish Non-industrial Private Forest Owners (NIPF Owners) 1990–2010

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Abstract This paper presents a total survey of the characteristics and changes over time (1990–2010) within the entire population of Swedish non-industrial private forest owners (NIPF owners). By charting the changed demographic, socio-economic and geographic profile of the NIPF owners, it also provides a baseline for a discussion and analysis of potential implications for forest management, policy and values. NIPF owners differ in important ways from the general population of Sweden. However, the gap has narrowed over time with regard to, e.g., educational level and sex composition. The ongoing urbanization process is evident in the growing share of non-residential NIPF owners who live at a distance from their forest property and who differ from their residential (rural) peers through, e.g., higher education, higher income and a higher prevalence of co-ownership of their forest holdings. Although these changes might translate into updated views on forest values among NIPF owners, there could be a delay before this impacts on forest management practices and output.

Keywords Non-industrial private forest owners · Urbanization · Socio-economic change · Register data · Total survey

Introduction

To a substantial degree, forest ownership in Europe is a private affair (Pulla et al. 2013). Over the last few decades, it has to some extent shifted from public to private ownership through, e.g., the privatization of previously state-owned forests (e.g. Lindgren 2013) and restitution in several Eastern European countries (e.g. Hedin 2005; Pulla et al. 2013). While forest management is significantly shaped through

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the institutional framework of national laws and policies, forest owners exercise power within these boundaries, for instance what action to take and how to use the revenues from their forests. The management of forests, and ultimately of the economic, social and ecological utilities they produce (MA 2003), is thus largely determined by non-industrial private forest owners—henceforth referred to as NIPF owners. Previous studies (Boon et al. 2004; Wiersum et al. 2005; Ingemarson et al. 2006; Ní Dhubháin et al. 2007; Urquhart and Courtney 2011; Urquhart et al. 2012) have shown that NIPF owners make up an increasingly heterogeneous group, that their approaches to forest management tend to differ across different sub-groups (Lindroos et al. 2005; Ingemarson et al. 2006; Nordlund and Westin 2011; Urquhart and Courtney 2011), and that they are increasingly influenced by other activities than traditional timber production (Lien et al. 2007). Therefore, changes within the group of forest owners can be expected to have consequences on the use and management of forests (MA 2003; Haugen 2015).

Various changes in Western societies, including processes of urbanization, increased female participation, and population ageing can affect forest ownership and management (Hirsch et al. 2007). While some changes are confined to national (or other) scales, and differences in the institutional framework should be taken into account, the development of forest ownership in Sweden can be considered representative of the Northern boreal regions more generally (Beland Lindahl and Westholm 2012). In Sweden, around 50 % of the productive forest land (22.3 million hectares) is owned by NIPF owners (Swedish Forest Agency 2013), whose management decisions have great impact on their private economy as well as on the local and national economy, landscape scenery, biodiversity, recreation opportunities and other ecosystem services (Pulla et al. 2013; Haugen 2015).

Although there is a general understanding that forest ownership is in a process of transition, there is ‘a notable lack of an overview of the patterns of forest ownership in European countries’ (Pulla et al. 2013:7). The present paper utilizes a unique data set covering rich detail of the characteristics of the entire NIPF owner population in Sweden in 1990 and 2010. By charting the changed demographic, socio-economic and geographic composition within the NIPF owners this paper—through statistical description of the entire forest owner population in Sweden—provides a baseline for a discussion and analysis of potential implications for forest management, policy and values. The paper emphasizes a comparison of the characteristics of residential and non-residential NIPF owners, as well as the features of NIPF owners and the general population.

Literature Review: Society and Forest Ownership in Transition

Urbanization and Economic Dependency on Forests

Rural change and economic restructuring in many European countries have brought about generally weak labour markets in many rural areas and in small towns beyond commuting distance to major labour markets, compared to cities and metropolitan areas. Mechanization and rationalization in agriculture and forestry over several

decades have led to fewer jobs in the primary sector (Hedlund and Lundholm 2015; Živojinović et al. 2015). This is associated with a reduction in NIPF owners' relative dependence on the forest as a source of livelihood in terms of both labour and capital income (Ziegenspeck et al. 2004; Wiersum et al. 2005; Lien et al. 2007). It has also been argued that NIPF owners who are focused on non-economic aspects of forest management and who are not financially dependent on forest-related income are becoming more numerous (Boon et al. 2004; Urquhart and Courtney 2011). A lack of job opportunities and a narrow labour market in rural areas have also contributed to a steady out-migration to urban areas, leaving the rural areas with a declining population (Hedlund and Lundholm 2015). Moreover, personal and lifestyle-oriented preferences have become important motives for migration (Fielding 1989; Lundholm 2007; Thissen et al. 2010). Although a majority of NIPF owners still live in rural areas the ongoing urbanization has affected their residential patterns, resulting in increasing shares of owners who do not live on their property (non-residential owners) and hence a lower proportion of residential owners (Schmithüsen and Hirsch 2010).

Female Ownership

Improvements in gender equity and the development towards increased female participation in the labour market as well as in business and politics are to some extent reflected in the composition of NIPF owners (Nordlund and Westin 2011). Although several studies have noted a development towards increasing female participation in the context of forest ownership (Lidestav 1998; Bernhardt et al. 2008), women nevertheless continue to occupy a minority position among European NIPF owners (Schmithüsen and Hirsch 2010). Further, studies from, e.g., Sweden, Finland and the US (Lidestav and Ekström 2000) show that the mean size of forest holdings is lower among women than among men. There are also differences between men and women in forest management (felling, harvesting, planting, etc.) (Lidestav and Ekström 2000). In general, women tend to have a more environmental or ecological value orientation compared to men (Stern et al. 1993). This is also reflected in their attitudes towards forests, as women often emphasize protection values (Tarrant et al. 2003) while men stress economic values to a greater extent (Nordlund and Westin 2011).

Ageing, Co-ownership and Parcelization

The ageing of the population in most European countries is also discernible among NIPF owners (e.g. Schmithüsen and Hirsch 2010). Only a small share of the NIPF owners are under 30 years old, and in many countries (e.g. France and Romania) more than half of the NIPF owners are over 60 years old. In addition, with increased longevity, it is possible that generational shifts will be delayed and the successor will take over at a higher age. However, when the generational shift does occur, the forest holding is often handed down to several heirs, resulting in parcelization (the subdivision of tracts into increasingly small holdings) and multiple ownership (Zhang et al. 2004). In the long run, continued parcelization could have negative

effects on timber management and supply as holdings become too small for efficient forestry (Rickenbach and Steele 2006). However, in the Swedish case, the institutional framework functions as an obstacle to parcelization, as land cannot be subdivided in a way that damages the prerequisites for economic robustness (Lantmäteriet 2015). Hence, the legislation stimulates the opposite development, i.e. an amalgamation of holdings rather than parcelization. This development towards fewer but larger holdings will most likely result in a more homogenous forest landscape and counteract a mosaic landscape that can result from multiple owners (e.g. Widgren 2006).

Forest Values and Forest Owner Typologies

The NIPF owners' forest values and their objectives concerning their forest estate affect their approach to forest management (Ni Dhubbáin et al. 2007). Hence, changes in the composition of NIPF owners might also bring about changes in forest values, views and management practices. Forest values can be defined as 'an enduring concept of the good related to forests and forest ecosystems' (Bengston 1994:520) and classified into ecological values, production values and human-centred values (Kozak et al. 2008). These differences in forest values, which can be seen as 'forest discourses', apply not only to NIPF owners but can also be identified among forest companies and other stakeholders with regard to forest use, not least advisors and timber buyers who cooperate with the NIPF owners (Ambjörnsson Lazlo et al. 2016). Production and human-centred values are often described as anthropocentric, as they stress the role of forests in satisfying human needs. Ecological values can be regarded as either anthropocentric or biocentric, depending on whether they are oriented towards human interests or focused on nature in its own right (Eriksson et al. 2015).

Forest values differ between NIPF owner sub-groups (Ingemarson et al. 2006; Nordlund and Westin 2011). For instance, residential NIPF owners tend to assign greater importance to economic revenue than non-resident owners do, and female NIPF owners assign greater value to ecological aspects than men do (Lidestav and Ekström 2000; Nordlund and Westin 2011). NIPF owners residing in urban areas tend to be more focused on recreational forest values compared to rural owners (Kangas and Niemeläinen 1996). Common characteristics of owners who express concern over conservation include young age, urban residency and conservation-related knowledge (Vaske et al. 2001; Uliczka et al. 2004; Ingemarson et al. 2006). A Swedish study found that those who were dependent on forest incomes, were aged 55 or older, and had a land-use-related occupation were less positive towards conservation (Uliczka et al. 2004). Preferences for different forest management practices also differ within owner sub-groups, such that, e.g., female forest owners tend to have more negative attitudes towards clear-cutting than do their male counterparts, thus expressing attitudes similar to those of the non-forest-owning general population (Kangas and Niemeläinen 1996).

Different NIPF sub-groups have also been shown to differ with regard to their objectives for forest ownership (Ingemarson et al. 2006; Nordlund and Westin 2011), including economic, conservational, social and aesthetic aspects (Boon et al.

2004). Several studies have been carried out with the aim of classifying NIPF owners into typologies based on their motives for ownership, management strategies and individual characteristics. The typologies often classify forest owners into two general groups: those with production goals, and those with consumption goals (Ni Dhubháin et al. 2007). The production goals include, e.g., an emphasis on timber production (Kline et al. 2000) and securing an income (Karppinen 1998). Consumption goals can comprise the extraction of wood and other forest products for personal consumption (Mizaraitė and Mizaras 2005; Wiersum et al. 2005); recreationist values (Karppinen 1998; Kline et al. 2000); environmentalist motives (e.g. Wiesum et al. 2005; Nordlund and Westin 2011); or using the forest for hobby activities (Boon et al. 2004). However, for many NIPF owners the objectives for forest ownership are not a question of either production or consumption. Several studies have identified multi-objective owners as a significant group, for whom economic as well as non-timber benefits are valued equally. For instance, in a survey of Finnish NIPF owners, Karppinen (1998) found that almost a fourth of the owners (representing a third of the forest land) could be classified as multi-objective owners who valued both economic and amenity benefits. It has also been suggested that NIPF owners who are focused on the non-economic aspects of forest management, and for whom forest-related income is complementary rather than essential, are increasing in number (Boon et al. 2004; Urquhart and Courtney 2011).

Data

The present paper is based on a unique set of official, individual-level register data on the entire population of Swedish NIPF owners, compiled by Statistics Sweden in the 'ASTRID' database. In addition, complementary data on forest land and forest production have been retrieved from official statistics published by the Swedish Forest Agency. Data on the features of the general population of Sweden as a whole were collected from the official records of Statistics Sweden; this information is used for comparing the NIPF group and the general population.

A data set containing the demographic and socio-economic characteristics of each individual NIPF as well as attributes of their forest holdings (e.g., size,¹ value² and location) was extracted from the ASTRID database. The data are geo-referenced with a high resolution (accurate to 100 m * 100 m), which makes it possible to explore spatial features such as the distances between forest owners' residential location and their properties. In accordance with the aim, the methods employed were based on descriptive analyses across two temporal cross-sections of data. The conditions in 2010 are compared to those of two decades previously, in

¹ A minimum property size criterion was applied: only the owners of properties covering at least one (1) hectare of productive forest land or forest waste land were included in the analysis.

² To enable comparisons over time, all pecuniary information for 1990 has been recalculated into constant prices based on the price level in 2010. The figures have been converted from Swedish crowns to Euro at the current (21 April 2016) exchange rate € 1 = SEK 9.2.

Table 1 Total land area, productive forest land, forest properties and standing volume in total and owned by NIPF owners. *Source:* ^a Swedish Forest Agency (1993); ^b Swedish Forest Agency (2013); ^c In 1992

	1990 ^a	2010 ^b
Total land area (million ha)	41.0	40.8
Productive forest area (million ha)	23.0	23.1
Standing volume on productive land (million m ³)	2644	3002
Gross felling (million m ³)	64.0	84.8
Annual increment (million m ³)	99.4	120.0
Protected area total (million ha)	3.7 ^c	4.4
Protected area on productive land (million ha)	0.7 ^c	0.8

1990.³ Because the focus of the paper is on characteristics and changes in the composition of NIPF owners, the individual forest owners—rather than the forest properties—are the primary unit of analysis⁴ unless stated otherwise. Moreover, because the data cover the target population of NIPF owners in their entirety, and hence do not refer to a sample, inferential statistics are redundant.

In order to illustrate the heterogeneity among NIPF owners, they are divided into two sub-groups: residential and non-residential. Residential NIPF owners are defined as those who were resident in the same municipality as their forest property, and non-residential NIPF owners are defined as those who lived in a different municipality than where their forest was located.

Forests in Sweden: Setting the Scene

Sweden is part of a largely boreal region, and of the country's total land area of 40.8 million hectares approximately 56 % is classified as productive forest land (Table 1). The small increase noted between 1990 and 2010 in productive forest area is partly explained by the transformation of former agricultural land into forest (planting on meadows, etc.). Despite the marginal increase of forest land the estimated total standing volume increased more substantially, by 13 %, and in 2010 was estimated at 3 billion m³ (approximately 2600 million m³ in 1990). The gross felling increased by 20 million m³ (32 %), and the annual increment also increased by 20 million m³ (20 %) in the same period. Between 50 and 60 % of the harvested volume stemmed from NIPF owned forests. In the revised Forest Act from 1994, one of the short-term concrete goals was to double the protected forest area by 2010.

³ Because of improvements in data quality over time, some of the information available for 2010 is lacking for 1990, and consequently the comparisons are focused on those aspects of NIPF owners and their forest properties for which data are available for both years.

⁴ Some NIPFs (9.4 % in 1990 and 16.3 % 2010) owned multiple forest properties, and therefore some results are presented as averages based on all properties owned by the same individual. For instance, for those NIPF owner who own more than one forest property, the reported distance between the owners' residential location and their properties is calculated as an average of the distances to all properties owned by the same individual.

The proportion of formally protected forest land, such as national parks and nature conservation areas, was 7 % in 2010.

Historically, forests were of utmost importance for the Swedish economy. In 1950, the export value of the wood and forest industries (the forest sector) was 42 % of the country's total export value. By 2013 it was down to 11 %, albeit yielding € 12.9 billion. Put in relation to the import of forest products, which amounts to € 3.3 billion, the net export value is still high compared to other industry sectors (Swedish Forest Agency 2014). However, the forestry-related industries' share of the total employment in Sweden is marginal. The forest sector employs 2 % of the total workforce (10 % of all employed within the industry sector), largely in the paper industries.

Findings

NIPF Owners and the General Population in Comparison

The features of Swedish NIPF owners deviate from those of the general population in many respects (Table 2). Although the share of female forest ownership has grown over the 1990–2010 period the sex composition among NIPF owners is far from even, with men still in the majority in 2010. The NIPF owners were also older on average compared to Swedes in general, which can be expected given a substantially lower proportion of children among the NIPF owners. The educational divide between NIPF owners and the general population narrowed dramatically over the period, as the share of NIPF owners with a higher education has doubled. However, in 2010 there remained a gap between the lower share of highly educated NIPF owners and the general population. Concerning residential patterns, while nearly half of Swedes in general lived in metropolitan areas in 2010, the corresponding figure for NIPF owners was only around a fifth, despite the urbanization that has taken place within this group over the study period. Hence, the

Table 2 Characteristics of NIPF owners and the general Swedish population. *Source:* ^a ASTRID database and ^b Statistics Sweden (1992, 2014)

	NIPF owners ^a		General population (aged >16) ^b	
	1990	2010	1990	2010
Women (%)	24.9 %	38.5 %	50.6 %	50.2 %
Age (years, mean)	54.0	57.6	39.0	41.1
Higher (tertiary) education (%)	14.3 %	30.3 %	28.3 %	33.0 %
Residential environment				
Metropolitan area	17.2 %	21.7 %	43.8 %	48.1 %
Larger regional centre	46.5 %	44.7 %	38.8 %	37.3 %
Small regional centre	24.0 %	22.5 %	12.5 %	10.7 %
Small region	12.3 %	11.2 %	4.9 %	4.0 %
Foreign-born (%)	1.3 %	2.1 %	4.6 %	14.7 %

Table 3 Characteristics of NIPF ownership in 1990 and 2010. *Source:* ^a Swedish Forest Agency (1992, 2014 correspondence from Swedish Forest Agency; unreferenced), ^b ASTRID database

	1990	2010
No. of private (NIPF) owners	218,879 ^b	336,296 ^b
No. of privately (NIPF) owned properties	240,014 ^a	233,695 ^a
Privately owned area (1000 ha)	10,633 ^a	11,250 ^a
Average property size (ha)	44 ^a	48 ^a

rural inertia appears to be stronger among NIPF owners. Inversely, one in three NIPF owners lived in a small regional centre or a small, rural region, compared to around 15 % of the general population.

Although the share of NIPF owners who were of foreign origin grew slightly over the study period, the prevalence of forest ownership in this group is by no means proportionate to their share of the population. Being a NIPF owner living in Sweden was almost exclusively a matter for native Swedes in both years. Among the NIPF owners who were born abroad, most were of Nordic origin and only very small numbers originated from places beyond Sweden's neighbouring countries.

Properties, Ownership and Forest Value

Almost half of the total productive forest land was owned by approximately 336,000 NIPF owners in 2010 (Table 3). In comparison to 1990 the number of NIPF owners had grown by approximately 50 %, even though the number of properties decreased concomitantly, largely as a result of amalgamation. As indicated in Table 3, the average privately owned property size in 2010 was 48 hectares, which corresponds to an increase of 9 % since 1990. Because the number of properties has declined somewhat, the increased number of owners is attributable to a higher prevalence of co-ownership of forest holdings.

Each year, only around 1 % of Swedish forest properties are transferred to new owners through purchase, inheritance, gifts,⁵ etc. (Swedish Forest Agency 2006). An indicator of the duration of forest ownership is that, on average, those who were NIPF owners in 2010 had been in possession of their forest for 14.4 years.⁶ Also, of those who were NIPF owners in 2010, 30.3 % were still part of this group in 1990. Hence, there appears to be a substantial share of relatively long-term owners.

The share of individual NIPF owners who owned (or co-owned) more than one forest property increased from 9.6 to 16.3 %.⁷ The average total size of the forest land (including productive forest land as well as forest waste land) owned by the same individual NIPF owner—distributed across one or sometimes several holdings, and owned exclusively or together with other co-owners—rose from

⁵ Co-ownership through marriage is a frequent example of gift.

⁶ Data on duration of forest ownership are available as far back as 1987.

⁷ As mentioned, for owners of more than one forest property, certain information in this section (the area and value of forest holdings, the distance between forest holdings and the owner's residential location, ownership share and years of ownership of forest property) is an average for their owned properties.

58.1 hectares in 1990 to 73.7 hectares in 2010. Again, this indicates a growth not only in multiple ownership but also in co-ownership.

The proportion between productive forest land and waste land for the privately owned properties shows a decrease in productive forest land from 80.6 % in 1990 to 78.0 % in 2010. Nevertheless, the average value of NIPF forest possessions skyrocketed from 1990 to 2010, from approximately € 22,000 to almost € 200,000 (albeit with significant geographical variations). This is attributable to a rise of both the market price and the standing volume. Several policy and law changes from the late 1970s to the early 1990s resulted in a deregulation of the forest property market (Hugosson and Ingemarson 2004), and this is in all likelihood what led to the mounting price levels. A similar value development has also been noted concerning agricultural land (Swedish Board of Agriculture 2013).

Forest properties can be owned by several individuals. The 2010 data include information on co-ownership, indicated by NIPF owner's share of the total ownership of their forest properties. A large majority, nearly two-thirds of the Swedish NIPF owners, co-owned their properties with others (for instance siblings or spouses), while around a third were the sole owners of their properties. Although data on co-ownership are not available for 1990, the increase in the number of NIPF owners along with the reduction in the number of privately owned forest properties and the increase in the average size of the NIPF-owned forest properties together indicate that there has been a growth in co-ownership of forest properties over the study period.

Demographic, Socio-economic and Geographical Profile of the NIPF Owners

The prevalence of female NIPF owners grew over the study period, from a fourth in 1990 to nearly 40 % in 2010, thus substantially reducing the dominance of male NIPF owners in terms of number of owners (Table 4). However, the numerical growth in female NIPF owners has not been accompanied by a corresponding boost in women's forest ownership in terms of property size or the pecuniary values of the forests they control. Female NIPF owners owned less forest compared to their male counterparts, in terms of both the average value and size of their forest possession. In 1990, the ratio of the average value of forest holdings owned by women was 79.9 % of that of male owners, a figure that had changed only slightly to 82.1 % by 2010. Concerning the average areal size of their forest possession, the ratio was 84.2 % in 1990 and 83.8 % in 2010.

The NIPF owners became older on average over the study period: the average age rose from 54 to approximately 58 years. Mirroring the ageing of the NIPF owners, the share of retirees (those aged >65) also increased, while simultaneously the share of younger owners (those aged <40) declined. The share of NIPF owners who were active in the labour force also declined, while the share of owners with 'other' occupational status (including retirement) grew. The NIPF owners' incomes

Table 4 Demographic and socio-economic characteristics of NIPF owners in 2010 and 1990. *Source:* ASTRID database

	1990	2010
Sex		
Men	75.1 %	61.5 %
Women	24.9 %	38.5 %
Age (years)		
Mean [Median]	54.0 [53.0]	57.6 [58.0]
<40	19.7 %	12.1 %
40–65	55.7 %	58.5 %
>65	24.6 %	29.4 %
Occupation		
Work	73.9 %	67.9 %
Other occupation	26.1 %	32.1 %
Wage income (€1000) Mean [Median]	19.8 [20.4]	31.8 [31.0]
Pension income (€1000), Mean [Median]	10.1 [7.8]	18.9 [16.9]
Level of education		
Low (primary/compulsory)	48.1 %	24.5 %
Mid (secondary)	35.9 %	45.2 %
High (tertiary)	16.0 %	30.3 %

(at 2010 price levels) from both wages and pensions rose over the period, most markedly with regard to pensions (as a result of the increase in retirees).

The changing residential pattern of the NIPF owners is clear in the increased share of metropolitan dwellers (Table 2), which is the only type of residential environment that has grown in prevalence. Simultaneously, the shares of NIPF owners living in other types of residential environments have declined. It should be noted that this is most likely only partially the result of migration among NIPF owners. The entry of new individuals into forest ownership—for instance, people who have inherited forest land or city dwellers who have invested in forest land—is also most likely an important part of the explanation.

The changing residential patterns are closely linked to the increased distance between NIPF owners and their forest holdings. The average distance between the residential location of the NIPF owners and their forest holdings changed from 37.1 km in 1990 to 58.3 km in 2010. The distribution of distances has clearly developed towards longer distances over the 20-year study period (Fig. 1); yet, a majority of NIPF owners lived on or within a few kilometres of their properties in both years. The median distance was 0.3 km in 1990 and 2.2 km in 2010. Although this constitutes as sizeable change in relative terms, in 2010 half of the NIPF owners still lived within walking distance of their forest properties. It is important to bear in mind that the increase in mean and median distance may be partially explained by co-ownership, whereby for instance one co-owner resides on the forest holding and the other lives in a distant metropolitan area.

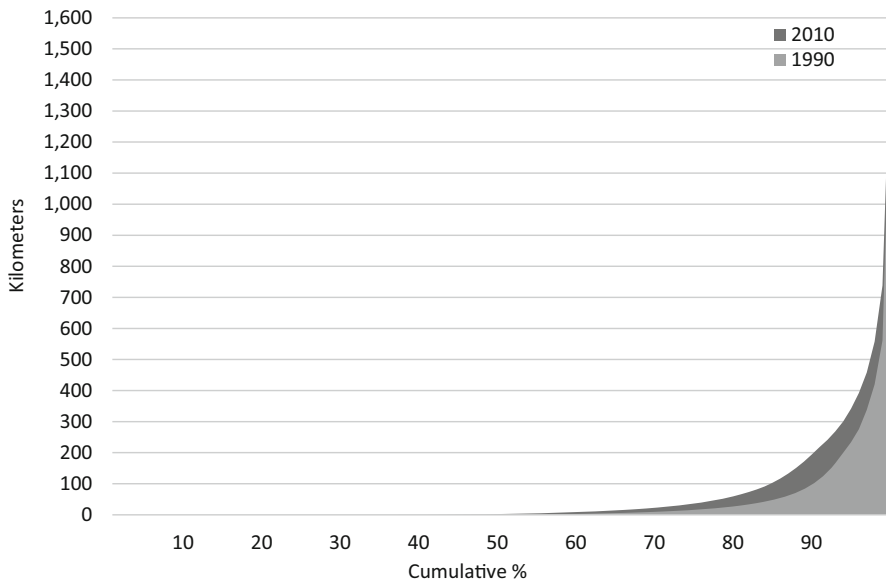


Fig. 1 Mean distance^a (cumulative %) from NIPF residential location to forest holdings in 1990 and 2010. *Source:* ASTRID database. ^aForest owners whose distance to their forest property is zero are resident in the same 100 metre “pixel” as their property, i.e. are resident on the property

The addition of new owners⁸ to the incumbent NIPF owner group has brought about various changes. Although larger regional centres were the most common type of residential environment for both ‘new’ owners (who possessed forest land in 2010 but not in 1990) and ‘old’ owners (who possessed forest land in both years), there were also inter-group differences. It was more common among ‘new’ owners to live in metropolitan areas, 23.6 % compared to 17.2 % for the ‘old’ owners. For the latter group, it was more common to live in residential environments further down the urban hierarchy, ranging from regional centres to rural areas. Moreover, the revealed propensity for migration was higher among the ‘new’ NIPF owners: the share who had moved to a different municipality during the study period was 24.1 % for this group compared to 9.8 % for the ‘old’ NIPF owners, whose residential patterns were more sedentary.

A key issue in the present paper is geographically based changes among the NIPF owners. One of the key transformations over the 1990–2010 study period is the changing residential patterns. The growth in non-residential forest ownership is a reflection of the ongoing process of urbanization. The share of NIPF owners who lived in a different municipality than where their forest holding/s were located rose from 21.3 % in 1990 to 27.9 % in 2010. As a reflection of the shifting of the residential patterns of both residential and non-residential NIPF owners towards

⁸ Individuals registered as forest owners in 2010 but not in 1990 may hypothetically have been forest owners at some point in the period between these years. Similarly, it is possible that owners registered in both years have not owned forest continuously over the period.

more urban environments, the distances between the owners and their forest holdings have also grown. The mean distances from the NIPF owners' residential location to the location of their forest holdings obviously (per definition) differed substantially across these two sub-groups. In 1990, the average distance was 3.7 km for residential NIPF owners and 160.7 km for non-residential NIPF owners. By 2010, the figures had grown to 6.0 km for residential owners and 193.7 km for non-residential owners. In relative terms, the increase in mean distance was more dramatic for the residential owners (62.1 %) than for the non-residential owners (20.5 %). Among the resident NIPF owners, a vast majority (73.0 % in 1990 and 71.9 % in 2010) lived not only in the same municipality but also in close proximity (within 1 km) to, or on, their forest properties.

Men dominated among residential as well as non-residential NIPF owners, particularly so among the former (Table 5), despite the development over the period towards higher shares of women in both groups. Nevertheless, the sex composition has changed substantially over time, particularly among non-resident NIPF owners, where the composition came rather close to that of the general population in 2010, with 45.0 % women. In 1990, resident NIPF owners were on average 3 years older than non-resident NIPF owners, but by 2010 the age structure in the groups had converged and this difference had disappeared. Thus, particularly in the non-resident sub-group, there appears to have been an entry of older people into, and/or exit of young people from, forest ownership.

The occupational status within the residential and non-residential sub-groups shifted over the study period. The share of workers declined in both groups over time, while the share of people with other occupations, including retirement, grew larger. The share of workers was higher among non-resident NIPF owners in 1990 and among resident NIPF owners in 2010. Wage and pension incomes rose over the period across both groups. Non-resident owners had higher incomes in regard to both these sources of income and in both years compared to resident owners. Despite a partial convergence over the study period, in 2010 the non-residential NIPF owners had around 25 % higher average wages compared to the residential NIPF owners. This is likely to be connected to level of education, and therefore the types of jobs for which individuals within the respective groups are eligible. Despite the previously mentioned considerable educational increase, which occurred among residential as well as non-residential NIPF owners, there were also marked differences across the groups. The level of education was distinctly lower among resident NIPF owners than non-resident NIPF owners, and conversely the share of individuals with tertiary education was much higher among non-resident than resident owners.

Over the study period, the prevalence of NIPF owners born outside Sweden shifted from a slightly higher level among non-residential owners in 1990 to a higher prevalence among residential owners in 2010, possibly related to international migration to rural areas in Sweden (Eimermann 2015). However, the shares of foreign-born NIPF owners were nevertheless small in both groups.

The current residential patterns of the groups were of course distinctly different given the criterion used for defining the groups. Hence, it is unsurprising that it was much more common for non-residential owners to live in metropolitan areas, and

Table 5 Demographic and socio-economic characteristics and residential patterns of residential and non-residential NIPFs in 1990 and 2010. *Source:* ASTRID database

	1990		2010	
	Non-residential	Residential	Non-residential	Residential
Sex				
Men	61.9 %	78.7 %	55.0 %	64.0 %
Women	38.1 %	21.3 %	45.0 %	36.0 %
Age, Mean [Median]	51.5 [51.0]	54.5 [54.0]	57.5 [59.0]	57.5 [58.0]
Occupation				
Work	78.1 %	72.7 %	66.7 %	68.3 %
Other	21.9 %	27.3 %	33.3 %	31.7 %
Wage income (in € 1000 s), Mean [Median]	26.0 [24.5]	17.6 [18.8]	39.0 [34.9]	28.7 [29.6]
Pension income(in € 1000), Mean [Median]	12.1 [9.4]	9.7 [7.5]	23.0 [20.2]	17.2 [15.8]
Level of education				
Low (primary/compulsory)	27.3 %	54.1 %	13.5 %	28.7 %
Mid (secondary)	37.6 %	35.5 %	37.0 %	48.4 %
High (tertiary)	35.1 %	10.4 %	49.5 %	22.9 %
Country of birth				
Sweden	98.6 %	98.8 %	98.3 %	97.8 %
Outside Sweden	1.4 %	1.2 %	1.7 %	2.2 %
Residential environment				
Metropolitan area	34.6 %	12.4 %	41.1 %	14.2 %
Larger regional centre	44.8 %	47.0 %	41.2 %	46.0 %
Small regional centre	14.3 %	26.6 %	12.7 %	26.3 %
Small region	6.3 %	13.9 %	4.9 %	13.6 %

for residential owners to live in rural ‘small regions’.⁹ However, for both groups and both years, the most common type of residential environment was larger regional centres. Over the study period, the distribution across different living environments of the residential NIPF owners remained relatively stable. As for the non-residential NIPF owners, the only living environment whose share grew was metropolitan regions, thus indicating a process of urbanization to larger urban areas. This trend is also present among residential owners, although the changes are of a lesser magnitude. It was also considerably more common for the non-residential owners to have migrated at some point during the study period. Among the non-residential owners, the share of ‘movers’ who had changed their municipality of residence

⁹ However, it is not uncommon for NIPF owners residing in urban areas to own forest land outside the city but within the same municipality; these NIPF owners are classified as residential.

between 2010 and 1990 was 31.0 %, compared to 15.6 % among the residential owners, among whom ‘stayers’ dominated more strongly.

Residential owners had a longer duration of forest ownership, as indicated by whether they had status as NIPF owners in both 1990 and 2010. This was the case for a third (34.1 %) of the residential NIPF owners and a fifth (20.8 %) of the non-residential NIPF owners. While a vast majority of both groups owned only one forest property, the prevalence of multiple forest properties ownership increased over the study period, particularly among residential owners. By 2010, the share of NIPF owners who owned more than one forest property had grown to 17.5 % among residential NIPF owners and 13.2 % among non-residential NIPF owners from relatively similar starting levels of 9.7 and 8.1 %, respectively, in 1990. Residential owners were more commonly sole property owners, and also controlled larger shares on average of co-owned forest holdings, whereas co-ownership was more common among non-residential owners. The share of NIPF owners who were the sole owners of their properties was on average 39.3 % among residential owners and 27.4 % among non-residential owners.

As shown in Table 6, in 1990 the residential and non-residential NIPF owners had equally large average forest possessions. This had changed by 2010, and non-residential NIPF owners had significantly larger forest possession than residential owners. However, the table shows the average size of forest holdings. As non-residential NIPF owners more often co-owned their forest holdings with siblings, spouses or other persons than residential owners did (72.6 and 60.7 %, respectively), the average owned forest area per residential NIPF owner was similar to that of non-residential NIPF owners. With regard to the value of the forest possessions, the considerable growth over the study period is seen in both groups. Again, the higher mean value among non-residential compared to residential NIPF owners in 2010 is a result of higher co-ownership among the former.

Concluding Discussion

Forests are a key feature of the Swedish and the Northern European landscape, and they provide a multitude of goods and services of societal relevance, for instance ecological, economic and social functions. Although forest land is largely owned by non-industrial private forest owners (NIPF owners), the implications of forest management are of relevance beyond their immediate circle. Given that various NIPF owner sub-groups differ in their motives for forest ownership, dependence on forest revenues and views on forest values, a changing profile and composition within this group could be expected to lead to different forest management practices (Urquhart and Courtney 2011) which might in turn impact land use patterns and landscape features. Stakeholder groups who might be affected can be found, e.g., within the realms of ecological conservation, economic activities and recreational activities.

One important compositional change among the Swedish NIPF owners in the period 1990–2010 is a growing group of non-residential owners. This group features higher shares of women and of those with high education and/or high income. Co-

Table 6 Mean area and mean value of total forest possession (one or more properties) for residential and non-residential NIPFs, in 1990 and 2010. *Source:* ASTRID database

	1990		2010	
	Non-residential	Residential	Non-residential	Residential
Area (ha), Mean [Median]				
Productive forest land	45.5 [20.0]	47.2 [22.0]	63.3 [23.0]	54.7 [22.0]
Forest waste land	12.4 [2.0]	10.9 [2.0]	21.5 [3.0]	14.0 [2.0]
All forest land (total)	58.0 [23.0]	58.1 [26.0]	84.8 [28.0]	68.7 [25.0]
Value (€ 1,000 s), Mean [Median]				
Productive forest land	20.4 [7.8]	23.0 [10.2]	193.0 [75.1]	188.8 [82.0]
Forest waste land	0.1 [0.0]	0.1 [0.0]	2.9 [0.5]	2.1 [0.4]
All forest land (total)	20.5 [18.8]	23.1 [10.3]	196.0 [77.1]	190.0 [83.3]

ownership of forest holdings is also more common than among residential NIPF owners. The changed characteristics of the NIPF owners also play into the tension between different forest values such as productivity, conservation and social values. Residential NIPF owners tend to assign greater importance to the economic aspects of forest management, whereas the higher income and education level of non-residential NIPF owners is likely to imply less economic dependency on forest-related income. Therefore it is possible that they are able to ‘afford’ to emphasize values such as recreation or conservation. It could be argued that the trend towards increased distance between the NIPF owners and their forest holdings, increased female ownership, less economic dependence on forest revenues, and continued co-ownership reduce the economic motives for ownership. However, the immediacy of the impact on forest management practices is not evident. In the 20-year period (1990–2010) described in this study, all these changes concerning forest owners have taken place while at the same time gross felling has increased by 32 %, the standing volume by 13 % and the annual increment by 21 %. A likely partial explanation is that forest owner associations (FOAs), who represent around a third of the NIPF owners (LRF 2016), are focused on production. Another explanation is that NIPF owners can hold and balance seemingly conflicting values, for instance their concern for biodiversity can be accommodated while simultaneously the level of production is maintained (Nordlund and Westin 2011).

A further major change is increasing co-ownership, suggesting that control over forest land is a question for potentially intricate clusters of individuals. The co-owners may differ across gender, age, education, residential location and other individual traits that tend to be associated with variegated forest values and management strategies. Other factors that might complicate the decision making are, for instance, varying economic dependence on the forest among the co-owners, and whether they live at a distance from each other and from the forest property. For the owners this might lead to difficulty deciding on a common strategy, or inefficiency, for example hampering the inclination to harvest. Thus, the co-owners may need to find common ground across different forest ownership objectives, values and management strategies. For forest-related agents such as FOAs, forest

industry and policymakers, it might be difficult to establish how to target their communication and activities. This suggests that their targeting strategies have to change, and that it can become necessary to balance different demands stemming from co-owners of forest property.

An additional aspect of co-ownership is related to increasing longevity in Sweden, in most developed countries. Concerning NIPF owners, it can be assumed that generational shifts or selling forest property will be postponed. However, forest holdings will eventually be transferred to new owners, and in the case of handing them over to children it is not unlikely that co-ownership will continue to increase.

While there are differences between the NIPF owners and the general population in terms of e.g. sex composition, level of education and residential patterns, the gap is narrowing. This could potentially bring about augmented similarity in views on forest values, such as an increased attentiveness among NIPF owners to the importance of ecological issues, as ecological values have been found to be stronger among the general public compared to NIPF owners (Eriksson 2012). Moreover, ecological values are also often advocated by women more than men. However, while female NIPF owners have become more prevalent it is questionable to what extent this could entail a change in the attitudes toward forest management, since female NIPF owners are not on a par with their male peers in terms of the forest area and forest values they control. In this sense, it is premature to speak of a feminization of forest ownership.

The trend towards an increasingly urban NIPF owner profile could be economically disadvantageous for the local, rural community, but not necessarily so. Non-resident NIPF owners can for instance be more likely to buy management services (such as thinning) from local entrepreneurs, whereas resident NIPF owners are more likely to carry out these activities themselves. The non-resident owners thus contribute to employment and tax revenues to the communities in which the forest is located. On a more general level, the changing residential patterns of NIPF owners imply the people who own a great deal of the forest resource in rural areas do not live in these areas themselves. Thereby control over the management of forest land, the related landscape effects, and by extension a substantial aspect of rural development, are transferred from the local rural level to actors and forest owners in urban settings. Rural development strategies will need to be adapted to these new circumstances, for instance through extending the spatial reach of participation in rural development initiatives into urban areas. Through their connection to different places in rural and urban areas, NIPF owners can also potentially be seen as contributing to developing the relationship between different geographies.

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