

SMALL-SCALE FAMILY FOREST (SSFF) OWNERSHIP IN THE UNITED STATES: RATIONALE AND IMPLICATIONS FOR FOREST MANAGEMENT

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ABSTRACT

This paper attempts to provide rationale for the rise and expansion of small-scale family forestry. The historical aspects of the small-scale forests are also briefly reviewed. The paper particularly attempts to explain the reasons for the increasing number of nonindustrial private forest ownerships with smaller holding size or private forestland parcelization. The main arguments are that small-scale family forestry expands as economic needs are reflected in the structure changes in demand for and supply of forest products and services. The cause of the rising number of small-scale family forestry should be investigated from the vantage point of changes in the demand side of forest products and services, while the causes of shrinking holding sizes of forestland owners should be examined from the supply side of forestland. Small-scale family forestry is behaving more like forestland consumers than timber producers. So the efficiency of small-scale family forestry is reflected in the efficiency of forestland consumption of non-timber purposes for transaction costs savings. It is suggested that policy analysts and private stewardships should extend their focus on analysis of production to consumption and distribution efficiency.

INTRODUCTION

Land ownership is the key for many social-economic and environmental issues. Forest ownership is particularly complicated and diversified. A unique ownership class in forestry is the non-industrial private forest (NIPF) landowner. The NIPF owners and their purposes of owning vary greatly, so that some argued that the name NIPF is not what it is supposed to be (see, Finley et al., 2001; Wiseman, 2003). The number of NIPF owners is huge, and their behaviors are important in forestry. In the United States an estimated 9.9 million private forestland ownerships units held about 390 million acres of forestland in the mid-1990s. About 94% of the private ownerships are individuals (often called non-industrial private forest--NIPF owners) collectively holding 59% of the private forest land (Birch 1996), and supplying about half of the country's round wood timber supply (this number is expected to rise to 60% by the year 2030 according to Harrell 1989).

For several decades, there have been many discussions, meetings, articles and arguments (e.g., see Clawson 1957, Binkley 1981, Cubbage 1983, Row 1978, Siry 2002) that see NIPFs as "problems": (1) individual utility maximization that may not be consistent with social objectives; (2) low efficiency of small scale forest management; (3) ignorance of forest management and its application; (4) reluctance in forest investment and timber harvesting. Except for the first problem, these issues are mainly related to the small scale. However, the reality is, except for

the non-industrial private forests owned by Timber Investment Management Organizations (TIMOs), the majority of NIPFs are small scale: 40% owned less than 10 acres, 96% owned less than 100 acres (Birch 1996). Since we just attempt to examine small-scale forest ownership, small scale family forest (SSFF) is used to distinguish the family-owned from TIMOs in this paper.

The "problems" recently have received even greater attention because of accelerating parcelization—the reduction in size of forestland ownerships that are resulting from the division of properties during land transfer (forestland parcelization mainly refers to the ownership subdivision, rather than forestland fragmentation which refers to the breaking up of large tracts of forest into smaller fragments). In the USA, the largest forestland owners that primarily aim for timber production remain intact for now, but the acreage in midsize woodlots is shrinking and the bottom class in growing (Birch 1996, DeCoster 1998). For example, from 1978 to 1994, all private timberland ownerships in the U.S. South increased by nearly one-third, or 1.1 million units. Acreage held in tracts of <10 acres increased by 51%; 10- to 99-acre tracts (+25%); 100- to 499-acre tracts (-15%); 500- to 999-acre tracts (-9%); 1,000+-acre tracts (+9%) (Moulton and Birch 1995). Preliminary results from the most recent survey by USDA indicated that the total of family owners had increased by 11% (from 9.3 million to 10.3 million) from 1994 to 2002 (Forest Inventory and Analysis: National Woodland Owner Survey 2003). Currently, NIPF owners hold an average of 24 acres per individual, and it is expected the average size will drop to 17 acres by 2010 (Tyrell and Dunning 2000).

In order to design appropriate policies that direct NIPF to effectively manage their land to meet social goals, we need to understand these landowners and their objectives and behaviors. Many studies have been conducted in these areas (Greene and Blatner 1986, Romm et al. 1987, Hyberg and Holthausen 1989, Kuuluvainen 1989, Newman and Wear 1993, Kuuluvainen et al 1996, Karppinen 1998). But it is still not clear, and rarely examined, why SSFF appear in the first place, survive, and even expand. In this paper we attempt to provide rationale for SSFF expansion. In particular, we address why the number of NIPF increase with smaller holding size. The next section provides some historical background on forestland ownership evolution in the U.S., followed by possible economic explanation of SSFF expansion. Then we question the implication for forest management, with final discussions. Our main conclusions are that SSFF expand as economic needs as well as pursuing economic efficiency since SSFF owners behave more like forestland consumers than timber producers. We suggest policy analysts and private stewardships should extend their focus on analysis of production to consumption and distribution efficiency.

HISTORY

The share of SSFF varies greatly from country to country. History context explains a great part of the patterns. Ownership as an institutional setting has some path dependence and is of institutional rigidity. Alexander and Hall (1998) pointed out that

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the major impediment to small-scale forestry in Australia is the lack of a farm forestry culture of long history like in Scandinavia and Japan. The present forest ownership in the U.S., a result of the over three hundreds years of development, cannot be understood without considering that long history. The earliest politicians in the U.S. dealing with land ownership had great influence on the current pattern. For instance, the first objective of the politicians was to build economic and military strength in colonial times. So the usual objective in New England was to establish compact settlements of small, family-size farms. The values of a free market economy and competition (a fear of monopoly) play an important role in shaping forest ownership throughout history. The American Revolution and the demographic traditions which it fostered strengthened the trend towards small ownership.

Since England started to claim all of North America when it colonized the New World, the Crown made large grants of land to the London Company, the Plymouth Company, and later to other individuals and groups. Gradually, the lands of the 13 original states of the Union had numerous individual ownerships. As settlement extended westward after the Revolutionary War, the territory beyond the Appalachians was passed to settlers as land bonuses to war veterans and grants and sales (Clepper and Meyer 1965). After the United States purchased Louisiana and obtained all the western territory, one of the most significant policies was the Homestead Act by Congress in 1862, designed to quickly occupy and populate the new country. After a clamor for ever-increasing liberalism in the disposition of these lands, groups calling for free distribution of such lands were formed from 1830, leading to a demand of the Free-Soil Party. The Act allowed anyone to file for a quarter-section of free land (160 acres) if some improvement was made within 5 years. The improvement activities include building a house, digging a well, breaking (plowing) 10 acres, fencing, or actually living there. Additionally, one could claim a quarter-section of land by "timber culture" (commonly called a "tree claim"). This required that you plant and successfully cultivate 10 acres of timber (Hibbard 1965).

Another aspect needing to be noted is its strong link to agricultural farming. That is not a surprise since forest management can be viewed as part of broadly defined agriculture. "Wood is a crop. Forestry is tree farming." (Gifford Pinchot). Farmers were thought to be the most desirable owners of private forestland and could devote the most care and attention on the management of their woodland lots. In 1920, there were 6.5 million farms in the U.S. with average size of only 149 acres (USDA 1997). The numerous farms could be an important factor to numerous individual forestland ownerships. Farm woodlands also contributed significantly to the total farm income; meanwhile existing farms justify economic efficiency of holding some forest land. Combining forestry and agricultural operation allow financial diversity and efficient use of labor and capital. Even today, farm forestry is still important for the farmers. For example, Selter (2003) observed that farms holding larger forest land more likely survive in Germany: during the period from 1971 to 1995, 90% of the enterprises which manage more than 5 ha (12 acres) forest land survived. These farms were not only able to continue as forest enterprises, but also as mixed farms, retaining their agricultural land. Farms with smaller forestland holding could not survive.

The public ownership of forestland occurred in the late 1800s, and by the middle of 1900s, the private-public division of forest landownership was firmly established. Private industry firms expanded their forestland ownership dramatically in the first half of the 20th century and then gradually stabilized (see Table 1). The biggest change since the 1950s has been within the non-industrial private forests, particularly the shift from farm forest to other kinds of NIPFs as individuals outside traditional forest business started to own more forest land.

Table 1: Timber land ownership in the U.S., 1952-2002. Sources: Forest Resources of the U.S., 1992, 1997, 2002. Unit: 1000 acres.

Year	Public	Industry	NIPF		
			Total	Farmer	other private
1952	145,436	58,979	304,441	172,781	131,660
1962	146,157	61,434	307,528	143,645	163,883
1977	138,169	68,937	285,250	114,485	170,765
1987	131,025	70,347	283,564	95,791	187,773
1992	131,493	70,455	287,605	82,484	205,121
1997	145,967	66,858	290,840		
2002	147,280	65,596	290,663		

Note: Data regarding the ownership between farmer and other private are not available probably because it is becoming more difficult to distinguish the farmers and non-farmers.

ECONOMIC RATIONALE

The Efficiency of SSFF

The efficiency of the SSFF has been questioned for a long time. With the exception of Sutton (1973), a majority of studies (e.g., Clawson 1957, Wilstrom and Ally 1967, Row 1978; Noer 1975; Gardner 1981) found that the small parcel significantly increases the production costs per unit in harvesting operation, plantation, and management. Since NIPF in general is smaller in size than industrial forest, it is believed that NIPFs have lower economic efficiency than industrial private forests (Doll and Orzen 1978, Cabbage, 1983). Studies have shown that timber supply has a positive relationship with holding size (e.g., Binkley 1981, Greene and Blatner 1986; Romm et al. 1987). Towell (1982) even claimed that private nonindustrial forestlands are producing only half or less of what they are capable under a conservative estimate. More recent surveys also showed that NIPFs generally are less intensively managed (see Siry 2002). Only a very limited number of studies indicated the holding size has only slight influence on timber supply (Dennis 1989, Hyberg and Hothausen 1989; Kuuluvainen 1989).

It is not a surprise that NIPFs have lower efficiency in terms of timber production based on the economy of scale. However, the number of owners with decreased holding size continues to rise across the world. As we know, manufacturing began with small family owned firms also, but smaller firms were gradually replaced by firms with growing scale through time. In agriculture, although family farms are still important in North America, the farm size has been dramatically increasing, from the average size of 149 acres in 1920 to 500 acres in 1997 (USDA 1997). This trend is more or less same in Europe. What difference is there between agriculture and forestry? Some economic rationale of small scale forestry must exist. Otherwise, the NIPFs cannot survive for centuries, and even expand.

One explanation for the larger number of small land holdings is related to the partitioning of forestland from generation to generation. If dividing the forestland dramatically reduces the total value (because of low efficiency), there is no reason why it should proceed. Why does it not in agriculture or in other industries? According to a survey in Florida by Jacobson (1998), 70% of

the owners acquired their land through purchase. Kennedy and Roche (2003) also found that 64% of landowners acquired their land through purchase or trade in Alabama. This is a relatively large number considering that traditionally much of the private forestland used to be inherited.

Another common explanation is the nature of multiple uses of forests and the increasing number of landowners with non-timber objectives: residential use, aesthetic enjoyment, timber production, hunting, moral commitment, nature conservation, estate investment, and so on. This explanation may be partially right. But to economists, it is far from enough. We have multiple needs and growing number of wants, but we get more and more from markets since the specialization and market development are more efficient. So the fundamental reason for increasing number of SSFF must lie in its efficiency. But the efficiency must be understood broadly. More timber produced from the same land is just one aspect of efficiency. Efficiency includes the stages of production, distribution and consumption. If one is willing to pay higher rent than another, that means the former's holding can generate higher value (at least the private value) that may come from the saved cost, or increased products value, or saved transaction costs.

Why Are More People Holding Forestland?

Regarding the increasing number of the SSFFs, demand analysis may be more appropriate: 1) the total population or households increase; 2) change in preferences, and more people are able and willing to hold some forest land due to the rise in income and probably general deterioration of environments. The most important characteristic of such demand is not using land to produce timber, but using forestland to produce consumer goods.

Holding or not holding a piece of forestland depends on goods and services generated from the forest land that satisfy an individual's needs and the transaction costs he must spend to acquire these goods and services through the market if he does not own the land. Transaction costs are determined by the numbers of trade and per unit cost of trading. If the transaction costs for a forest product are extremely costly relative to other factors, probably owning the firm by that forest owner is more efficient. Owning a piece of forest land is more efficient than buying the multiple goods and services from the land when demands for these goods and services is strong and the transaction costs to acquire these goods and services via market are high. Alternatively, selling the service generated from forest land is not as efficient as to sell the land from the owners. Centuries ago, landlords hired labor, now in general capital hires labor. But in the information technology industry, it is often that technological labor hires capital, at least a few years ago. Fundamentally, the purposes of holding SSFFs are to save transaction costs from different perspectives (Zhang 2001):

- **Capital transaction costs.** Using borrowed funding to invest in SSFF is not likely to be attractive since SSFF may need to pay higher capital costs compared with a large-scale business or forestry operation. But if the owners have extra capital, the owners may still be better off when the return rate is higher than the deposit interest rate, but lower than the interest rate borrowed from banks (The gap is exactly the transaction costs of capital). The prevailing interest rate (loan) based criterion of investment for SSFF owners may not be very well grounded.

- **Labor transaction costs.** The transaction costs can also be divided into fixed and variable costs, so the relative transaction costs for searching jobs (or hiring) are relatively high for one person's partial labor force. Farmers are more likely to own some SSFF since it is more costly when only part-time labor (seasonal jobs) is in transaction. In addition, the opportunity cost of occasional and self-chosen time could be very small, even

negative: the work per se may be for recreation. Minimum wage (or prevailing wage level) is largely irrelevant for this category of work. Timberland management is often fun and satisfying.

- **Forestland transaction costs.** High taxation and difficulties in measurement between the land transactions lead to higher transaction costs. Transaction costs may be relatively lower between relatives or both sides know the land very well, so it is quite often that NIPFs are transferred between relatives who become new NIPF owners rather than between strangers and private industrial forest owners. The value of culture and heritage of the forests for the current owner is often higher than potential sale prices. Willingness to accept is higher than willingness to pay, so the owners are more likely to keep the land than to buy the same kind of land.

- **Forest product (wood and non-wood) transaction costs.** The transaction costs for timber are high. As Vardaman (1988) argued, "no market I know of is like the timber market. A phone call can get you a firm price on many common items: stock, bond, groceries, clothing, commodities, autos, and so on. But a phone call to 20 timber buyers will likely get you 20 different estimates, and each buyer will want to see your timber before making a firm offer". It is still moderate compared to recreation goods. Demands for non-timber services from forests are increasing rapidly. It is not difficult to imagine how costly it is to go through the stages of searching, contacting, negotiating and implementing the exchange on these products, such as renting a summer house, hunting access from other owners. Recreation products generated from the forests cannot be moved and do not have standards. Asymmetric information is substantial, so when such demand become frequent, likely owning the land used for own production and consumption is more efficient than partially "buying" the services produced by others.

The above analyses are only illustrating exercises. The owners may have all the characteristics, saving various transaction costs mentioned above. Farmer owners accounted for a majority at an earlier time, so saving transaction costs of labor could be a major reason for them, but they are being gradually replaced by saving transaction costs of recreational services for other kinds of owners. Currently the most fundamental drive for increasing SSFF comes from more wealthy individuals who are able to buy a piece of land as a second home for both seasonal residency and recreation, or for investment purpose (the appreciation of the land value, not the timber). Evidence shows that more and more retired people and white-collar professionals hold SSFF. The investment and timber income is the 6th and 7th place in the list of their holding reasons (Tyrrell and Dunning 2000, p. 10).

Based on the above argument, some general conclusions for SSFF owners can be made between owning or not-owning: most likely SSFF owners have some saved capital or stable and high income, at least free of debt unless he/she is a farmer and expects to use forestry as seasonal employment; retired or aging people who have not much opportunity costs to their time, but enjoy the bigger space and peaceful living in the forest. SSFF owners have some tendency of continuity from generation to generation since significant transaction costs are higher to other owners.

Why Hold Less Land?

The shrinking size of forestland holdings can be explained from the supply side. Without considering supply or assuming constant price, wealthy individuals would like to hold more forestland regardless of whether it is for hunting purposes or serves as a second home. But increasing demand from OTHERS together with the decreasing supply (land is fixed) due to other competitive uses drive up the forestland price, particularly at suburban areas.

We would contend that smaller (or same) family size is becoming less affordable (or not desirable) to hold the increasingly valuable but physically static land—the opportunity costs cannot justify the marginal value for them. In other words, the marginal value increased by the wealth cannot catch up to the land appreciation (opportunity costs). Hence, holding smaller land is rational even without considering taxation reasons (Fig. 1).

Mehmood and Zhang (2001) also found that the tax variable was not statistically significant in parcelization. But we should note that for timber production, the holding size is based on the production efficiency of timber production: holding size may increase further. For the consumption purposes of many SSFF owners, the optimum size is based on consumption efficiency. So it can co-exist that the scale of forestland holding for timber production increases, while the scale of SSFF declines. The small sizes become more directed towards non-timber purposes for the owner, while the larger size holding still serve for timber production.

This is consistent with evidences from the USA, Finland, and other countries. In the USA, the largest parcels remain intact for now, but the acreage in midsize woodlots is shrinking and the bottom class is growing (DeCoster 1998). The number of small holders with less than 100 acres has increased since 1978; the medium holding size holders has declined (Birch 1996, p.14). In the Southern U.S., tracts of fewer than 10 acres increased by 51%, 10- to 49-acre tracts increased by 83%, and 50- to 99-acre tracts by 18%; but the holdings between 100-1000 acres have declined by 15%; tracts over 1000 acres have increased by 9% (Moulton and Birch 1995). Bliss and Sisock (1998) also found that the share of private forestland owned by the largest 1% of the owners had increased from 51% to 58% from 1978 to 1993 in Alabama. In Finland the number of medium-sized forest holdings (20–50 ha) is decreasing, and the number of small- and large-sided holdings is increasing (Ripatti 1999). This is not a surprise since increasing size may increase efficiency in terms of timber production, while reducing size may increase efficiency for consumption of forest land for non-wood production purposes.

Relationship Between Owner's Characteristics and Holding Size

As mentioned above and as shown in many other studies, there is a strong relationship between characteristics of the owners, the purposes, and the size of owning forests. Figure 2A shows the probability of holding size and for the given owner (the purpose). This is only for illustrating and speculation purposes. The owners may have multiple objectives and can be female as well as professional or retired. For instance, rural farmers have diversified objectives for owning forests, but self-employment likely could be the most important purpose. Farmers may hold various sizes of forests, but medium size is most appropriate and the variance is bigger since they have more multiple objectives. Comparatively, the holding size for residential purposes is most likely to be small, while for recreational purposes could be a little bigger. The most recent trend is that the number of rural farmers is decreasing as the descendents of farmers live increasingly in urban areas and depend on sources of income other than primary production, so the employment purposes of forest holding will decline. In addition, the small and medium size of the holdings historically had a purpose to provide a seasonal labor force for logging. However, the need for this labor force was more short-lived than had been anticipated. Increased mechanization of logging meant that the seasonable work was gradually replaced by professional forest workers; more recently these workers have been largely replaced by modern harvesters. So the number of rural farmers holding forests is decreasing (Table 1). Data regarding the ownership patterns between farmer and other private landowners are not available since 1997, probably because it is becoming more difficult to distinguish the farmers and non-farmers. Table 2 shows the change in land ownership structure.

It is interesting to see the frequency distribution of parcel size from Drzyzga and Brown (2002) (Fig. 2B). The distribution of owners and their objectives leads to the probability (frequency) of holding size (Fig. 2A). For instance, the efficiency size for residential purposes is most likely small, while recreational purposes (e.g., hunting) could be a little bigger. Theoretically, joining the distribution of the owner objectives and the distribution of the holding size for each objective will get the whole holding size distribution.

IMPLICATIONS FOR FOREST MANAGEMENT

Is the boom in forest owners really—a bust for forestry? The patterns of forest ownership change have some relation with forest management (e.g., Stanfield et al. 2002), but what kind of impacts need to be carefully assessed? The following aspects might be our major concerns and questions.

Conversion to Non-forest Use and Fragmentation?

Although forest fragmentation (large and contiguous forest landscapes broken into smaller, more isolated fragments) differs from land parcelization (larger number of owners with smaller land), they are definitely related. The United States loses more than half a million acres of privately owned timberland to development each year, and SSFF was often claimed as the cause and/or victim. On the one hand, SSFF could be easier to convert to non-forest use if other land use values (e.g., market value for development) are higher than the owner's values in forest use. On the other hand, SSFF owners may preclude forestland from other uses since the SSFF owners value the forest use more than timber, which may increase competitiveness with other uses. So this question may be more complicated than thought. Parks or urban forests can be found in many big cities. Can we find urban agriculture? Forest land value is appreciated by a rising number of SSFF owners who value the land more than the timber and timber productivity.

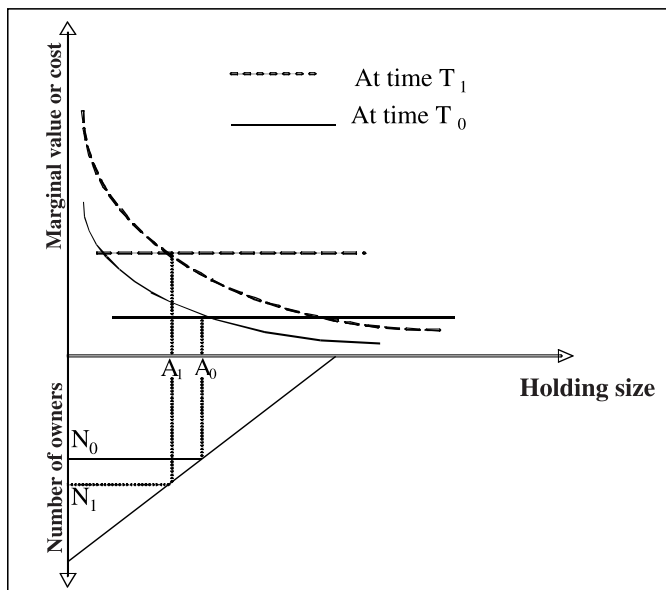


Figure 1: Shrinking holding size and increasing number of forestland owners

Drzyzga and Brown (2002) found more small scale private forests lead to higher forest cover.

If we look at a long history, the multiple uses of forests, which may be less intensive in terms of timber production, reverse the forest decline to forest expansion. The higher population density, if under given socio-economic circumstances, increases the absolute land value in every use, but probably most for residential and industrial use value. More land either in agriculture or in forests will likely be converted to residential and industrial uses as the economy develops and the population grows. But it is unclear between agriculture and forest land. If forest land is used more than for timber production, the relative value for forestland may rise faster than agricultural use. If that is the case, SSFF owners may play a positive role in saving some forests. Witness New York State, where 63% was forested in 1780, 25% in 1880 and 63% again in 1980 and the percentage is even higher today (cited from Larson 2000). Therefore, SSFF might play a bigger role for the increase since they consume the forest in situ and do not care about the profitability generated from wood production.

Reduced Management Intensity?

As introduced above, a majority of evidence supports that SSFF reduce the forest management intensity in terms of timber production. Typically, as the average parcel size declines to some threshold, owners are less likely to actively manage their forests for sustainable timber. The new U.S. Department of Agriculture Assessment clearly shows such a situation (Fig. 3 and Table 3)

Table 2: Changes in Private forest ownership and percentage of total forest acreage

	1978		1994		2010	
	Ownerships	Percent	ownerships	percent	ownerships	percent
less than 100	7, 156	21.60%	9, 274	31.60%	11, 550	38.00%
100-499	538	30.80%	559	23.30%	570	18.80%
500 and above	63	47.60%	68	45.10%	68	43.20%

Probably there are three major reasons causing the reduced management intensity: 1) Intensive management is difficult and more expensive on smaller tracts that are usually owned by small forest land holders; 2) multiple objectives of the SSFF owners prefer less intensive management that can lead to more non-timber value of the forests at the expense of timber production; 3) the owners do not know how to improve the management. However, evidence and studies also support that timber production and profit maximization is still the objective of the NIPFs (McComb 1975, Newman and Wear 1993). In addition, SSFF prefer hardwood and longer rotation of timber management (Fig. 3). Can we say this is less intensive management? Maybe it is less intensive in terms of timber production, but more intensive in non-timber forest management--that is good since it generates positive externalities to the society.

Impacts on Timber Supply?

Timber supply has been the major concern that may be affected by small landowners. Do we need to worry about the future supply impacted by parcelization? If we see timber as private goods, then we do not need to worry about it since the market can use pricing to adjust demand and supply. In spite of the fact that SSFF may not be very sensitive to timber prices as an incentive to timber management investment, return from timber production definitely still is the objective for most owners, particularly the medium-size-holders. If the timber prices rise, the land value for industrial timber management will rise too, then it is more expensive for the SSFF to hold or hold bigger forest land, and opportunity costs not used for timber production is greater. That will at least defer the land transition from industrial to small land holder, and induce even more intensive timber management.

Another important aspect we need to pay attention to is not just the rapid growing number of SSFF owners, but the total acreage they hold. In spite of the fact that both number and rate of increase for the holding sizes have gone up, the percentage of their holdings in terms of whole forestland or timber land is still small. For example, the total acreage of holding size less than 100 acres had doubled from 1978 to 1994, but made up only 10% of the total forestland

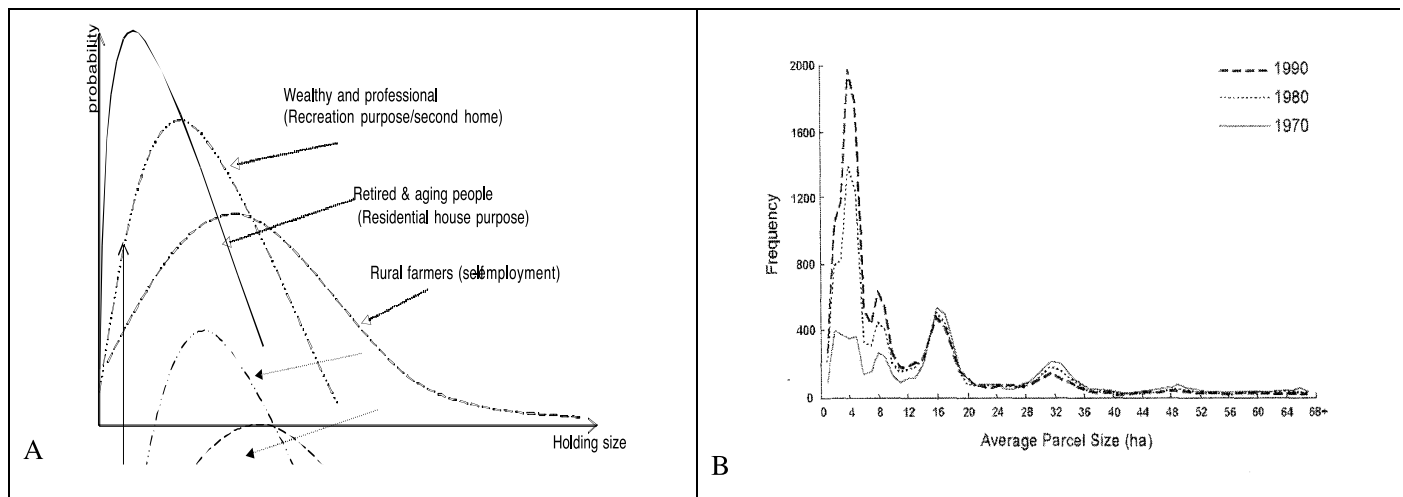


Figure 2A: Illustration the relationship between holding size probability and owner characteristics (purposes); 2B: Frequency distributions of private parcels in three counties (copied from Drzyzga and Brown 2002).

(from 21.6% to 31.7%). In other words, if the rest of the 70% of the forestland can increase timber productivity 5% then that can compensate for the reduction in productivity of 30% of the holding sizes less than 100 acres (10% of the total forestland).

Globalization of timber supply has prevented substantial increases in regional wood prices, while other products related to land uses, such as residential houses, cannot be imported. Consequently the value of other uses/or multiple uses (particularly the residential and recreational) of wood land rises in some regions (e.g., the USA) faster than that of timber production. It is likely the private forests, particularly for those small sizes of holders, will not intensively be used for timber production purposes, simply because it is a trial to increase benefits from wood production at the expense of non-wood benefits. It is also not worth obtaining the technology for better management for the so smaller scale woodlands. Globalization leads to land allocation for timber production globally. If we are concerned with timber supply, we need to think globally. Timber supply from the Southern hemisphere is becoming more and more important since it is more economically efficient (Zhang 2004).

DISCUSSIONS

Before World War II, farmers were believed to be the best managers of the private forests, while the forest industry was viewed

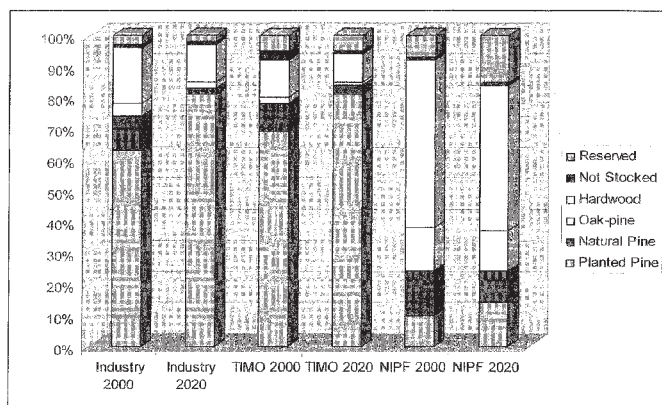


Figure 3: The structure of species of the forest land in forest industry, TIMO and NIPF.

Table 3: Management intensity of Forest Industry, TIMO, and NIPF

		2000			2020		
		Industry	TIMO	NIPF	Industry	TIMO	NIPF
Planted Pine	Standard	14	6	11	2	2	8
	Superior	46	38	64	25	28	46
	High Yield	40	56	25	73	70	46
Natural Pine	Lower	61	59	79	71	40	52
	Higher	39	41	21	29	60	48
Oak-Pine	Lower	95	75	85	95	73	76
	Higher	5	25	15	5	27	24

as only loggers and speculators. Since then, the forest industry has played a major role in private forest management; while the NIPFs were criticized for less intensively managing their land. The fact we are facing is that, as Harrison et al. (2002) observed, “throughout the world, there appears a trend to move from industrial forestry towards landholder-based forest management and community forestry and small-scale (often referred to as ‘smallholder’) forestry is of growing importance.”

“Are we trying to hold back the tide?” as raised in Tyrrell and Dunning (2000). Our answer may be “don’t try to hold back the tide”. First, generally speaking, land parcelization is the process of exchange between the land rich but cash poor people and land poor but cash rich people. The exchange generates social welfare and leads welfare redistribution. Many studies even found that more small private forest ownerships lead to social-economic development (Sisock 1998). In Finland, some attempts have been made to circumvent the partitioning process. It was proposed by the Finnish Forest 2000 program that the partitioning of NIPF holdings into units smaller than 10 ha should be made illegal, but this has never been implemented in practice (Ripatti 1996). Secondly, as argued throughout the paper, SSFF expansion has its economic rationale—the efficiency of consumption of forest based products and services. From a whole society perspective, the sum of millions of individuals’ net benefits (demand or value minus transaction costs) in each owning a small piece of forestland may far outweigh the sum of the benefits in fewer large scale private forestland ownerships (the latter benefits come primarily from economy of scale) largely because the production and consumption is more directly connected. SSFF expansion may not have to be associated with forest land loss, less management intensity, and less timber supply. The impacts may be more reflected in the form of forestland, type of management, and type of timber supplies. As the demand and supply change, so do number of owners and their holding sizes. The dynamics of holding size change (or parcelization) is exactly the adjustment of the supply for and demand of the forestland. Any changes in individual characteristics (e.g., change in income and age), society (e.g., population growth and wealth), and environment (e.g., the accessibility to recreation resources from public lands) will change the holding size and management strategies.

Our arguments on SSFF do not mean there are no problems; some policy changes are definitely needed. But we need to worry about unwarranted regulations on SSFF expansion and parcelization per se. Forestland not only generates timber but also provides many ecological and environmental services that are public goods. It is more widely agreed that parcelization has negative impacts on biodiversity, watershed management. That means the private costs and benefits differ from public costs and benefits. Therefore, welfare loss occurs and public policies are desired. We need to carefully evaluate and design effective policies to reduce the negative impacts. As pointed out in Larson (2000), “attention should focus on the more important goal of helping new and old forest owners manage their forest effectively, rather than preventing ‘fragmentation’ per se.”

We need to compare and examine the costs and benefits (both social and private) of different policies. So far, a variety of management approaches are suggested to reduce the diseconomies of

SSFF or small tracks of land. The most common way is to provide technical and financial support from the government. Row (1978) suggested that effects on financial returns can be reduced by managing small tracks in groups, and market cooperatives or aggregations of the owners. Uusivuori and Kuuluvainen (2001) also suggest collaboration in timber selling. All these important questions we need to address. It is unclear what policies are more efficient, but definitely this could be an interesting and important field for future study.

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