



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

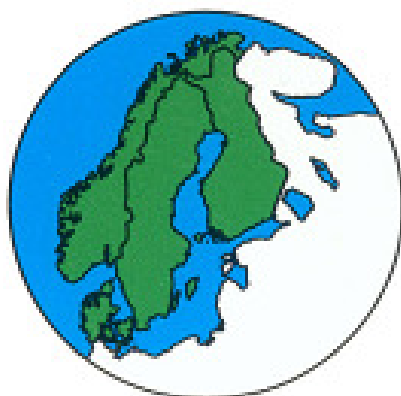
Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Scandinavian Forest Economics

No. 42, 2008



**Proceedings
of the Biennial Meeting of the
Scandinavian Society of Forest Economics
Lom, Norway, 6th-9th April 2008**

**Even Bergseng, Grethe Delbeck,
Hans Fredrik Hoen (eds.)**

Ås

Parcelisation of family forests in Finland

Jussi Leppänen

Finnish Forest Research Institute Metla
P.O.Box 18, FI-01301 Vantaa
Tel. +358 10 2112240, email: jussi.leppanen@metla.fi

Abstract

Forest holdings of sufficient size are one of the prerequisites for profitable forestry. This study will analyse the development in number of Finnish family forest holdings with affecting social, economic and political determinants. Firstly, a historical review is necessary. Secondly, a theoretical framework – based on economies of scale – with emphasis on progressive taxation effects is suggested. The major hypothesis to be tested in this study is that the major driver of parcelisation in Finland has taken place with respect to the population growth of the country.

In Finland, the partitioning of land has been deregulated gradually in time, it was almost completely deregulated in 1895 and then fully in 1916. After that, political and economic factors have been important parcellation drivers. Firstly, land reforms were instituted in order to liberalise tenant farms in the 1920s. Second of all, came the WWII resettlement of the Finnish population during the 1940s and which extended into the 1950s. Finally, there were great structural developments in agriculture, migration and urbanisation since the 1960s. These three changes have each accounted for an increase of some 100,000 family forest holdings.

The total number of independent and tenant holdings in Finland has been increasing for the last 250 years by an average of 8.6% with an increase in population of 10%. The increase in the number of holdings has been greater than that of the population in times when partitioning restrictions have been deregulated significantly, land reforms have been topical or property taxation high.

Keywords: economies of scale, profitability, land policy, taxation policy

1. Introduction

Forest parcelisation is one of the most important forest policy issues affecting both timber production and the profitability of forestry. In small holdings, recreation may become a more profitable main useage over timber production *per se*. Therefore, the actual cutting of timber, compared to allowable cut, may remain lower, the higher the share of small holdings is, in a country. For instance, in Sweden and Norway partitioning of arable and forest land is restricted in order to maintain economically viable agricultural and forest holdings. In Finland partitioning of land has been fully free from regulation since 1916. Restrictions upon partitioning have been in political discussion since then (e.g. Haataja 1935), but no amendments to hinder free partitioning have been made. One reason may be the relatively low population compared to the available land area in Finland.

In Finland, parcelisation has been studied by Ripatti (1996), who studied the probability of partitioning in a sample of holdings between two sequential points in time. His results indicated, for instance, that in the case where partitioning was made, it was three times more probable for jointly owned or non-agricultural holdings than for family owned or agricultural forest holdings, respectively. Parcelisation has also been an important issue in the United States, where the partitioning of land has had no restrictions. According to the literature review by Mehmood and Zhang (2001), the hypothesized causes of parcelisation can be divided into two groups: supply and demand. DeCoster (1998) finds that on the supply side the drivers are death, taxes and uncertainty. On the demand side the drivers are lifestyle and urbanization.

In Finland, historically speaking, forests have been used for hunting, agriculture, fuel, timber and tar production purposes. Commercial forestry within competitive timber markets has been in operation for no more than 100 years. Since the 1970's also, conservation has had an important role in forest land use. However, before commercial forestry, forestry as a land use form was not often an important part of land ownership policies, and the parcelisation of land progressed according to other land uses. Where other land uses did not maintain rural life, forests lost their value also.

The major objectives of this study are to find out:

1. What have been the major drivers of forest holding parcelisation in family forestry within a preliminary supply-demand framework?
2. How should forest holding parcelisation be controlled in Finland?

Firstly, a short historical background to Finnish land ownership development is presented. Secondly, advantages and disadvantages of scale

in forestry are suggested as economic drivers for the partitioning of forest land. Thirdly, an econometric model based on the country's population is suggested as a method of analysis, revealing other factors in the development of the number of holdings. Lastly, findings from the econometric model are discussed against the backdrop of historical developments.

2. Parcellation drivers

2.1 History: Ownership of land

In the very long term, the major driver of parcelisation can be assumed as being determined by population, although in the short term, other factors usually dominate. This is also the major hypothesis to be tested in this study. Population, on the one hand, affects land demand, and on the other hand it affects the distribution of wealth, if policies concerning redistribution are employed in the country. To conclude, two general partly overlapping periods of population impact upon land parcelisation, and eight more precise periods of population impact on land parcelisation can be separated in Finland:

- 1. Settlement (from prehistoric times until the 1950s)*
- 2. Wealth redistribution (since the 1920's)*

1. The occupation of land for settlement. The first period of settlement traces the occupation of land by the Finns. In Finland, the population was first settled in the south-west. South-eastern parts of the country were settled from western Finland before 11th century. Middle and northern Finland were settled gradually, both from south-west and south-east (e.g. Orrman 2003a).

2. Formation of villages. The second period of settlement was based on family and population growth. Houses were inherited, resettled, sold, bought, and villages were gradually formed in south-western Finland. Elsewhere, the population was more scattered and single-house holdings were the most usual ones. Timber as such in that period was a rather invaluable product and forest ownership rights were mostly defined by their use as a hunting resource by settlers and villages (e.g. Jutikkala 1942). The total population of Finland at the end of 13th century was very small, maybe less than 50 000 (e.g. Orrman 2003b).

3. Adoption of land regimes. The third period of settlement was based on public intervention by the Catholic church and the Swedish crown, which gradually entered Finland in the 12-14th centuries (e.g. Orrman 2003b). Land regimes started to constrain partitioning and impact the housing

organisation of holdings in order to maximise the tax revenues for the church and the king. This led to densely built village formations in south-western Finland and to a cooperative agriculture due to the very narrow partitioning of cultivated lands. Although every household owned a certain well-defined part of cultivated land, borders were not drawn up in the relatively worthless forests, although borders between villages were defined. It is from this period that the so-called "common" forest ownership by villages originates. The church started to receive holdings into its ownership e.g. as donations. State formation was continued, and tax reliefs were introduced for owners of such holdings, which could provide services for church or state, mostly by arming a man and horse (e.g. Orrman 2003c).

4. *The impact of feudalism.* The fourth period of settlement was based on strengthening the centralised state and the reformation of the church after the break-up of the Kalmar Union in 1523. On one hand, since king Gustav Vasa's regime in 16th century, the crown had taken holdings which were the property of church. It had also taken abandoned holdings and holdings which could not pay taxes, into its ownership (e.g. Jutikkala 1942, 1983). In order to increase the population in border areas, such forest areas, which were not settled but used for hunting according to rights of enjoyment by villages and households, were also taken for the crown and opened for new settlement with temporary tax reliefs. On the other hand, the crown expanded the granting of land to persons, who had served the king in military and civil tasks and awarded them with rank or nobility. Furthermore, tax revenue collection was greatly privatised in the feudalistic manner.

In the available statistics, it is notable that the number of holdings was rather stable during the 17th century. During the period between 1550-1750 many noble estates were formed and ordinary holdings had to be given up in the redistribution of land properties. Tax reliefs for the holdings of noble families became inheritable and free from service for the state. However, state decisions (reductions) called off the privatised tax collection rights of manors during the second half of 17th century. Therefore, the impacts of feudalism remained restricted in Finland, and ordinary peasant holdings remained the most important landowners (e.g. Jutikkala 1983).

5. *The clarification of peasant property rights.* The fifth period of settlement was the launch pad for the modern holding structure in Finland. After a disastrous famine in 1697-99 and the Great Northern War (1700-1721), population and agricultural policies were reformed to support new land settlement policy (e.g. Ylikangas 2007). Adoption of the new policy required deregulation of holding partitioning (1747) and clarification regarding private forest ownership rights. After 1743, the formation of tenant farms was allowed also for peasant holdings and the expansion of the tenant system was begun. Land reforms were brought to a conclusion in the

Great Partition after 1757 and in the *Act of Union and Security* by Gustav III in 1789.

After the Finnish War (1808-1809), Finland became a part of the Russian Empire, but this did not have much effect on the formerly adopted population and land policies. However, the *New Partition* was instituted in 1848, because the results of the *Great Partition* were not good enough for the desired parcel formation. The importance of land tax with respect to state revenues was decreasing all the time. Therefore, the partitioning of holdings was deregulated every now and then, until it became almost free in 1895 (Vihola 2004).

6. *The settlement of independent Finns.* The sixth period of settlement was the first period of wealth redistribution. This was based on the policy that rural people should have a right to the land. The expansion of the timber industries as land owners was stopped by the Finnish parliament in 1915 by prohibiting their acquisition of family forest land. The partitioning of holdings was liberalised completely in 1916. After the declaration of independence at the end of 1917 and the civil war in winter and spring 1918, the liberalisation of tenant holdings became based on the "Lex Pehkonen/Haataja" in 1918. Moreover, land was acquired for settlement according to the "Lex Kallio" of 1922 and the "Lex Pulkkinen" of 1925. After the *Winter War*, (1939-40) the act enabling the resettlement of evacuees was enforced, (1940) and after the *Continuation War* (1941-44) the act enabling land acquisition for the resettlement of evacuees from that war entered the statute books in 1945. Concerning economic policy, forest taxation had become property-based, site productivity taxation since the 1920's. Furthermore, separate property taxation was established, as well as inheritance and donation taxation.

7. *Building up the welfare state.* The second period of wealth redistribution started in the 1950s. The structural changes were accelerated at the end of 1960s. The importance of primary production was decreasing and urbanisation was increasing rapidly. Building up the Nordic welfare model required the expansion of tax revenues, which were collected by increasing the progressiveness of both income and property taxation. This meant that in the end, forests became the target. The peak in forestry taxation can be placed in the 1970s (Rutanen 1978, Sauli 1987). From the beginning of the 1980s, marginal tax rates were alleviated, especially for property taxation. In site productivity taxation, timber harvesting and silvicultural investments were encouraged (1980-2005) by adopting tax free areas after the final harvest.

8. *Modern polarisation of forest owners.* The third period of wealth redistribution started during the 1980s. First, the taxation of nominal profits from holding assignments was adopted in 1989. On the other hand, the transfers – of forest holdings lacking agriculture – to the next generation

were gradually shifted, to be taxed now according to fairer values, instead of formerly employed taxation values. The average age of forest owners, as well as joint and urban ownership of forest holdings, started to increase. After 1993, forest incomes started to be taxed according to capital income, with fixed rates. Although this tax reform included a 13-year long transitional period for 1/3 of the holdings, it practically ended the progressive taxation of working forestry businesses. In 1990, agricultural forest owners were on average 55 years old and other forest owners 53 years old (Ihalainen 1992), whereas in 2003 agricultural forest owners had been 49 and other forest owners already 62 years old (Ripatti 2006).

2.2 Economies of scale

In theory, the supply of forest holdings by partitioning may be influenced by scale disadvantages in timber production. On the other side, demand for small holdings may be influenced by scale disadvantages in timber production, or the recreational (or conservation) user-value of forests exceeding the respective capital costs of the holding. Therefore, the economic impact of the holding size for the unit costs of timber production can be presented as a scale advantage, scale disadvantage or constant returns of scale (Figure 1). For simplicity, economies of scale connected to the forest owner are focused, and economies of scale connected to harvesting and silvicultural operations are ignored. Forestry costs are assumed to depend on:

- a) rent of forest land,
- b) wage costs of labour and forest owner entrepreneurship,
- c) interest of capital (standing timber)
- d) taxes levied by society.

The forest owner, as a forestry entrepreneur, may be assumed to create partly fixed and partly variable wage costs. For instance, a fixed wage may depend upon up-to-date forestry knowledge as well as upon regular follow-up on market information and variable wages with regard to the management of the holding area. Forest-owner related scale advantages are gained if the forest owner diverts his/her fixed entrepreneurship costs into a larger annual production of timber, which in the case of forestry usually requires a larger area of forest.

If land area or timber-quantity related progressive taxation costs exceeds scale advantages received from the decrease of unit costs in forest owner wages, unit cost of timber production will start to increase after a certain point in forest area, or annual timber production. This means scale disadvantage in timber production.

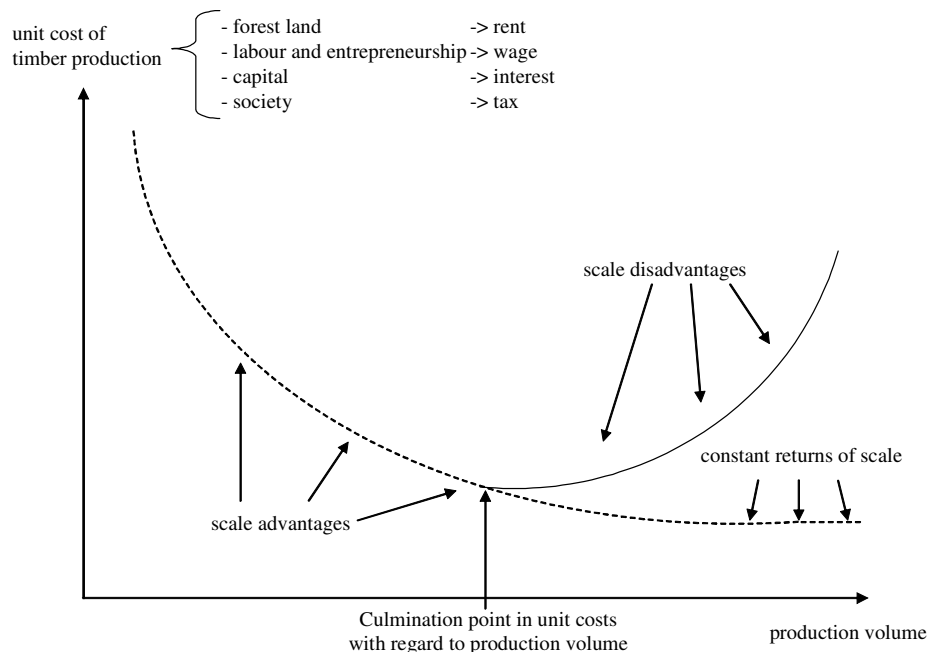


Figure 1. Economies of scale with regard to timber production volume (holding size).

Economies of scale may be applied also to property rights as opportunity costs. Land property rights on large holdings may become low e.g. due to land reforms favouring small holdings. If the value of timber and land are higher than the probable compensation in land reform, the opportunity costs i.e. scale disadvantage per cubic metre on large holdings will be high. As a consequence, large forestland owners may try to maintain their property rights by reducing the holding size and consequent land reform probability. This means sub-dividing the lands among the family/inheritors provided this is allowed during the land reforms.

Scale advantages may be gained in property rights, if the inheritance system favours a certain member of the family so that he/she may receive or buy the land in preference to other inheritors. For instance, the oldest son has previously been preferred, and is still preferred in some countries, in the inheritance system of agricultural and forestry land. In Finland, tax relief is available in inheritance and donation taxation, when a descendant continues agriculture and forestry as a single business. In this case the descendant usually buys the holding from the previous generation at a price which is under the market value of the holding.

3. Materials and method

In this study, population is considered as the major background factor in the supply of, and the demand for, forest holdings. The Swedish establishment of a system for population statistics *Tabellverket* of 1749, has meant, that Finland has had very good annual population statistics since the 1750s (Figure 2). Population is employed as an independent variable in the model to explain the development in number of forest holdings.

The most difficult task is to build a statistically consistent forest holding database for Finland. Definitions of holdings vary across time, and the existing statistics on holdings are not consistent. Today, there are statistics on management fee obligations for forest holdings, (taxation statistics). The taxation statistics include forest holdings, which have at least two hectares of forestland. Earlier, the minimum was one hectare. Forest holding statistics on management fee obligations were first collected for a full period between 1980-1987 (Ripatti and Reunala 1989). Since then, an almost complete database has been available, with improved quality on ownership details since 2001.

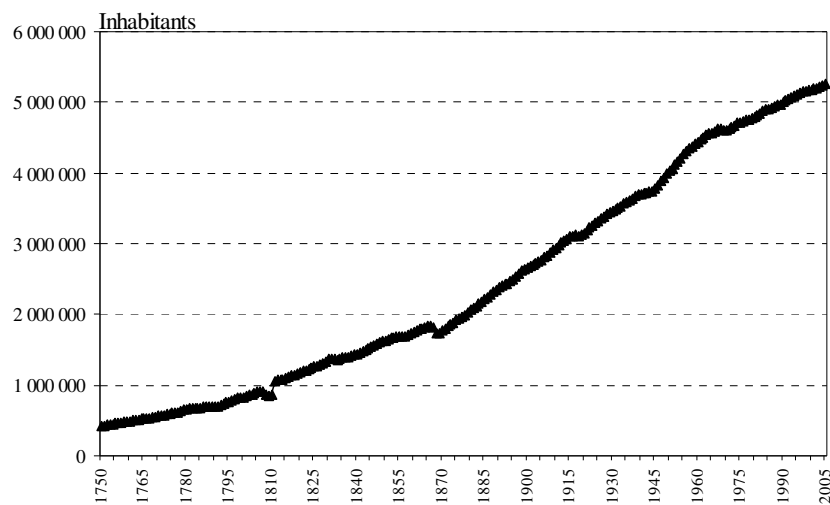


Figure 2. Population of Finland 1750-2005. Source: Statistics Finland.

Before 2001 there were also non-family forests included in the private forest taxation statistics, such as forests owned by municipalities and parishes. These holdings were mostly in the largest forest holding classes in the statistics. By using the information from the year 2001, data from previous years can be corrected by reducing the total number of holdings by 4,915, i.e. municipalities, parishes etc. Additionally, the statistics on family holdings which have a relief from the forest management fee, are not

classified according to their holding size, but presented as a total number. These holdings with relief, are larger than average forest holdings as well. At the other end, small-holdings over the minimum acreage (today 2 ha), which are not obliged to pay the forest management fee, are neither classified according to any size-classes. Furthermore, the data is organised according to forest management associations, which have gone through a merging process during last few decades. This means that a merge of associations may decrease the number of holdings. The conclusion reached with the data is that the forest management fee statistics prevent virtually almost all kinds of family forestry size-class analyses since 1980.

Before the 1980s there are agricultural censuses (or equivalent) available for single years, 1901 (independent and tenant farms), 1930, 1945, 1959, and 1969. Before that, there is published data available for the years 1749 (independent and tenant farms), 1805 (independent and tenant farms), 1815 (independent and tenant farms), 1830 (only tenant farms), 1840 (only tenant farms), 1850 (only tenant farms), 1865 (only tenant farms), and 1875 (only independent farms). In this study it is assumed that, after 1930, there were no tenant farms left in Finland, and that they had become independent farms. This is not quite correct, but accurate enough for econometric modelling purposes.

Consistent time series of forest holdings are built by interpolating the periods between observations with constant annual changes in holding number. This method neglects possible fluctuations between observations. Although some exact changes are lost, these have probably taken place since 1918, where observations are available for under 15 year intervals

From the constructed time series it can be seen that the number of independent holdings increased between 1749 and 1815 relatively quickly. The pace slowed down remarkably until the 1880s. The 20th century has been a time of very rapid increases in the number of independent forest holdings. The periods between 1918-45, 1945-70 and 1970-2005 have each accounted for an increase of some 100,000 independent forest holdings. This means that the present situation totals some 300,000 independent family forest holdings more than in the beginning of 20th century (Figure 3).

The number of tenant holdings started to grow from some 4,000 farms in 1750 relatively steadily until the end of 19th century. From the end of 19th century the number of tenant farms started to decrease slowly, and after Finnish independence (1917) and civil war (1918), the liberalisation of tenant farms was carried out as a matter of national policy. Most of the tenant farms became independent agricultural holdings by the beginning of the 1930s.

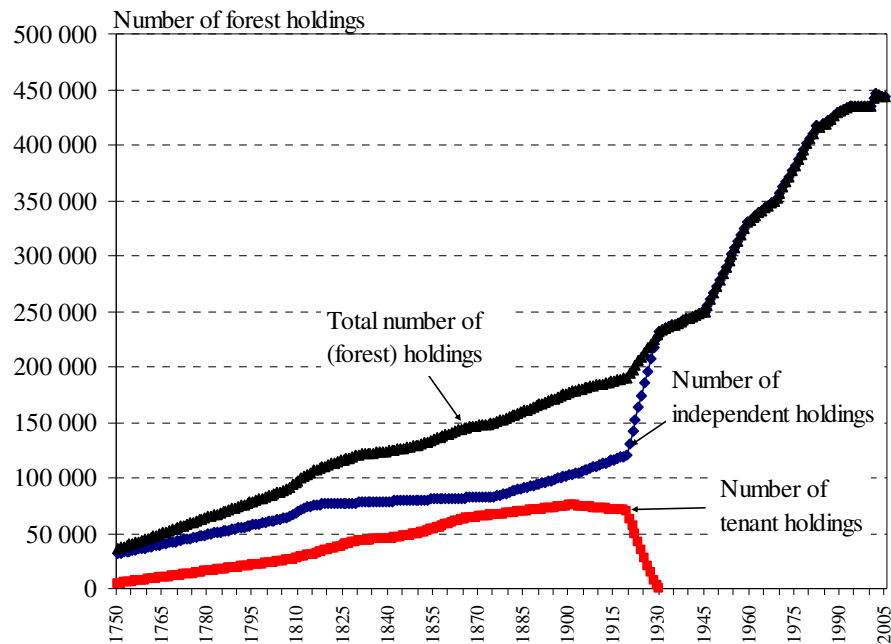


Figure 3. The number of forest holdings in Finland 1750-2005. Interpolated time series. Sources of data points: Jutikkala (1942), Rasila (2003), Ripatti & Reunala (1989), Ripatti (1996), Agricultural censuses and taxation statistics published in Finnish statistical yearbooks of forestry (various years) and Tapio's annual statistics (various years).

In statistical modelling, the simple *OLS-method* is employed, where population is used as the independent variable, and the number of forest holdings is used as the dependent variable. Natural logarithmic transformation is made for both variables in order to receive the elasticity interpretation between the population and number of forest holdings. In order to receive consistent results, the total number of forest holdings i.e. the sum of independent and tenant holdings, is used as the dependent variable.

Because both time series are growing and strongly autocorrelated, this results in poor diagnostics in the *OLS* modelling. However, if the causality is assumed to exist only in the long term between population and number of forest holdings, received elasticities can be used as such. Poor *OLS* diagnostics could be avoided, if there were time series of other affecting short term variables, at least slope and level dummies. Also taking differences of growing time series could result in stationarity of residuals, but in this case the most interesting long term causality would be lost. Because short term variables are not available exactly and the time series are over 250 years long, poor diagnostics of the model is ignored, and the received elasticity is used as if it was an efficient solution. Instead of

constructing lacking variables, an interpretation of residuals with previously described history and theory, is employed.

4. Results with an interpretation for the 1970s

Compared to the country's population, the total number of independent and tenant holdings in Finland has been surprisingly steady for 250 years, varying in time between 6 and 11 percent of the population. The first relatively steady growth in percentage between 1750-1790 was from 8.6% to 10.5%. Then the share decreased until 1917 falling to 6.1%. From 1918 the growth was again relatively steady until 1980 up to 8.6% of the population. Since then the percentage share has been almost unchanged and in 2005 it was about 8.4%.

When *OLS-method* is employed, the elasticity interpretation indicates that in a very long period an increase in population by 10% increases the number of holdings by 8.6% (Table 1). As expected the model's diagnostic, especially with regard to autocorrelation, is very poor.

Table 1. The model for number of forest holdings with diagnostics.

Dependent Variable: TOTALHOLDINGS

Method: Least Squares

Sample: 1750 2005

Included observations: 256

TOTALHOLDINGS = C(1)+C(2)*POPULATION

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) = Constant	-0.451247	0.136047	-3.316837	0.0010
C(2) = Elasticity	0.857428	0.009398	91.23632	0.0000
R-squared	0.970390	Mean dependent var		11.94435
Adjusted R-squared	0.970273	S.D. dependent var		0.657928
S.E. of regression	0.113437	Akaike info criterion		-1.507362
Sum squared resid	3.268443	Schwarz criterion		-1.479665
Log likelihood	194.9423	Durbin-Watson stat		0.013138

Next, residuals of the *OLS-model* are interpreted. Increasing series of the residuals indicate that the number of forest holdings are increasing faster than the model predicts, and decreasing series mean slower increase, respectively. When the series of residuals are flat, the elasticity is as the model predicts (8.6%). If the series of residuals are increasing or decreasing, the magnitude of the elasticity is dependent upon the period (Figure 4).

The first increasing series of residuals since 1750 were seen after allowing the establishment of tenant farms for peasant holdings in 1743 and

an extension of partitioning possibilities with regard to holdings in 1747. The *Great Partition* was started in 1757 (Jutikkala 1942). However, new levels of effective partitioning restrictions seem to be met around 1790. After that there was a period of some 20 years during which the number of holdings increased approximately within the elasticity received from the *OLS-model*. The first residual peak is due to the Finnish War 1808-09, and it is because of a decrease in population. From about 1815 until about 1850 partitioning restrictions upon holdings were effective. For instance, in 1852 partitioning restrictions were deregulated relatively speaking, to a large extent, and amendments were made again in 1864 and 1883. From 1850 until the years of great famine (1866-68) the number of holdings was increasing according to the model. From 1870 until 1917 partitioning restrictions upon holdings were again effective and the number of holdings increased very slowly, although partitioning was almost fully deregulated from 1895.

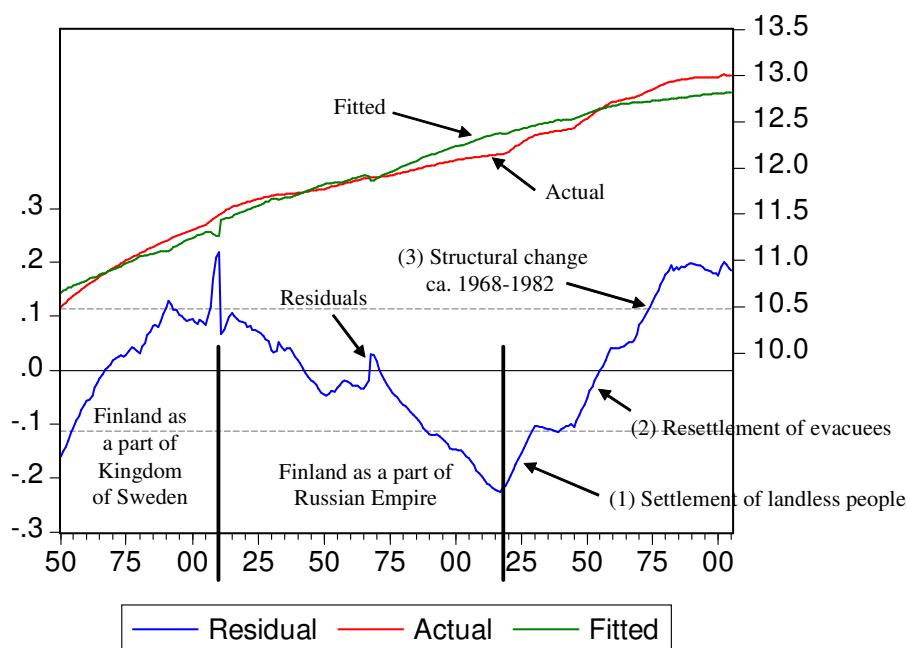


Figure 4. The residuals for the number of forest holdings model for years 1750-2005.

The form of model residuals from 1918 look like stairs with three rather flat steps. There are three rapid increases in the numbers of holding. After these booms, there are periods during which the number of holdings seem to increase according to the model elasticity (8.6%) with the population. Two preliminary increases in holding number, in relation to population, are seen

after the WWI and the WWII. Because all tenant holdings prior to tenant farm liberalisation, and holdings located in areas of the *Winter* and *Continuation War* cessions of territories were included in the total number of holdings, a strong increase in holding number can be interpreted in two ways. First, totally new holdings were established, which was also the documented case. Second, larger holdings probably tried to maintain their property rights e.g. by sub-dividing their lands between inheritants. This is a much less studied case.

So far, the last rapid increase in the number of holdings during the 1970s looks like the most interesting of the three steps. The birth-rate was high after WWII. This generation grew up as urbanisation accelerated at the end of the 1960s. Significant emigration, especially to Sweden, was underway. Therefore, the elements responsible for a decrease in the number of forest holdings were present. Concerning agricultural holdings, a decrease was actually the case. In contrast to these, the total number of forest holdings was increasing very fast.

A partial interpretation for the increase in the number of forest holdings in the 1970s can be found in the economy. The relative value of forest-land was increasing, because the value and volume of self-employed harvesting work was decreasing due to mechanisation. Inflation was peaking after the first oil crisis of late 1973. On the demand side, monetary compensations to inheritors lost their value quickly and therefore, inheritors may have demanded fixed property instead, i.e. forestland and sites for summer cottages. On the supply side, towards the end of 1960s, Finland built a strong, progressive taxation policy for both income and property. However, agricultural and industrial sectors received alleviation from the highest progressions rather quickly, which were also peaking due to lacking inflation corrections.

Consequently, according to Sauli (1987), forestry was almost the only production sector, which remained in the highest progressive income and property taxation bracket. The effect was complemented by progressive site productivity taxation, which instead of actual incomes, was also based on forest area size, i.e. on the size of property. In addition, inheritance and donation taxation was effective for holdings, although taxation values were still employed at that time. Selling a forest holding was largely free of the taxation of profits from assignment. It is simple to conclude, that there was a supply of parts and of whole forest holdings in order to lighten the forest owners' personal tax progression, and to obtain money for tax payments and living costs.

Around 1980 the property taxation progressions were alleviated substantially. In the site productivity taxation new effective deductions were included. Holdings that continued with agriculture got a partial concession from inheritance and donation taxation. Tax concessions were introduced

for self-employment in harvesting from 1979. At the same time, land purchase restrictions were introduced benefiting farmers. As a consequence, since 1982, and until 2005 the number of holdings has been increasing substantially at a rate of 8.6% with a 10% increase in population, although there have been many economic reforms and continued urbanisation since then also.

5. Discussion with emphasis on the present situation

The main hypothesis of this study has been that the parcelisation of forest holdings stands in relation to population growth in Finland. A very long term relationship of an 8.6% increase in the number of forest holdings with a 10% increase in population was found. In the short term, deviations from this were substantial. The results revealed that during the 1970s there was a strong parcellation phase in Finland, that can be argued to be the first one, which was *not* connected to rural settlement.

The strong parcelisation period of the 1970s had ended already in 1982. It is unfortunate therefore, that Ripatti's (1996) study on partitioning of forest holdings employed data collected just after this period. Explanations are consequently, to be drawn from economic strategy. By checking simultaneous reforms in economic programs, especially in forest taxation policy, it can be argued that extremely progressive income and property tax policies accelerated the structural change in forestry during the 1970s. In theory, supply of parts, or of whole forest holdings, due to high marginal taxation, can be caused by a disadvantage of scale. On the demand side, small-holdings may be demanded according to their more optimal scale in timber production or recreational (conservation) user values.

Compared to the United States, supply and demand factors in Finnish forest parcelisation are rather similar. However, on the supply side, solutions regarding past land-ownership questions in Finland in the 20th century, may have been affected by the uncertainty surrounding ownership property-rights. More so in Finland's case, than in that of the United States. On the demand side, the great share of landless people with a dream of their own parcel of land, on one hand, and settlement policies on the other, have had greater affect with the question of urbanisation being less than it has been in the United States. Rather than urbanisation, a special feature in Finland since the 1960s has been the high demand for sites for summer cottages which is due to the great share of lake-land areas in forestry regions, and the relatively late urbanisation of the population. The supply of summer cottage sites has increased due to their high value, which has been reflected also in the taxation of inheritance and donation.

Different land policies affecting the supply of forest holdings, especially since the end of 19th century, have resulted in a doubling of the number of family forest holdings in Finland as compared to Sweden. The forest area owned by families is almost equal in both countries (Leppänen and Nouro 2006). Finland has over 40 percent less of a population than Sweden. The difference would be rather similar, if Finland was compared to Norway, as well.

Today, forest owners are ageing, and the share of agricultural forest owners is decreasing rather steadily. Parcelisation is not progressing differently compared to last 250 years on average. Ageing and slow parcelisation phenomena, it could be argued, are affected also by taxation. Fixed rate capital income taxation was introduced for forestry in 1993, replacing the progressive site productivity taxation. Property tax was removed in 2006. Agricultural holdings have received a tax concession for inheritance and donation tax since 1979, and it has been amended every now and then, the last time in 2004. However, this tax concession has not applied to non-agricultural forest holdings.

The conclusion reached with regard to the current forest holding parcelisation situation is as follows. Nowadays, forest owners receive scale advantages in running forestry businesses, this prevents parcelisation. Therefore, if non-agricultural forest owners maximise their forest holding profitability, they will maximise their ownership period. In 2003 agricultural forest owners were on average 49 years old, and non-agricultural forest owners 62 years old (Ripatti 2006). However, compared to agricultural holdings, due to progressive inheritance and donation taxation non-agricultural holdings are more likely to be, transferred into joint ownerships, partitioned, and turned over to recreational or conservation use.

References

- DeCoster, L.A. 1998. The boom in forest owners - A bust for forestry? *Journal of Forestry* 96(5):25-28.
- Finnish Statistical yearbooks of Forestry (various years). Finnish Forest Research Institute Metla.
- Haataja, K. 1935. *Maakysymyksemme. Periaatteellista selvittelyä. Zusammenfassung: Unsere Bodenfrage.* WSOY, Porvoo. 189 p.
- Ihalainen, R. 1992. *Yksityismetsänomistuksen rakenne 1990.* Metsäntutkimuslaitoksen tiedonantoja 405. 41 p.
- Jutikkala, E. 1942. *Suomen talonpojan historia. Sekä katsaus talonpoikien asemaan Euroopan muissa maissa.* WSOY. 691 p.

- Jutikkala, E. 1983. Talonpoika, aatelismies, kruunu. Maapolitiikka ja maanomistusoloja Pohjoismaissa 1550-1750. Tietolipas 92. WSOY. 117 p.
- Leppänen, J. & Nouro, P. 2006. Results and implications from a comparative study of Swedish and Finnish forest sectors. *Scandinavian Forest Economics* 41:147-159.
- Orrman, E. 2003a. Suomen keskiajan asutus. In: Suomen maatalouden historia I. Perinteisen maatalouden aika. Esihistoriasta 1870-luvulle. Suomalaisen Kirjallisuuden Seura, Helsinki. Pp. 67-86.
- Orrman, E. 2003b. Keskiajan maatalous. In: Suomen maatalouden historia I. Perinteisen maatalouden aika. Esihistoriasta 1870-luvulle. Suomalaisen Kirjallisuuden Seura, Helsinki. Pp. 87-114.
- Orrman, E. 2003c. Talonpoikainen maalaisyhteiskunta. In: Suomen maatalouden historia I. Perinteisen maatalouden aika. Esihistoriasta 1870-luvulle. Suomalaisen Kirjallisuuden Seura, Helsinki. Pp. 115-129.
- Rasila, V. 2003. Torpparijärjestelmä. In: Suomen maatalouden historia I. Perinteisen maatalouden aika. Esihistoriasta 1870-luvulle. Suomalaisen Kirjallisuuden Seura, Helsinki. Pp. 365-384.
- Ripatti, P. 1996. Factors affecting partitioning of private forest holdings in Finland. A logit analysis. *Acta Forestalia Fennica* 252. 84 p.
- Ripatti, P. 2006. Yksityismetsänomistuksen rakenne ja rakennemuutos 2000-luvulla. Abstract: Structural changes in private forest ownership this decade. 4 p.
- Ripatti, P. & Reunala, A. 1989. Yksityismetsälöiden lukumäärän kehitys rekisteritietojen perusteella. Sammanfattning: Utvecklingen av antalet privata skogsbruksenheter på basen av registeruppgifter. Abstract: Development of the number of private forest holdings in Finland. *Folia Forestalia* 739. 23 p.
- Rutanen, E. 1978. Verotus ja tilan metsä. In: Paatela, J., Palosuo, V.J., Hänninen, E., Vauraste, E. & Leppänen, R. (eds.). Tuottava maa. Viljelijän tietokirja. *Metsätalous* 5. Pp. 239-246.
- Mehmood, S.R. & Zhang, D. 2001. Forest parcelization in the United States. A study of contributing factors. *Journal of Forestry* 99(4):30-34.
- Sauli, L. 1987. MTK ja Suomen maatalouspolitiikka. Maatalousyhteiskunnasta teollisuusvaltioksi 1950-1980. Kirjayhtymä, Helsinki. 364 p.
- Tapio's annual statistics (2001-2005). Forestry development centre Tapio.
- Ylikangas, H. 2007. Suomen historian solmukohdat. WSOY. 389 p.
- Vihola, T. 2004. Pärjääkö pienviljely? In: Suomen maatalouden historia II. Kasvun ja kriisien aika. 1870-luvulta 1950-luvulle. Suomalaisen Kirjallisuuden Seura, Helsinki. Pp. 135-216.

Acknowledgements

The receipt of funding from the Ministry of Agriculture and Forestry, (Finland) and from the Finnish Society of Forest Sciences is gratefully acknowledged. Particular thanks to Heimo Karppinen, Esa-Jussi Viitala and Harri Hänninen for reading the earlier version of the manuscript and to Mark Ward for checking the language.