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Regional economic impacts of fishing and hunting in Finland

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Abstract

A state enterprise, Metsähallitus, administers state-owned land and water areas in Finland covering approximately 12 million hectares. One of the official administrative duties of Metsähallitus is to provide hunting and fishing opportunities for citizens. In 2013, more than 81,000 hunting licenses and 71,000 fishing licenses were granted. As indicated in the study, during one season, Metsähallitus hunting and fishing customers spent over EUR 33 million in the regions of licenses destinations. This paper indicates that hunters and fishers in Finland travel extensively and support the regional economy via their expenditures.

In the summer and autumn of 2013, Metsähallitus carried out a survey that provided rich and up-to-date information that could be used for quantitative and qualitative research. For modelling purposes the private expenditures of hunters and fishers were grouped into trade, accommodation, restaurants, local public transport, and entertainment. However, the study also analysed these expenditures in more detail, presenting the personal expenditures per trip, per day of a trip, and per license. Moreover, the location of the expenditures was disaggregated into the region of license destination, the region of residence, and “on the way” between those two. For example, an average grouse hunter with a short-time (1–7 days) license in 2013 spent around EUR 150 per hunting trip within his or her region of residence, and more than EUR 440 per trip if the hunting area was located outside the region of residence.

RegFin, a comparative-static regional Computable General Equilibrium (CGE) model was used in this study to calculate the wider economic impacts at a regional level, as well as to serve as an engine for an Excel-based assessment tool. The assessment of the regional economic impacts focused on basic economic indicators such as regional gross domestic product (GDP), household consumption, and employment.

The results of the study indicate that hunting and fishing activities have a positive impact on regional economies. Just considering license destination regions in 2013, hunting and fishing on state-owned land increased regional GDP by EUR 6.4 million, created 86.2 person working years, and produced household consumption of over EUR 36.6 million.

Among the many conclusions, it was found that investments in regional services linked to hunting and fishing activities would increase the regional economic impacts of Metsähallitus customers.

Introduction

Metsähallitus is a state-owned enterprise with both business and public administrations. It administers state-owned land and water areas in Finland covering approximately 12 million hectares, with one of the principles to manage and use these areas for the benefit of the Finnish society, and to support business opportunities.

Hunting and fishing opportunities on the state-owned land are managed by the authorized sales of licenses. All activities must be ecologically and socially sustainable. Ecological sustainability means that the game or fish stocks cannot be overstrained, and social sustainability stands for the equal treatment of customers and taking into the account needs and perceptions of the different key stakeholders.

In 2013, more than 150,000 hunting and fishing licenses for state-owned land were sold in Finland. The regional distribution of the sales is presented in Table 1. As indicated in the paper, Metsähallitus customers travel extensively and spend a significant amount of money on, inter alia, accommodation, daily goods, fuel and services. Assessment of the pattern of expenditures and their regional economic impacts is the key focus of the study.

Previous studies have focused on particular areas or regions (Matilainen & Keskinarkaus, 2010). For example, in 2009, the regional economic impacts of small game hunters in Eastern Lapland were evaluated (Keskinarkaus, Matilainen & Kurki, 2009). This paper, based on the *Evaluation of Regional Economic Impacts of Hunting and Fishing Customers of Metsähallitus*–project, financed by Metsähallitus and the Finnish Ministry of Agriculture and Forestry, is the first attempt to evaluate the regional economic impact of hunting and fishing activities in state-owned areas of the whole country.

The paper presents the regional differences in customers' behaviour and the regional economic impacts of fishing and hunting in Finland. The research team has created an innovative Excel-based evaluation tool for impact analysis for the Metsähallitus.

Methodology and Methods

Dictionary

Concept	Explanation
Tourist hunter/fisher	A respondent, who went hunting or fishing outside the region of residence.
Regional hunter/fisher	A respondent, who went hunting or fishing within the borders of the region of residence.
License type	Metsähallitus sells different types of hunting and fishing permits (e.g. grouse hunting license, moose hunting license, bear hunting license, recreational fishing license).
Region of license destination	A NUTS3 region where the license is valid.
Region of residence	A NUTS3 region of the current residence of a respondent, the set-off region of tourist hunter or fisher
CGE	Computable General Equilibrium model
Modelling shock	A change in economic conditions (in this case, the hunters' and fishers' expenditures impact on private consumption).
Regional GDP	Regional gross domestic product (Regional GDP = private consumption + investment + public consumption + exports – imports + trade and transport margins + change in inventories.
Direct impact	The impact that the shock has on the core sector.
Indirect impact	The impact that occurs in the sectors, which serve the core sector. This impact flows down and up from the core sector covering the whole value chain of the activity.
Inducted impact	The impact that occurs when the direct and indirect impacts will drive the income formation and consumption.
Multiplier impact	The sum of the indirect and inducted impacts.
Total impact	The sum of the direct and multiplier impacts.

At the first stage of the study, a detailed, online questionnaire¹ was sent to the Metsähallitus customers. The questionnaire was sent in total more than 10,000 times regarding fishing licenses and about 25,000 times regarding hunting licenses. The collected answers created a database of more than 8,000 observations; including nearly 2,000 based on fishing licenses. Fishers and hunters with a license from Metsähallitus approached with the questionnaire create *the population*, and all those who responded to it create a random *sample*. With the level of confidence at 95% and the tests for normality (Kolmogorov-Smirnov and Shapiro-Wilk tests), approved for smaller samples and not approved for the larger ones. The research team has decided that the descriptive analyses will represent the sample level using frequencies distribution. The assessment of the regional economic impact has been based on the average expenditures calculated per one license in the license destination region, extended to the population.

The division of the types of licenses, used in the descriptive analyses, starts with a type of activities; hunting and fishing. Depending on the game, a Finnish hunter can choose to hunt small or big game. Furthermore, the small game hunting licenses are divided into short-term, lasting from 1 up to 7 days, and seasonal licenses. The study presented short-term small game licenses divided into grouse hunting licenses and waterfowl hunting licenses. In case of seasonal licenses, those two types were joined under the general name small game seasonal licenses. Big game hunting licenses are mainly seasonal and the study presents in detail results for moose hunters and bear hunters. Results for fishing licenses focus on recreational fishing, with the overrepresentation of Lapland in the study (more than 60% of all received answers).

The part of the questionnaire used as the base for the descriptive analyses focused on hunting and fishing trips, presenting their destination, the main purpose, travelling time, accommodation, company etc. Important information collected from that part of the data was the average amount of bought licenses per one trip in case of short-term licenses (including fishing licenses), and the amount of trips done during the seasonal licenses. Those averages were later used to calculate the average expenditures per license.

In order to fit the results to the economic calculations and the CGE model, NUTS3 regions were used as the official administrative regions. An important approach in the study was to divide all hunters and fishers into tourists and regionals, as the difference in behaviour as well as the average costs of the hunting or fishing trips has been proven to be significant.

At the second stage, a sufficient number of scenarios were design and ran by Computable General Equilibrium (CGE) model called RegFin (Törmä & Zawalinska 2010, 2011, and Törmä et al. 2010). Finally, an Excel-based tool was created allowing regional economic impacts assessment in case of changes in licenses sales in the future.

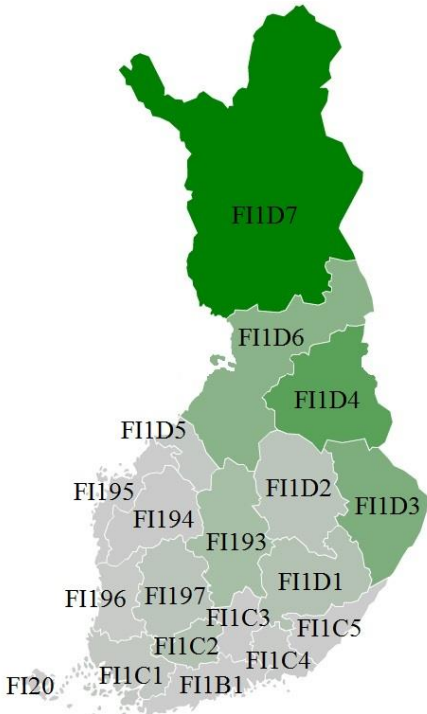
¹ The detailed description of the questionnaire and sampling process is described by Sarajärvi (2014).

Results and discussion

Descriptive analyses

As most of the results are presented at the regional level, Table 1 includes informative map of Finland presenting the region at the NUTS3 level and the distribution of both fishing and hunting licenses sales.

Table 1. Regional distribution of hunting and fishing licences sales in 2013



NUTS Code	Name of the region	Share of license sale
FI193	Central Finland	6.1 %
FI194	South Ostrobothnia	0.5 %
FI195	Ostrobothnia	0 %
FI196	Satakunta	0.3 %
FI197	Pirkanmaa	2.7 %
FI1B1	Helsinki-Uusimaa	0 %
FI1C1	Finland Proper	1.4 %
FI1C2	Tavastia Proper	4.0 %
FI1C3	Päijänne Tavastia	0.3 %
FI1C4	Kymenlaakso	0.4 %
FI1C5	South Karelia	0 %
FI1D1	Souther Savonia	4.1 %
FI1D2	Northern Savonia	2.8 %
FI1D3	North Karelia	12.9 %
FI1D4	Kainuu	18.7 %
FI1D5	Central Ostrobothnia	1.1 %
FI1D6	North Ostrobothnia	10.9 %
FI1D7	Lapland	33.8 %
FI20	Åland Islands	0 %
FINLAND		100%

Analysing the results of the descriptive part based on frequencies distribution, there are two main approaches; to compare the findings for the different type of licenses; and to present the regional differences.

As the conducted study indicates, among all small game hunters several important behavioural differences can be underlined. First and the most important difference is that grouse hunters with short-time license (from 1 up to 7 days) travel most extensively among all small game hunters. Small game hunters with seasonal licenses travels visibly shorten distances comparing with the short-term licenses owners, and they have the lowest share of the tourist hunters among them (53%). Also the small game seasonal licenses owners more likely, than the short-term licenses case, are going to travel alone. Finally, an owned cottage and a rented cottage are the two most common choices of accommodation among all small game hunters; with the note that only hunters with grouse hunting license (short-term) choose the rented cottage the as the first choice, increasing the average costs of the trip.

Analysed different types of big game hunters are more similar within the group, than small game hunters among them. An average moose hunter only slightly more often hunts during the season when compared to a bear hunter. Big game hunting is, without a doubt, a social activity, with the smallest share of single hunters

among all studied activates. Additionally moose hunting, due to the typically group arrangements, represents the most numerous hunting trips. Bear hunting trips are on average longer than any other hunting trips, as well as those hunters spend the longest time travelling to the license destination region, which is assumed to be connected with other recreational activities on the way. Among all different types of hunters, both big game hunters have a noticeably longer overnight stay in the license destination region.

Among all fishers with the licenses valid in Lapland, the most represented region in the study, 20 % comes from Uusimaa, the capital region. This share is only slightly smaller from the share of regional fishers, who in Lapland constitute of 21 %. This geographical distribution makes fishers travel all across the country in order to fish, which noticeably increase the fishers' personal costs.

Table 2. Summary of the results of descriptive analyses of the data

	Short-term licenses		Seasonal license		Fishing licenses	
	Grouse hunters	Waterfowl hunters	Small game hunters	Moose hunters	Bear hunters	Recreational fishers
Share of men in %	97 %	95 %	97 %	97 %	98 %	93 %
The most common age groups	45-64 years old (45%)	45-46 years old (46%)	45-46 years old (57%)	45-46 years old (60%)	45-46 years old (52%)	25-44 years old (48%)
The most common regions of residence	Uusimaa (20%)	North Ostrobothnia (19%)	Northern Savonia (19%)	North Ostrobothnia (25%)	Northern Savonia (15%)	Uusimaa (17%)
The most common regions of license destination according to the official sales	Lapland (30%)	Central Finland (18%)	North Karelia (35%)	Lapland (43%)	Reindeer herding area ² (56%)	Lapland (37%)
Main aim of the trip	Hunting activities (78%)	Hunting activities (65%)	Hunting activities (77%)	Hunting activities (85%)	Hunting activities (82%)	Fishing activities (56%)
Share of tourists in %	73 %	60 %	53 %	59%	63%	72 %
Average number of licenses per trip (short term only)	1,3	1,3	-	-	-	1,4
Average number of trip per license (seasonal only)	-	-	2,6	2,5	2,3	-
The most common lengths of the trip in km	101-500 km (34%)	101-500km (44%)	101-500km (52%)	101-500km (44%)	101-500km (57%)	101-500km (31%)
The most common lengths of the trip in days	1 day and 3 days (16%)	1 day (35%)	1 day (36%)	1 day (24%)	4 days, 5 days and 9-14days (14%)	1 day (25%)
The most common types of accommodation	Rented cottage (34%)	Own cottage (25%)	Own cottage (35%)	Own cottage (31%)	Rented cottage (25%)	Rented cottage and own accommodation (e.g. tent) (28%)
Share of travelling alone in %	17 %	20 %	36 %	11 %	12 %	13 %
The most common number of travellers	2 persons (35%)	2 persons (38%)	1 person (36%)	More than 7 persons (40%)	2 persons (23%)	2 persons (40%)
The most common accompanying persons	Friends (60%)	Friends (55%)	Friends (44%)	Friends (72%)	Friends (80%)	Friends (52%)

² Lapland, North Ostrobothnia and Kainuu

Analysing the descriptive results from the regional perspective gives the clear picture that the northern parts of Finland (Lapland, North Ostrobothnia and Kainuu) are much more common and attractive destinations than any other regions in Finland. This is in line with the fact that the accumulation of state-owned areas in Finland is located in the North. Two of the small game hunters (seasonal and waterfowl hunters) are here the exception, where the most common destination is other than Lapland. Among tourists, small game hunter and recreational fishers most often live in the south or central part of Finland, whereas big game hunters more likely are residents of the northern parts of the country. Among extensive hunting and fishing trips (the duration of two weeks or more) Lapland and Kainuu are always the most common destination, in some cases having the 100% of the shares.

The longer the trip to hunting or fishing area, the higher chances are to take part in other activities along the way. Some of the respondents are likely to acquire more than one license type per one trip. This can be expected to occur, for example, within the reindeer herding area, where the moose hunters additionally obtain bear hunting license.

Important results of the study are presented in form of average expenditures of the Metsähallitus customers calculated in total per trip, per license and per day. All above descriptions of the trip length, overnight stay, aim, etc. have their reflection on the average expenditures. For example, it is clearly visible that the longer destinations to the license destination region, the higher petrol expenditures occur.

Table 3. Averages of total personal expenditures

		EUR per person per trip		EUR per person per license		EUR per person per day	
		Tourists	Regionals	Tourists	Regionals	Tourists	Regionals
Short-term licenses	Grouse hunters	443 €	156 €	341 €	114 €	81 €	58 €
	Waterfowl hunters	308 €	96 €	220 €	79 €	73 €	49 €
Seasonal license	Small game hunters	358 €	152 €	830 €	471 €	71 €	67 €
	Moose hunters	544 €	264 €	1 144 €	826 €	99 €	61 €
	Bear hunters	579 €	382 €	1 409 €	853 €	92 €	71 €
Fishing licenses	Recreational fishers	547 €	139 €	378 €	105 €	82 €	57 €

On average, 70% of the expenditures from Table 3 for tourists is located in the license destination region, 10% is located in the region of residence and the remaining 20% on the way between them. As for the regionals, 100% of all expenditures are located in the license destination region that is the same at the region of residence.

Behind each average total personal expenditure there are three main cost items (in a different order); food and groceries, petrol and accommodation. Those three cost items for all types of licenses constitute between 80-90% of total expenditures. The remaining share of costs consists of; coffee and restaurants, local transportation, hunting or fishing services and other amusement services.

Regardless the type of obtained license, there is a visible difference between costs of tourists and regionals, as presented in Table 3. One of the reasons is that regional hunters and fishers travel shorten distances; also more often the trips are only one day long, without an overnight stay.

CGE modelling

Average expenditures located in license destination regions, aggregated into trade, land transportation, accommodation, restaurants and entertainment were calculated based on the samples. Based on Metsähallitus customer databases, a proportion between tourists and regionals was estimated; also an official licenses sales in 2013 were collected. Finally, by combining all those data, an expenditure consumption pattern of tourists and residents was created.

The sum of expenditures of tourist hunters in 2013 in the licenses' regions round up to EUR 17 million while regionals spent nearly 7.5 million. Tourist fishers left in the licenses' regions more than EUR 7.6 million and the regionals spent about 1.7 million while travelling in their regions of residence.

Based on above described data, 150 alternative scenarios were run by the CGE RegFin model giving the range of possible evaluation results of regional economic impact of hunting and fishing on the state-owned land in Finland. These results were utilized in the creation of the Excel-based evaluation tool.

Table 4. Regional economic impact of hunting and fishing; regional GDP and household consumption

		Change in regional GDP, EUR	Change in private consumption, EUR	Change in employment, person years
	Direct impact of the money used	Total impact	Total impact	Total impact
Hunting				
Lapland	10 901 308€	2 418 334€	11 959 488€	31,2
Kainuu	5 646 205€	1 130 133€	6 202 107€	14,1
NorthOstrobothnia	3 287 944€	68 716€	3 598 444€	6,9
Central Ostrobothnia	332 683€	68 716€	364 033€	0,7
Central Finalnd	571 472 €	114 942 €	625 254 €	1,2
North Karelia	2 489 823€	496 556€	2 726 293€	6,1
Pirkanmaa	345 743€	73 560€	378 255€	0,7
Other	588 138 €	117 799 €	643 447 €	1,0
HUNTING TOTAL	24 163 316 €	4 488 756 €	26 497 321 €	61,9
Fishing				
Lapland	5 412 720 €	1 193 507 €	5 929 764 €	15,3
Kainuu	1 341 185 €	263 101 €	1 468 676 €	3,2
North Ostrobothnia	602 013 €	119 371 €	658 651 €	1,3
North Karelia	847 381 €	168 347 €	927 316 €	2,0
Other	1 079 700 €	219 914 €	1 181 250 €	2,5
FISHING TOTAL	9 282 999 €	1 964 240 €	10 165 657 €	24,3

The first indicator of the economic impact is the change in regional GDP, calculated separately for hunting and fishing. First, the size of the change in economic conditions was evaluated. This defined the shock value on private consumption and was based on the before mentioned expenditure or the direct effects. Secondly, taking into account the multiplier impact, the total impact on regional GDP was estimated. As presented in Table 4 the total impact of hunting and fishing at the state-owned land in Finland on regional GDP was estimated for more than EUR 6.4 million.

The second result variable was household consumption. In the study, the multiplier impacts of household consumption were of a positive sign and therefore increase the direct impacts. The total changes in household consumption due to hunting and fishing activities in the year 2013 exceeded EUR 36.6 million.

The third result variable of economic impact evaluation was employment. The direct employment impact of hunting and fishing in the state-owned land in Finland is 440 person-working years. The multiplier impact, in this case, reduces this number and gives the total employment effect of approximately 86.2 person working years. This is because the sectors compete for labour. The tourism related sectors attract workers, while the other sectors lose in employment in a situation where total labour force is restricted.

Tool presentation

The Excel-based tool can be used to evaluate the regional economic effects of hunting and fishing for the year 2013. It can also be used to evaluate a situation where there is a change in the regional allocation of the number of licenses sold. The results can be calculated separate for fishers and hunters, tourists and locals. The structural differences in money spending between tourists and regionals are taken into account in the calculations. The tool presents the regional economic impacts in form of changes in regional GDP, household consumption and employment.

In addition, it is possible to influence the use of money per license change. Changes in relative prices can be raised or lowered by the money amounts, so that if the change is significant, it is sensible to examine the significance of this effect. Within the calculations, the overall impact is divided into direct and multiplier impacts.

Picture 1. Excel-based tool assessing the regional economic impacts of Metsähallitus customers in 2013 (Finnish language)

METSÄHALLITUKSEN METSÄSTYS- JA KALASTUSASIAKKAIDEN RAHANKÄYTÖN ALUETALOUDELLISET VAIKUTUKSET

Ohje: solut joiden väri on: ovat ne, joihin käyttäjä syöttää valintansa

Valitse listalta (solu C5)

Maakuntakoodi

Maakunnan nimi

Nimi mallissa

Indeksinro

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tarkasteltava alue:

MK19

Lappi

Lappi

15

Myydyt luvat 2013

Uusi lupien myyntimäärä

Onko lupatyyppi alueella käytössä?

Muutos, prosenttia

Paikalliset

Vierailijat

Paikalliset

Vierailijat

Paikalliset

Vierailijat

Paikalliset

Vierailijat

Kalastus

5 248

18 390

0

0

Kyllä

Kyllä

-100,0

-100,0

Kanalintu

1 579

10 775

0

0

Kyllä

Kyllä

-100,0

-100,0

Vesilintu Jämsä

279

835

0

0

Kyllä

Kyllä

-100,0

-100,0

Kausiluvat Pienriista

245

38

0

0

Kyllä

Kyllä

-100,0

-100,0

Karhu

824

565

0

0

Kyllä

Kyllä

-100,0

-100,0

Hirvi

2 007

4 074

0

0

Kyllä

Kyllä

-100,0

-100,0

Lupia yhteensä

10 182

34 677

0

0

Rahankäytön muutos per lupa

Metsästäjien ja kalastajien rahankäyttö 2013, euroa

Uusi rahankäytön taso, euroa

Paikalliset

Vierailijat

Yhteensä

Paikalliset

Vierailijat

Yhteensä

Paikalliset

Vierailijat

Yhteensä

Kalastus

784 793

4 627 928

5 412 721

0,0

0,0

0

0

0

Kanalintu

248 088

2 995 250

3 243 338

0,0

0,0

0

0

0

Vesilintu Jämsä

28 089

208 460

236 549

0,0

0,0

0

0

0

Kausiluvat Pienriista

78 432

20 630

99 062

0,0

0,0

0

0

0

Karhu

963 395

803 650

1 767 045

0,0

0,0

0

0

0

Hirvi

1 980 616

3 574 696

5 555 312

0,0

0,0

0

0

0

Kulutus yhteensä euroa

4 083 413

12 230 615

16 314 028

0

0

0

kokonaisvaikutus

Aluetaloudellisia vaikutuksia

yhä rahayksikköä kohden

Lappi

0,223

1,099

2,890

Suora vaikutus rahankäyttöön ja osuudet

Rahankäytön muutos yhteensä, euroa

Rahankäytön muutos yhteensä, prosenttia

Muutoksen osuus yksityisestä kulutuksesta, prosenttia

Muutoksen osuus ABKT:stä, prosenttia

BKT-osuuden mukainen suora työllisyysvaikutus

-16 314 028

-100,0

-0,510

-0,285

-201,9

Kerroinvaikutukset

ABKT:n muutos, euroa

Yksityisen kulutuksen muutos, euroa

Työllisyyden muutos, henkilötyövuotta

12 673 409

-1 608 448

154,8

Kokonaisvaikutus

ABKT:n muutos, euroa

Yksityisen kulutuksen muutos, euroa

Työllisyyden muutos, henkilötyövuotta

-3 640 619

-17 922 476

-47,2

Conclusions

The licenses of Metsähallitus have been known as an investment in nature, since the income gained from the sales is used by the state-owned company to provide several benefits to nature. The results of the study present also the hunting and fishing licenses as an investment in regional economy.

One of the major observations in the study is that there are high regional differences in economic impacts as well as the customers' behaviour pattern. Especially in northern parts of Finland, the scale of hunting and fishing activities as well as the length of the trips has a visible impact on the economy.

As presented in the paper, hunting and fishing activities in Finland are strongly connected with travelling; within or outside the region of residence. Therefore, without the possibilities provided by Metsähallitus, the Finnish domestic tourism would be significantly reduced.

It is assumed that if the study would be arranged at a municipal level, even higher differences, especially between rural and urban areas, would occur. Therefore for the future study, several data improvements and municipal level focus is recommended.

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