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office service accessibility:
an entry approach

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ABSTRACT

Structural changes in retail banking markets and development of remote access technologies have reduced the number of bank branches in many developed countries. That makes close-downs of bank branches and service accessibility in rural/peripheral regions interesting topics of public discussion. This paper uses an empirical entry approach in order to analyze whether the peripheral regions have suffered from the development branch networks in general, or are some specific regions faced more close-downs that one can expect? The analysis shows that there are some differences between the regions in accessibility of the services measured both by the number of bank groups and number of branches located in the municipality. Commutation directed to the municipality increased the accessibility as well as the increase in average taxable income. These characteristics are typically related to the local centers but also the administrative city-status had additional positive effect. When it comes to the development of accessibility, the analysis shows no differences between the regions.

JEL Classification: G21, R12

Keywords: banking, accessibility, regional differences, technological development, concentration

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1 INTRODUCTION

During the late 1990's and early 2000's banks in Finland substantially scaled down their office networks. This development was driven by both the development of remote access technologies making some of the branch offices redundant and changes in market structure in Finnish retail banking markets. This paper analyzes the regional development of office accessibility in Finland during 1995-2001, i.e. during the period of most intense branch network reorganization.

Accessibility of the branch services is typically studied in terms of branch density measured by numbers of banks per square kilometer (or mile) (see e.g. Evanoff 1988, Gunther 1997). This paper approaches the problem according to the idea that it is more appropriate analyze the accessibility in the same basis than the decisions are made by firms. The approach enriches the picture about the accessibility of services with taking into account the economic constraints faced by the banks.

In the age of digitalization of the services and ever developing remote services, it is naturally questionably whether the geographic distance is good proxy for service accessibility. When it comes to daily bank business, for most of the people access to the internet is more important than the geographic proximity of a bank office. Therefore in addition to tradition geographic distance, the accessibility of the bank is defined by the share of the population having both computer, access to internet AND internet banking account. In this study I do not have data on this variable at hands. It is however likely that some control variables are correlated with this variable and therefore the results presented in this paper are actually even stronger with the wider definition of the accessibility. Since this is naturally only speculation, for remainder of the paper the accessibility of the service refers to geographic proximity.

The banks entry in certain market is driven by expected profitability the market. A simple entry and competition analysis methodology is provided by Bresnahan & Reiss (1987, 1990, and 1991). The methodology is based on the observed number of firms in certain markets and assumed demand conditions in the market indicated by certain market characteristics. By ordered probit models econometrician can estimate the entry thresholds for different number of firms operating in the market in terms of population. The methodology is applied in analysis of retail bank competition for instance by Cetorelli (2002).

This paper concentrates on parameter coefficient estimates of the index function to see what parameters are ones driving entry and furthermore affect on accessibility of banking service provided in offices. The entry threshold ratios are, however, presented to characterize the growth in market size required to support extra bank or branch and shed some light on the branching strategies of the banks.

The second question in this paper is how the banking service accessibility has developed regionally in Finland during 1995-2001. Similarly Gunther (1997) analyzed the development of banking service accessibility in rural areas of the U.S. In the analysis he

assumed that changes in branching restrictions could have effect on the banking service accessibility. In our study we have no *a priori* assumption concerning neither regional differences nor the development of accessibility. However, it is possible that both the effects of mergers and changes in inter-organizational co-operation as well as adjustment of office network with respect to new technology have been regionally unequal for peripheral locations.

In addition to the regional differences interesting aspect within theme is potential differences in accessibility between different municipality types. Koponen & Widgrén (2003) found that the production of financial services is concentrating in Finland towards the existing regional centers. This study seeks an answer whether the accessibility of the banking services was better in regional market centers. The concentration towards centers can be analyzed by the development of accessibility of banks.

The paper is organized as follows. Section 2 provides an overview of the Finnish retail banking markets during 1995-2001. Section 3 describes the method and data used in the analyses. Section 4 presents the estimated models and results. Section 5 discusses the results and concludes the paper.

2 BANKS AND BANK GROUPS IN FINLAND

According to Finnish Bankers' Association, at the end of 2001 there were a total of 334 domestic banks operating in Finland, which included 8 commercial banks, 244 co-operative banks belonging to the OKO Bank Group, 42 local co-operatives and 40 savings banks. Additionally, there were 18 branch offices of foreign credit institutions active in Finland, of which seven receive deposits. Those banks are grouped in this paper as follows:

1. Nordea: Finnish retail banking activities of Nordea. The local branches of Finnish predecessors of Nordea are seen as the branches of Nordea.
2. Savings banks: Savings banks are treated as a one group. Savings banks include both local savings banks and a bigger savings bank, Aktia, which was the "central bank" of the group during the period of analysis. Current savings banks are the few ones survived from Finnish banking crises in early 90's.
3. OKO Bank Group: local cooperative banks, which are members of the OKO Bank Group and commercial bank OKO Bank operating in Helsinki-area.
4. Local cooperative banks: local cooperative banks which did not join the OKO Bank Group and which established The Association of Local Co-operative Banks in 1997
5. Ålandsbanken: mainly locally operating bank in Ahvenanmaa.
6. Sampo (formerly known as Postipankki, Leonia-bank, current name from year 2001.)
7. Other banks; mainly branch offices of international large bank corporations. Includes also few small Finnish banks with legal right for retail banking.[1]

During the analysis period there was a few occasions affecting on market structure in retail banking markets and furthermore on the number of branch offices. The first one was the merger of Kansallis-Osake-Pankki and Union Bank of Finland in 1995 and formed the predecessor of current Nordea-bank's operations in Finland. This decreased the number of branches of the group due to elimination of overlaps in branch network. In 1997 the current OKO Bank Group was officially established. Due to conflicts of opinions about the group structure some 40 something local cooperative banks left OKO Bank Group and established group of local cooperative banks. At the same time the group structure of OKO Bank Group became more solid.

The third major structural change in market structure and later on the number of bank branches in markets started in 1997 when state-owned bank, Postipankki, merged with Suomen vientiluotto Oy (Finnish Export Credit ltd.). As a result of this merger the activities of these firms we pooled under new holding company, which was renamed to Leonia-bank in 1998. This event did not affect on branch network of the bank but the end of cooperation in office service provision between Finnish Post and Leonia-bank

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[1] For more detailed information on other banks operating in Finland, visit homepage of Federation of Finnish Financial Services <http://www.fkl.fi >.

(predecessor of Sampo Bank) in the beginning of the year 2000 drastically decreased the number of outlets where Leonia-bank's services were supplied. Finally Leonia-Bank merged with insurance company Sampo. The subsequent merger with Mandatum investment bank created practically the current Sampo-bank.[2] Also over the time many banks with small-scale activities in Finland have entered to the market.

The effects of these occasions on branch accessibility are as follows. The elimination of the branch network overlaps of Union Bank of Finland and KOP and end of the old and traditional Finnish Post-Leonia -cooperation both decreased the number of branch offices in the market.[3] Contrary to this changes in cooperative bank group had improved the office accessibility, i.e. after this the number of major bank groups operating in some municipalities increased. Generally development of remote access technologies has decreased the importance of branch offices and made some branch offices redundant.[4] Therefore there has been trend of decrease in number of branch offices. Development of number of branch offices will be presented in table 1.

Table 1. Development of bank office networks by bank groups

	1995	1997	1999	2001
Nordea and its predecessors	806	484	347	301
Savings banks	256	252	262	267
OKO Bank Group	974	898	736	711
Local Cooperative Banks Group	0	0	108	129
Sampo and its predecessors	1034	778	543	150
Other	31	42	54	62
Total	3101	2454	2050	1620

Source: Finnish Bankers' Association. Note that Saving banks include Aktia and local savings banks. Respectively Sampo and its predecessors includes the number of post offices, which provided bank services.

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[2] For overall view of developments of market structure, see e.g. Anderson et al. (2000).

[3] Naturally, in the previous case the decrease in number of branch offices was merely due to elimination of overlaps in branch office networks and it did not actually affect so much in the branch office service accessibility. In latter case the accessibility of current Sampo Group's office services was weakened remarkably.

[4] According to Finnish Bankers' Association in 1995 some 48 % of the payments were made in branch office. This ratio was as low as 11,8 % in 2000. Number of payments made via online connections increased 184 % (12,3 % p.a.) from 1991 to 2000. Respectively number of payments made with giro ATMs increased 119 % with average yearly growth rate of 9 %. For a study on the customers' choices on e-banking in Finland, see Karjaluoto (2002). Vesala (2000) provides a study on competitive effects of technological transformation in retail banking.

3 RESEARCH METHOD AND DATA

3.1 The method

Following the entry model presented in Cleeren et al. (2006), the estimated (latent) profit functions take form $\Pi_{it}^N = \pi_{it}^N - u_i - \varepsilon_{it}$, where π_{it}^N refers to deterministic part of the profitability of the bank i at year t, u_i is the market specific random effect and ε_{it} is normally distributed error term. Banks are assumed enter to the market as long as the $\Pi_{it}^N > 0$. The deterministic part depends on the number of banks or bank branches in the municipality as well as the other economic characteristics of the municipality, i.e.

$$\pi_{it}^N = \alpha \ln(POPUL_{it}) + \beta POTENTIAL_{it} + \gamma DIFFERENTIATION_i + \delta^K REGION_i^K - \lambda^N BANKS_i^N$$

,

where $POPUL_{it}$ is population in the municipality i at year t, $POTENTIAL_{it}$ is a vector of variables affecting on demand for bank services, $DIFFERENTIATION_i$ a vector of variables describing possibilities of geographic differentiation in the municipality, $REGION_i^K$ is a vector of dummies indicating whether the municipality i's location in NUTS2 region K and $BANKS_i^N$ respective vector of dummies indicating whether the number of banks (or bank offices) equals the N in municipality i.

The most interesting estimated parameters for the purpose of this study are the δ^K, since the significances of these parameters reveals the possible regional differences in service accessibility. Variables included in vector $POTENTIAL_{it}$ basically controls for the economic differences between the municipalities. These variables are average taxable income in the municipality, jobs per employed labor force ratio and city-status as an indicator of municipality's center-role. $DIFFERENTIATION_i$ includes types of municipality(rural, dense, town-like), share of farm jobs and geographic area of the municipality. λ^N's are used later in computations of entry threshold ratios.

Following subsection provides motivation and descriptive statistics for main variables in analyses.

3.2 Data

Both accessibility of certain bank groups' branches and branches in the municipality in general can be seen as measures of accessibility of banks' office services. The first one is more appropriate if analyst sees the variety of different bank groups more important than

unconditional proximity of the branch. Basically, in the first case analyst values higher the differentiation between the bank groups compared to the distance based differentiation. To achieve more alternatives for the analyses we estimate same model specifications for both measures.

The dependent variables of ordered probit estimations are the number of banks and offices in the municipality (for ordered probit, see e.g. Maddala 1983 or Greene 2000). In ordered probit estimations dependent variable has to take *all* values between the 0 and maximum in data. In the case of the bank groups, dependent variable takes all the values from zero to seven and therefore there are no problems with estimations. Unfortunately, this is not the case with the branches. The maximum number of branches in the municipality was in 2001 as high as 100. Therefore it is clear that required presence of all values in the sequence of ordered responses does not satisfy. Therefore the data is censored such that for all municipalities with at least 10 branches belong to the last group.[5]

Development of frequencies of different market structures measured by number of bank groups and bank offices are presented in tables 2 and 3. Respective regional figures for the NUTS2 regions (see map in appendix A) are presented in appendices B and C.

As described above, the trend in number of branches has been decreasing. From 1995 to 2001 there were only few municipalities, where the number of branches increased. Therefore only the change in number of bank groups operating in municipalities in analyzed. During the analyzed period there were a couple of consolidations of municipalities. Since the consolidations are driven by the fact that the municipalities form economic entity, it is justified to treat the consolidated municipalities as a one market during the all period. There have been also made few artificial consolidations due to difficulties to distinguish the locations of the branches in those municipities. The artificial consolidations are justified since in these cases the municipalities are ones, which are either already consolidated or are very likely to be consolidated officially within few years.

Evanoff (1988) and Gunther (1997) used the population and per capita income in municipality in their analyses as variables to control for the differences between the municipalities.

The point of departure in chosen independent variables is that their studies did not take into account the geographic area of the municipality. This, in a way, reveals results on absolute differences in service accessibility. That is, if tries to achieve absolute equality in accessibility without taking into account the geographic area of the municipality, the average distance to bank office must be the same. This approach is rather hard to justify, since from bank's point of view for same profitability in municipality with two times bigger geographic area the variable profits of the services should be doubled. Therefore,

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[5] To be precise, also the values of bank groups are somewhat censored, since in some of the biggest cities operates more than seven groups.

we take into analyses also the geographic area of the municipality. It is also likely that area has positive effect on the number of banks or offices in municipality due to higher returns generated by better possibility of horizontal differentiation.

Today many people work outside their hometown. Since people typically are working at the same time when bank offices are open, it is possible that those who work outside the hometown also do business with the bank located at the municipality where the work place is. The municipalities with high jobs to employed labor force ratios have therefore higher customer potential and it is possible that the service accessibility is higher, too.

The differences between municipalities are also captured by dummy-variables describing the municipality's type. Municipality classification is one used by Statistics Finland. In the classification the municipalities belong either to the group of rural municipalities, densely populated municipalities or town-like municipalities. In theoretical models the concentration of economic activity is encouraged via circular causality. Spatial concentration of activities, thus, itself creates an environment for further regional concentration (see Krugman 1991, Fujita, Krugman & Venables 1999). The share of immobile labor works like a friction in this system. Therefore, in areas with high share of farm jobs it can be assumed that the people are not willing to move another areas and therefore providing more stable demand and the accessibility of bank services should be higher than otherwise. Also the distribution of population within these municipalities can be more equal giving room for horizontal differentiation, freedom of pricing and furthermore better service accessibility. Dummy for town status is included, since it is likely that towns are centers were the accessibility of bank services is higher than otherwise.

Table 2. The distribution of municipalities by the presence of bank groups

Bank groups in municipality	1995	1997	1999	2001
0 Groups	0 (0.0000)	1 (0.0023)	1 (0.0023)	4 (0.0090)
1 Groups	7 (0.0158)	26 (0.0588)	59 (0.1335)	142 (0.3213)
2 Groups	141 (0.3190)	135 (0.3054)	128 (0.2896)	157 (0.3552)
3 Groups	213 (0.4819)	187 (0.4231)	145 (0.3281)	71 (0.1606)
4 Groups	75 (0.1697)	85 (0.1923)	92 (0.2081)	44 (0.0995)
5 Groups	4 (0.0090)	4 (0.0090)	11 (0.0249)	13 (0.0294)
6 Groups	2 (0.0045)	4 (0.0090)	2 (0.0045)	7 (0.0158)
7+ Groups	0 (0.0000)	0 (0.0000)	4 (0.0090)	4 (0.0090)

Table 3. The distribution of municipalities by bank offices

Offices in municipality	1995	1997	1999	2001
0 Offices	0 (0.0000)	1 (0.0023)	1 (0.0023)	4 (0.0090)
1 Offices	4 (0.0090)	16 (0.0362)	43 (0.0973)	100 (0.2262)
2 Offices	83 (0.1878)	93 (0.2104)	90 (0.2036)	116 (0.2624)
3 Offices	73 (0.1652)	94 (0.2127)	104 (0.2353)	81 (0.1833)
4 Offices	69 (0.1561)	68 (0.1538)	72 (0.1629)	48 (0.1086)
5 Offices	36 (0.0814)	46 (0.1041)	40 (0.0905)	31 (0.0701)
6 Offices	50 (0.1131)	36 (0.0814)	26 (0.0588)	16 (0.0362)
7 Offices	22 (0.0498)	25 (0.0566)	24 (0.0543)	12 (0.0271)
8 Offices	27 (0.0611)	14 (0.0317)	8 (0.0181)	12 (0.0271)
9 Offices	19 (0.0430)	10 (0.0226)	10 (0.0226)	3 (0.0068)
10+ Offices	59 (0.1335)	39 (0.0882)	24 (0.0543)	19 (0.0430)

At last, the potential differences in service accessibility between the regions are reflected by dummy-variables. The reference group is the town-like municipalities in Uusimaa-region (For NUTS2 regions of Finland, see map in appendix A). Independent variables used in estimations are described in table 4.

Table 4. Descriptive statistics of the independent variables

	Mean	Std.Dev.
Population	11635.7	32748.7
Average taxable income (thousand euros)	13.5314	2.75445
Jobs/employed labor force in municipality	0.862517	0.180635
Share of farm jobs in municipality	0.1986	0.125231
Geographic area of municipality	765.033	1436.75
Municipality has a City-status (dummy)	0.246606	0.431157
Municipality is classified to be a town-like municipality (dummy)	0.151584	0.358718
Municipality is classified to be a dense populated (dummy)	0.162896	0.369375
Municipality is classified to be a rural municipality (dummy)	0.68552	0.46444
REGIOND1 – Municipality is located in South Finland (dummy)	0.076923	0.266545
REGIOND2 – Municipality is located in South Finland (dummy)	0.384615	0.486642
REGIOND3 – Municipality is located in East Finland (dummy)	0.169683	0.375461
REGIOND4 – Municipality is located in Central Finland (dummy)	0.19457	0.395981
REGIOND5 – Municipality is located in Northern Finland (dummy)	0.138009	0.345007
REGIOND6 – Municipality is located in Ahvenanmaa (dummy)	0.036199	0.186838

Source: Statistics Finland, Number of observation units=442, N=1768.

4   ESTIMATION RESULTS

In following estimations four different specifications are used for π_{it}^{N}. The first specification includes only population and dummies for regions and number of bank groups (or offices). In the second specification also natural logarithm of geographic area, average taxable income and jobs/employed labor force in municipality are included. The third specification includes also the share of farm jobs. In addition to all previously mentioned variables statistical or administrative variable describing the municipality type (dense or rural) and city-status are included in the fourth specification. Also a full set of year dummies and constant term is included in the models.

These specifications are used in both of the accessibility estimations as well as in accessibility chance estimations. The results are reported in two following subsections.

4.1   Differences in accessibility

First set of estimations used the number of bank groups present in municipality as a dependent variable. Parameter estimates are presented in table 5.

Population of municipality has positive sign and was statistically significant in every model specification. According to the first specification the number of banks was below the level of Uusimaa in Northern Finland and above that in Ahvenanmaa. Accessibility differences between Uusimaa and other regions were statistically insignificant. Additional control variables made the difference between Uusimaa and Northern Finland more significant and also the accessibility in the East Finland become statistically significantly lower compared to Uusimaa.

Job-sufficiency of the municipality, i.e. the jobs per employed labor force, increased the number of bank groups operating in municipality. If municipality had administrative city-status, the municipality had more banks. Interesting finding here is the statistical insignificance of geographic area of municipality in the full model. According to theory this should have positive sign, i.e. the market size should encourage entry due to increased possibility of differentiation and freedom of pricing. Therefore it seems that the excess revenues due to differentiation are negligible and more equal distribution of population indicated by share of farm jobs generates more village level monopolies.

As a conclusion can be said that there are still some differences between the regions in accessibility of bank services measured by the number of bank groups located in the municipality. Commutation directed to the municipality increased the number of bank groups as well as the increase in average taxable income. These characteristics are typically related to the local centers but also the city-status had additional positive effect.

Table 5. Differences in accessibility – bank groups

	Spec. 1a	Spec. 2a	Spec. 3a	Spec. 4a.
Population (natural log)	2.07644**	1.79256**	2.22835**	2.06234**
	(0.098025)	(0.103543)	(0.133532)	(0.171193)
Constant	-10.3202**	-12.3838**	-16.9992**	-15.7886**
	(0.940763)	(0.948885)	(1.29773)	(1.60342)
Year 1997	-0.10134	-0.08896	0.023535	0.020669
	(0.17827)	(0.180312)	(0.179902)	(0.180666)
Year 1999	-0.29044**	-0.30605*	-0.07447	-0.07752
	(0.110662)	(0.135836)	(0.13793)	(0.14036)
Year 2001	-1.77677**	-1.85885**	-1.5861**	-1.5949**
	(0.100741)	(0.15778)	(0.158383)	(0.159518)
Geographic area (natural log)		0.304748**	0.221925*	0.254321
		(0.101319)	(0.109332)	(0.130437)
Average taxable income		0.033345	0.053209*	0.056611*
		(0.028311)	(0.025375)	(0.025339)
Jobs/employed labor force in municipality		3.43953**	3.89455**	3.54841**
		(0.443268)	(0.47069)	(0.50615)
Share of farm jobs in municipality			4.90461**	5.2118**
			(0.895125)	(0.924266)
Municipality type - dense				0.309739
				(0.393956)
Municipality type - rural				-0.01236
				(0.487276)
City-status				0.663295*
				(0.28753)
South Finland	0.213434	-0.20706	-0.26502	-0.26802
	(0.316069)	(0.309274)	(0.312348)	(0.32905)
East Finland	-0.70635	-1.7171**	-1.94712**	-1.91582**
	(0.378968)	(0.39066)	(0.425229)	(0.444276))
Central Finland	0.372872	-0.43726	-0.6146	-0.64856
	(0.343995)	(0.344343)	(0.362011)	(0.374296)
Northern Finland	-0.76995*	-1.77574**	-1.75071**	-1.75049**
	(0.38772)	(0.435767)	(0.456178)	(0.4909)
Ahvenanmaa	1.6681**	1.52775**	1.85922**	1.69647**
	(0.572523)	(0.502641)	(0.516267)	(0.529042)
2 Groups	3.62485**	3.70801**	3.92256**	3.89811**
	(0.25606)	(0.260946)	(0.27007)	(0.272111)
3 Groups	6.31982**	6.41572**	6.72323**	6.70027**
	(0.28071)	(0.283624)	(0.291758)	(0.293515)
4 Groups	9.47536**	9.58906**	9.98848**	10.0045**
	(0.323374)	(0.328677)	(0.336256)	(0.339627)
5 Groups	12.5375**	12.7004**	13.222**	13.237**
	(0.347597)	(0.358798)	(0.369815)	(0.37215)
6 Groups	13.5482**	13.7347**	14.3487**	14.3381**
	(0.374952)	(0.383545)	(0.396888)	(0.398739)
7+ Groups	14.7904**	15.0636**	15.8571**	15.7965**
	(0.510385)	(0.524025)	(0.545938)	(0.549447)
Sigma	1.42838**	1.33649**	1.45654**	1.44766**
	(0.074461)	(0.070373)	(0.076736)	(0.078749)
Pseudo-R^2	0.178909	0.161582	0.170664	0.169482

Notes. Standard errors are in parentheses. Significance levels of 5% and 1% are denoted respectively by * and **. R^2 in ordered probit estimations is pseudo-R^2 calculated as R^2=1-(Lf/Lr), where Lf is value of log likelihood function maximized with respect to both the intercepts and explanatory variables and Lr is value of log likelihood function maximized with respect to intercepts alone. N=1768 (442 per yearly cross-section)

Another way to analyze the accessibility is to use number of offices as a basic unit. The parameter estimates are presented in table 6.

Again the coefficient of population is positive and significant for all specifications. The regional differences in accessibility were the same as ones presented in previous subsection except for the first model specification, which showed that in addition to Ahvenanmaa the number of offices was statistically higher also in Central Finland compared to Uusimaa. In specifications 2-4 the number of offices were lower in East Finland and Northern Finland and higher in Ahvenanmaa compared to the the Uusimaa.

Average taxable income did not have statistical significance in any of the models. In contrast to the results of bank groups geographic area has positive and highly significant effect on the number of offices. Also in the rural municipalities had more offices than either town-like municipalities or municipalities with city-status, all other things being equal. Therefore it seems that some bank groups are located in the rural areas and follow the strategy of extensive branch networks. This can lead to entry deterrence and fewer bank groups in municipality. Previously presented results give some support for that.

In general the bank accessibility, either measured by bank groups or offices, is better in towns even with taking into account the municipality characteristics. There are statistically significant differences between the regions. The question whether those differences are the legacy of financial crisis or created during the late 1990's will be analyzed in next subsection.

Table 6. Differences in accessibility - Offices

	Spec. 1b	Spec. 2b	Spec. 3b	Spec. 4b.
Population (natural log)	3.18548**	3.00279**	2.95923**	3.11397**
	(0.122885)	(0.136293)	(0.157698)	(0.197501)
Constant	-16.1154**	-18.782**	-18.3424**	-19.8022**
	(1.0698)	(1.23963)	(1.46607)	(1.87147)
Year 1997	-1.08879**	-1.02948**	-1.04227**	-1.06809**
	(0.114801)	(0.116244)	(0.121257)	(0.121292)
Year 1999	-1.97229**	-1.85872**	-1.88446**	-1.93993**
	(0.106468)	(0.143893)	(0.155123)	(0.154998)
Year 2001	-3.52285**	-3.35695**	-3.39247**	0.166599
	(0.127823)	(0.207116)	(0.224596)	(0.299832)
Geographic area (natural log)		0.674878**	0.681886**	0.536716**
		(0.125014)	(0.128362)	(0.141798)
Average taxable income		-0.03833	-0.03857	-0.03816
		(0.047749)	(0.047836)	(0.047723)
Jobs/employed labor force in municipality		1.5703**	1.55787**	1.9939**
		(0.512335	(0.51728)	(0.579855)
Share of farm jobs in municipality			-0.43162	-1.3985
			(0.889107)	(0.903853)
Municipality type – dense				0.581165
				(0.452911)
Municipality type - rural				1.50737**
				(0.551109)
City-status				-3.47456**
				(0.222538)
South Finland	0.117141	-0.07442	-0.0828	-0.45185
	(0.31364)	(0.382151)	(0.381814)	(0.41184)
East Finland	-0.58595	-1.97636**	-1.95212**	-2.54173**
	(0.380195)	(0.476185)	(0.475611)	(0.507372)
Central Finland	0.891207**	0.132496	0.121291	-0.06679
	(0.334921)	(0.415546)	(0.416793)	(0.44592)
Northern Finland	-0.58007	-1.90692**	-1.93811**	-2.38096**
	(0.393355)	(0.502869)	(0.503618)	(0.557537)
Ahvenanmaa	2.63578**	2.89427**	2.84434**	2.29861**
	(0.590743)	(0.622073)	(0.634945)	(0.611412)
2 Offices	4.07812**	4.14464**	4.13827**	4.13125**
	(0.22164)	(0.218332)	(0.220109)	(0.217817)
3 Offices	7.1915**	7.27009**	7.2602**	7.2598**
	(0.250584)	(0.248138)	(0.250306)	(0.247229)
4 Offices	9.50863**	9.58239**	9.57303**	9.58456**
	(0.277091)	(0.276391)	(0.279)	(0.277305)
5 Offices	11.2057**	11.2645**	11.2566**	11.2757**
	(0.29957)	(0.299314)	(0.302038)	(0.299144)
6 Offices	12.3597**	12.4116**	12.4046**	12.4393**
	(0.309546)	(0.30886)	(0.312044)	(0.311841)
7 Offices	13.5051**	13.5528**	13.5465**	13.588**
	(0.334569)	(0.337444)	(0.340901)	(0.338618)
8 Offices	14.3901**	14.4319**	14.4256**	14.4746**
	(0.347018)	(0.351442)	(0.355326)	(0.353314)
9 Offices	15.1937**	15.2351**	15.2312**	15.284**
	(0.362231)	(0.365779)	(0.370391)	(0.367219)
10+ Offices	15.9185**	15.9682**	15.966**	16.0165**
	(0.382299)	(0.386593)	(0.391312)	(0.388953)
Sigma	2.14718**	2.09062**	2.09025**	2.09821**
	(0.085814)	(0.085747)	(0.085726)	(0.089555)
Pseudo-R^2	0.240575	0.226189	0.22567	0.225144

Notes. Standard errors are in parentheses. Significance levels of 5% and 1% are denoted respectively by * and **. R^2 in ordered probit estimations is pseudo-R^2 calculated as $R^2=1-(L_f/L_r)$, where L_f is value of log likelihood function maximized with respect to both the intercepts and explanatory variables and L_r is value of log likelihood function maximized with respect to intercepts alone. N=1768 (442 per yearly cross-section)

4.2   Changes in accessibility

Like in previous subsection ordered probit is used in order to analyze the changes in bank accessibility. The changes in accessibility are measured by change in the number of bank groups operating in the municipality. Parameter estimates are presented in table 7.

Table 7. Changes in accessibility

	Spec. 1c	Spec. 2c	Spec. 3c	Spec. 4c
Population (natural log)	0.469282**	0.489136**	0.471235**	0.328217**
	(0.037013)	(0.053562)	(0.060094)	(0.075021)
Constant	-2.83142**	-2.36662**	-2.06706**	-1.04295
	(0.353639)	(0.45834)	(0.646028)	(0.745353)
Year 1999	-0.01852	0.000529	-0.00448	-0.00558
	(0.089383)	(0.094165)	(0.094529)	(0.094812)
Year 2001	-1.25272**	-1.22129**	-1.22924**	-1.24922**
	(0.092086)	(0.11141)	(0.112318)	(0.112703)
Geographic area (natural log)		-0.13349*	-0.13151*	-0.03568
		(0.05187)	(0.051999)	(0.061436)
Average taxable income		-0.01302	-0.01762	-0.01017
		(0.023072)	(0.024237)	(0.023958)
Jobs/employed labor force in municipality		0.375187	0.347089*	0.011167
		(0.223162)	(0.227372)	(0.247449)
Share of farm jobs in municipality			-0.3365	-0.0925
			(0.510936)	(0.532216)
Municipality type – dense				-0.34923*
				(0.171103)
Municipality type - rural				-0.34181
				(0.218216)
City-status				0.355721**
				(0.136512)
South Finland	0.124914	0.103401	0.100913	0.097578
	(0.141388)	(0.148371)	(0.148446)	(0.149112)
East Finland	-0.04623	0.029558	0.03256	0.000973
	(0.156087)	(0.182727)	(0.182859)	(0.184696)
Central Finland	0.153886	0.153979	0.157085	0.162609
	(0.151871)	(0.170087)	(0.170221)	(0.171001)
Northern Finland	-0.07051	0.052275	0.042128	-0.03555
	(0.162422)	(0.185741)	(0.186445)	(0.191964)
Ahvenanmaa	0.719612**	0.620003**	0.601635*	0.503302*
	(0.233201)	(0.235174)	(0.236886)	(0.239804)
Increase in banks	2.81645**	2.84077**	2.84405**	2.88226**
	(0.086907)	(0.088352)	(0.0887)	(0.09138)
Pseudo-R^2	0.204585	0.210166	0.210378	0.217418

Notes. Standard errors are in parentheses. Significance levels of 5% and 1% are denoted respectively by * and **. R^2 in ordered probit estimations is pseudo-R^2 calculated as $R^2=1-(L_f/L_r)$, where L_f is value of log likelihood function maximized with respect to both the intercepts and explanatory variables and Lr is value of log likelihood function maximized with respect to intercepts alone. N=1326 (442 per yearly cross-section)

Population has positive effect on the development and the bigger the municipality the less likely the number of bank groups decreased. Furthermore no model specification showed regional differences except positive one for Ahvenanmaa. In dense populated municipalities the number of banks decreased more and respectively municipalities with city-status faces less bank exits. Also the population growth was added to the model, but it did not change qualitatively any of the above presented results.

As a general result about changes of accessibility we can conclude that if we measured the accessibility by number of bank groups the banking activity has concentrated in towns. The absence of interregional differences in development of accessibility together with the regional differences in the levels of accessibility leads to conclusion that differences are one legacy of the banking crisis in early 1990's.

4.3 Entry threshold ratios and competition

Entry-threshold ratio tells how much the market should grow per active bank (or office) in order to support a new entrant. This ratio can be used as an indicator of changes in intensity of competition: the higher the ratio, higher is the impact of new entrant on competition. High values of the ratio also give indication of deficiency of competition at the initial level.

Basically the ratio is population per banks in markets with N banks divided by population per bank in markets with $N\text{-}1$ banks. By using the profit equation in subsection 4.1 the entry thresholds for N banks can be computed according to the function

$$S^N = e^{\left(-\frac{\hat{\beta}\overline{\text{POTENTIAL}} + \hat{\gamma}\overline{\text{DIFFERENTIATION}} + \hat{\delta}^K\overline{\text{REGION}}^K - \hat{\lambda}^N}{\hat{\alpha}}\right)},$$

where $\overline{\text{POTENTIAL}}$, $\overline{\text{DIFFERENTIATION}}$ and $\overline{\text{REGION}}$ are the sample means of the respective variables (cf. Cleeren et al. 2006) and Greek letters with hats are the estimates for coefficients of respective variables. Parameter $\hat{\alpha}$ is the estimated coefficient for population. Furthermore entry threshold ratio can be written as

$$R^N = \frac{S^N}{N} \Big/ \frac{S^{N-1}}{N-1} = e^{\left(\frac{\lambda^N - \lambda^{N-1}}{\hat{\alpha}}\right)}$$

Table 8 presents the entry thresholds ratios both for bank groups and bank offices for each model specifications.

Table 8. Entry thresholds ratios

Bank groups

	Model 1	Model 2	Model 3	Model 4
R^3	2.441017	2.998028	2.234319	2.462774
R^4	3.428098	4.360871	3.090726	3.463901
R^5	3.495803	4.415434	3.161448	3.531228
R^6	1.355845	1.464493	1.311593	1.360365
R^7	1.559063	1.713991	1.496759	1.565452

Offices

	Model 1	Model 2	Model 3	Model 4
R^3	1.771632	1.880173	1.909089	1.811845
R^4	1.552275	1.622514	1.641049	1.578423
R^5	1.362891	1.40779	1.41955	1.379667
R^6	1.197154	1.223833	1.230776	1.207155
R^7	1.228039	1.2552	1.262267	1.238221
R^8	1.155221	1.174913	1.180022	1.162615
R^9	1.143949	1.161642	1.166227	1.150596
R^{10}	1.129948	1.145699	1.149777	1.135868

Table 8 shows that differences between the models are rather marginal. The required growth in markets supporting three bank groups instead of two is strikingly high and up to five bank groups the entry of additional bank has strong impact on competition. Another explanation bank groups have different branching strategies such that for some groups the fixed cost of the branch office is higher than for some others. Therefore the market should grow at the rate presented above.

Evanoff (1988) showed that office density was higher in rural areas where branching was limited compared to the regions allowing statewide branching. Explanation for this phenomenon was the pre-emptive behavior of incumbent banks – saturating markets with branches deters the entry of new rivals. This kind of behavior could be also possible reason for the high entry thresholds ratios related to the entry of bank groups.

Since the focus of the paper was not actually analyze the competition in local bank markets during the 1995-2001, these results were presented as an illustration that the market was interesting also from the point of competition. The use of entre threshold ratios is however rather dubious as an indication competition since the market definitions can be inappropriate. Also these entry models leave out most of the strategic behavior as well as the role of the barriers of entry.

5 CONCLUSIONS

This paper presented an analysis of interregional differences in bank service accessibility in Finnish retail banking markets. The analysis tried to find out whether there are differences in accessibilities, first between regions of Finland, and second between the different types of municipalities. Also the differences in development of bank accessibility were analyzed. Bank service accessibility was measured both with accessibility to certain bank groups and more generally as an accessibility to bank offices in general. Previous approach was based on the idea that customers have preferences concerning different bank groups and latter just on the idea that proximity of the office benefits the customer in general. Variables controlling for differences between the local markets were population, taxable income, geographic area, share of the farm jobs and job sufficiency of the municipality.

The results show that there are indeed differences in bank accessibility measured both by number of bank groups and offices in the municipality. Accessibility of bank groups were significantly higher in municipalities with city-status, other things being equal. This shows that banking activity is concentrating in the centers. In the development of accessibility we did not find differences between the regions.

The main possible problems of this study are related to the market definition, that is, is municipality natural base-unit of analysis? If one is comparing interregional differences in bank service accessibility measured by offices, it can be so. For the banks it is not likely, since banks can have branch network strategy based on the use of remote access technologies. However, if this behavior is same in every region of the country then there should not be differences in branch accessibility.

More difficult question is the appropriateness of the NUTS2 regions defined by Eurostat. These regions are purely statistical units and definitions for Finnish regions are concurrently even changing. It is obvious that the use of NUTS2-classification is not necessarily the best grouping method for the study of regional differences. Hence, in the future we are going to try other regional classifications for the regions. Also, as turned up with Eastern and Northern Finland, for more rigorous analysis there is need for deeper time-dimension in the data.

Even the paper was not concentrated on the entry and competition issues, also the entry threshold ratios were presented. As shown by market entry studies, the intensified competition leads to higher market thresholds. Interesting question is whether the competition is actually more intense in the areas with fewer banks. Unfortunately the data at hands does not allow this kind of analysis, but more recent data used in Koponen (2008) and Koponen & Pohjola (2007) allows that.

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APPENDIX A: NUTS2 REGIONS IN FINLAND
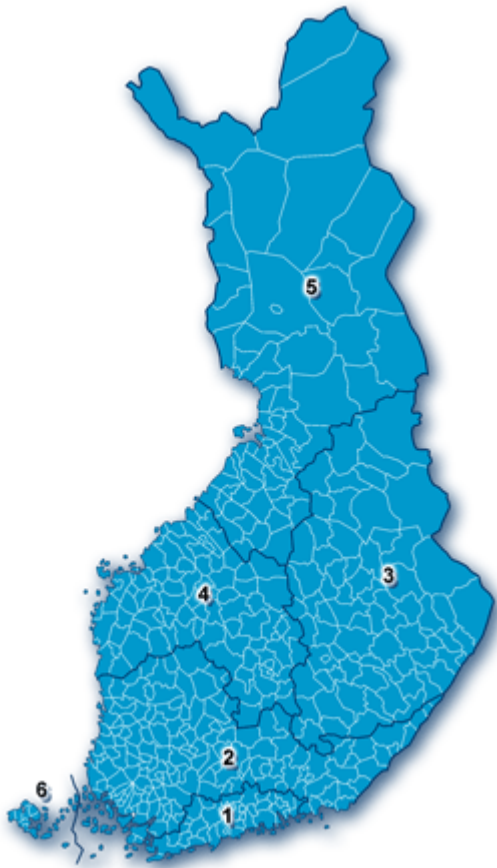
Region-codes
1. Uusimaa
2. South Finland
3. East Finland
4. Central Finland
5. Northern Finland
6. Ahvenanmaa

APPENDIX B: REGIONAL DEVELOPMENT OF ACCESSIBILITY BY BANK GROUPS

Region 1 – Uusimaa

	1995	1997	1999	2001
0 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Groups	0 (0.0000)	3 (0.0882)	4 (0.1176)	4 (0.1176)
2 Groups	3 (0.0882)	5 (0.1471)	8 (0.2353)	11 (0.3235)
3 Groups	17 (0.5000)	11 (0.3235)	3 (0.0882)	4 (0.1176)
4 Groups	12 (0.3529)	13 (0.3824)	16 (0.4706)	11 (0.3235)
5 Groups	1 (0.0294)	1 (0.0294)	1 (0.0294)	2 (0.0588)
6 Groups	1 (0.0294)	1 (0.0294)	1 (0.0294)	1 (0.0294)
7 Groups	0 (0.0000)	0 (0.0000)	1 (0.0294)	1 (0.0294)

Region 2 – South Finland

	1995	1997	1999	2001
0 Groups	0 (0.0000)	1 (0.0059)	1 (0.0059)	3 (0.0176)
1 Groups	3 (0.0176)	18 (0.1059)	35 (0.2059)	51 (0.3000)
2 Groups	52 (0.3059)	44 (0.2588)	34 (0.2000)	52 (0.3059)
3 Groups	74 (0.4353)	61 (0.3588)	45 (0.2647)	31 (0.1824)
4 Groups	39 (0.2294)	43 (0.2529)	49 (0.2882)	24 (0.1412)
5 Groups	1 (0.0059)	1 (0.0059)	4 (0.0235)	6 (0.0353)
6 Groups	1 (0.0059)	2 (0.0118)	0 (0.0000)	1 (0.0059)
7 Groups	0 (0.0000)	0 (0.0000)	2 (0.0118)	2 (0.0118)

Region 3 – Central Finland

	1995	1997	1999	2001
0 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Groups	0 (0.0000)	0 (0.0000)	2 (0.0267)	32 (0.4267)
2 Groups	31 (0.4133)	31 (0.4133)	28 (0.3733)	28 (0.3733)
3 Groups	39 (0.5200)	36 (0.4800)	37 (0.4933)	10 (0.1333)
4 Groups	5 (0.0667)	8 (0.1067)	6 (0.0800)	2 (0.0267)
5 Groups	0 (0.0000)	0 (0.0000)	1 (0.0133)	2 (0.0267)
6 Groups	0 (0.0000)	0 (0.0000)	1 (0.0133)	1 (0.0133)
7 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)

Region 4 - East Finland

	1995	1997	1999	2001
0 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Groups	0 (0.0000)	1 (0.0116)	8 (0.0930)	20 (0.2326)
2 Groups	25 (0.2907)	25 (0.2907)	26 (0.3023)	37 (0.4302)
3 Groups	44 (0.5116)	40 (0.4651)	30 (0.3488)	17 (0.1977)
4 Groups	16 (0.1860)	18 (0.2093)	17 (0.1977)	6 (0.0698)
5 Groups	1 (0.0116)	1 (0.0116)	4 (0.0465)	2 (0.0233)
6 Groups	0 (0.0000)	1 (0.0116)	0 (0.0000)	3 (0.0349)
7 Groups	0 (0.0000)	0 (0.0000)	1 (0.0116)	1 (0.0116)

Region 5 – Northern Finland

	1995	1997	1999	2001
0 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	1 (0.0164)
1 Groups	0 (0.0000)	0 (0.0000)	1 (0.0164)	26 (0.4262)
2 Groups	27 (0.4426)	27 (0.4426)	26 (0.4262)	23 (0.3770)
3 Groups	32 (0.5246)	31 (0.5082)	30 (0.4918)	8 (0.1311)
4 Groups	1 (0.0164)	2 (0.0328)	3 (0.0492)	1 (0.0164)
5 Groups	1 (0.0164)	1 (0.0164)	1 (0.0164)	1 (0.0164)
6 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	1 (0.0164)
7 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)

Region 6 - Ahvenanmaa

	1995	1997	1999	2001
0 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Groups	4 (0.2500)	4 (0.2500)	9 (0.5625)	9 (0.5625)
2 Groups	3 (0.1875)	3 (0.1875)	6 (0.3750)	6 (0.3750)
3 Groups	7 (0.4375)	8 (0.5000)	0 (0.0000)	1 (0.0625)
4 Groups	2 (0.1250)	1 (0.0625)	1 (0.0625)	0 (0.0000)
5 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
6 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
7 Groups	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)

APPENDIX C: REGIONAL DEVELOPMENT OF ACCESSIBILITY BY BANK OFFICES

Region 1 – Uusimaa

	1995	1997	1999	2001
0 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Offices	0 (0.0000)	1 (0.0294)	3 (0.0882)	2 (0.0588)
2 Offices	1 (0.0294)	3 (0.0882)	5 (0.1471)	8 (0.2353)
3 Offices	5 (0.1471)	6 (0.1765)	4 (0.1176)	5 (0.1471)
4 Offices	5 (0.1471)	4 (0.1176)	7 (0.2059)	4 (0.1176)
5 Offices	1 (0.0294)	5 (0.1471)	3 (0.0882)	4 (0.1176)
6 Offices	5 (0.1471)	4 (0.1176)	1 (0.0294)	1 (0.0294)
7 Offices	2 (0.0588)	0 (0.0000)	1 (0.0294)	3 (0.0882)
8 Offices	2 (0.0588)	1 (0.0294)	2 (0.0588)	3 (0.0882)
9 Offices	2 (0.0588)	3 (0.0882)	3 (0.0882)	1 (0.0294)
10+ Offices	11 (0.3235)	7 (0.2059)	5 (0.1471)	3 (0.0882)

Region 2 – South Finland

	1995	1997	1999	2001
0 Offices	0 (0.0000)	1 (0.0059)	1 (0.0059)	3 (0.0176)
1 Offices	1 (0.0059)	11 (0.0647)	23 (0.1353)	33 (0.1941)
2 Offices	30 (0.1765)	31 (0.1824)	29 (0.1706)	41 (0.2412)
3 Offices	31 (0.1824)	35 (0.2059)	34 (0.2000)	35 (0.2059)
4 Offices	23 (0.1353)	26 (0.1529)	31 (0.1824)	22 (0.1294)
5 Offices	18 (0.1059)	15 (0.0882)	19 (0.1118)	15 (0.0882)
6 Offices	20 (0.1176)	17 (0.1000)	10 (0.0588)	5 (0.0294)
7 Offices	6 (0.0353)	10 (0.0588)	7 (0.0412)	5 (0.0294)
8 Offices	9 (0.0529)	7 (0.0412)	4 (0.0235)	5 (0.0294)
9 Offices	8 (0.0471)	2 (0.0118)	4 (0.0235)	0 (0.0000)
10+ Offices	24 (0.1412)	15 (0.0882)	8 (0.0471)	6 (0.0353)

Region 3 – Central Finland

	1995	1997	1999	2001
0 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Offices	0 (0.0000)	0 (0.0000)	2 (0.0267)	23 (0.3067)
2 Offices	15 (0.2000)	20 (0.2667)	18 (0.2400)	24 (0.3200)
3 Offices	12 (0.1600)	21 (0.2800)	24 (0.3200)	13 (0.1733)
4 Offices	17 (0.2267)	13 (0.1733)	15 (0.2000)	8 (0.1067)
5 Offices	7 (0.0933)	10 (0.1333)	9 (0.1200)	3 (0.0400)
6 Offices	9 (0.1200)	2 (0.0267)	1 (0.0133)	2 (0.0267)
7 Offices	3 (0.0400)	2 (0.0267)	3 (0.0400)	0 (0.0000)
8 Offices	4 (0.0533)	1 (0.0133)	0 (0.0000)	0 (0.0000)
9 Offices	2 (0.0267)	1 (0.0133)	1 (0.0133)	0 (0.0000)
10+ Offices	6 (0.0800)	5 (0.0667)	2 (0.0267)	2 (0.0267)

Region 4 - East Finland

	1995	1997	1999	2001
0 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Offices	0 (0.0000)	1 (0.0116)	6 (0.0698)	15 (0.1744)
2 Offices	17 (0.1977)	17 (0.1977)	16 (0.1860)	17 (0.1977)
3 Offices	10 (0.1163)	13 (0.1512)	14 (0.1628)	14 (0.1628)
4 Offices	12 (0.1395)	12 (0.1395)	13 (0.1512)	11 (0.1279)
5 Offices	5 (0.0581)	8 (0.0930)	3 (0.0349)	8 (0.0930)
6 Offices	11 (0.1279)	11 (0.1279)	13 (0.1512)	8 (0.0930)
7 Offices	7 (0.0814)	8 (0.0930)	13 (0.1512)	2 (0.0233)
8 Offices	7 (0.0814)	4 (0.0465)	0 (0.0000)	3 (0.0349)
9 Offices	5 (0.0581)	4 (0.0465)	2 (0.0233)	2 (0.0233)
10+ Offices	12 (0.1395)	8 (0.0930)	6 (0.0698)	6 (0.0698)

Region 5 – Northern Finland

	1995	1997	1999	2001
0 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	1 (0.0164)
1 Offices	0 (0.0000)	0 (0.0000)	1 (0.0164)	19 (0.3115)
2 Offices	16 (0.2623)	18 (0.2951)	18 (0.2951)	22 (0.3607)
3 Offices	10 (0.1639)	14 (0.2295)	25 (0.4098)	11 (0.1803)
4 Offices	9 (0.1475)	10 (0.1639)	6 (0.0984)	3 (0.0492)
5 Offices	5 (0.0820)	8 (0.1311)	6 (0.0984)	1 (0.0164)
6 Offices	5 (0.0820)	2 (0.0328)	1 (0.0164)	0 (0.0000)
7 Offices	4 (0.0656)	5 (0.0820)	0 (0.0000)	1 (0.0164)
8 Offices	4 (0.0656)	0 (0.0000)	1 (0.0164)	1 (0.0164)
9 Offices	2 (0.0328)	0 (0.0000)	0 (0.0000)	0 (0.0000)
10+ Offices	6 (0.0984)	4 (0.0656)	3 (0.0492)	2 (0.0328)

Region 6 - Ahvenanmaa

	1995	1997	1999	2001
0 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
1 Offices	3 (0.1875)	3 (0.1875)	8 (0.5000)	8 (0.5000)
2 Offices	4 (0.2500)	4 (0.2500)	4 (0.2500)	4 (0.2500)
3 Offices	5 (0.3125)	5 (0.3125)	3 (0.1875)	3 (0.1875)
4 Offices	3 (0.1875)	3 (0.1875)	0 (0.0000)	0 (0.0000)
5 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
6 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
7 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	1 (0.0625)
8 Offices	1 (0.0625)	1 (0.0625)	1 (0.0625)	0 (0.0000)
9 Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)
10+ Offices	0 (0.0000)	0 (0.0000)	0 (0.0000)	0 (0.0000)

APPENDIX D: REGIONAL DESCRIPTIVE STATISTICS OF INDEPENDENT VARIABLES

Region 1 – Uusimaa

	Mean	Std. dev.	N.
Population	39541.54	96911.62	136
Average taxable income (thousand euros)	17.01	4.56	136
Jobs/employed labor force in municipality	0.77	0.19	136
Share of farm jobs in municipality	0.11	0.11	136
Geographic area of municipality	282.06	179.42	136
Municipality has a City-status (dummy)	0.41	0.49	136
Municipality is classified to be a town-like municipality (dummy)	0.35	0.48	136
Municipality is classified to be a dense populated (dummy)	0.24	0.43	136
Municipality is classified to be a rural municipality (dummy)	0.41	0.49	136

Region 2 – South Finland

	Mean	Std. dev.	N.
Population	10664.08	22196.58	680
Average taxable income (thousand euros)	14.08	2.25	680
Jobs/employed labor force in municipality	0.83	0.18	680
Share of farm jobs in municipality	0.19	0.13	680
Geographic area of municipality	345.18	247.62	680
Municipality has a City-status (dummy)	0.24	0.43	680
Municipality is classified to be a town-like municipality (dummy)	0.18	0.38	680
Municipality is classified to be a dense populated (dummy)	0.16	0.37	680
Municipality is classified to be a rural municipality (dummy)	0.66	0.47	680

Region 3 – Central Finland

	Mean	Std. dev.	N.
Population	9270.26	12869.22	300
Average taxable income (thousand euros)	12.21	1.59	300
Jobs/employed labor force in municipality	0.92	0.12	300
Share of farm jobs in municipality	0.23	0.11	300
Geographic area of municipality	1135.62	1004.17	300
Municipality has a City-status (dummy)	0.23	0.42	300
Municipality is classified to be a town-like municipality (dummy)	0.11	0.31	300
Municipality is classified to be a dense populated (dummy)	0.09	0.29	300
Municipality is classified to be a rural municipality (dummy)	0.80	0.40	300

Region 4 - East Finland

	Mean	Std. dev.	N.
Population	8226.43	13336.54	344
Average taxable income (thousand euros)	12.72	1.99	344
Jobs/employed labor force in municipality	0.91	0.15	344
Share of farm jobs in municipality	0.22	0.12	344
Geographic area of municipality	547.48	309.56	344
Municipality has a City-status (dummy)	0.27	0.44	344
Municipality is classified to be a town-like municipality (dummy)	0.08	0.27	344
Municipality is classified to be a dense populated (dummy)	0.21	0.41	344
Municipality is classified to be a rural municipality (dummy)	0.71	0.45	344

Region 5 – Northern Finland

	Mean	Std. dev.	N.
Population	9138.62	15911.38	244
Average taxable income (thousand euros)	12.83	2.60	244
Jobs/employed labor force in municipality	0.89	0.16	244
Share of farm jobs in municipality	0.18	0.12	244
Geographic area of municipality	2230.61	3210.92	244
Municipality has a City-status (dummy)	0.21	0.41	244
Municipality is classified to be a town-like municipality (dummy)	0.15	0.36	244
Municipality is classified to be a dense populated (dummy)	0.18	0.39	244
Municipality is classified to be a rural municipality (dummy)	0.67	0.47	244

Region 6 - Ahvenanmaa

	Mean	Std. dev.	N.
Population	1590.88	2447.41	64
Average taxable income (thousand euros)	13.50	3.24	64
Jobs/employed labor force in municipality	0.71	0.34	64
Share of farm jobs in municipality	0.25	0.13	64
Geographic area of municipality	97.00	41.83	64
Municipality has a City-status (dummy)	0.06	0.24	64
Municipality is classified to be a town-like municipality (dummy)	0.06	0.24	64
Municipality is classified to be a dense populated (dummy)	0.00	0.00	64
Municipality is classified to be a rural municipality (dummy)	0.94	0.24	64

Aboa Centre for Economics (ACE) was founded in 1998 by the departments of economics at the Turku School of Economics, Åbo Akademi University and University of Turku. The aim of the Centre is to coordinate research and education related to economics in the three universities.

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Aboa Centre for Economics (ACE) on Turun kolmen yliopiston vuonna 1998 perustama yhteistyöelin. Sen osapuolet ovat Turun kauppakorkeakoulun kansantaloustieteen oppiaine, Åbo Akademin nationalekonomi-oppiaine ja Turun yliopiston taloustieteen laitos. ACEn toiminta-ajatuksena on koordinoida kansantaloustieteen tutkimusta ja opetusta Turun kolmessa yliopistossa.

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