

Spatial Mobility between Tallinn and Helsinki in Mobile Positioning Datasets.

Statistical overview.

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Helsinki-Tallinn Transport and Planning Scenarios

Central Baltic INTERREG IV A Cross-Border Co-operation Programme



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1. Introduction

This study report provides an overview of people's mobility between Estonia and Finland with focus on the routes Tallinn–Helsinki and Helsinki–Tallinn. The traffic between the capitals of the two neighbouring countries is heavy and with millions of trips per year, it is an important tourism link and trade route. The capitals are also in active cooperation in the fields of business, administration and culture, which is the reason why they could be considered twin cities according to many parameters. Yet, the meaning of “twin cities” is complex, and this report does not aspire to evaluate the connections between Helsinki and Tallinn.

The objective of this study is to provide an overview of people's mobility between the two countries and two cities. Due to the fact that the state borders in the European Union have been opened, there is a lack of border statistics. It is difficult to collect solid reference data concerning cross-border flows. We are using anonymous data from passive mobile positioning (Ahas et al. 2008) in order to study the mobility patterns between Helsinki and Tallinn. The study of phone movements in mobile networks enables to make generalisations on the flow of people between cities or countries, which is why mobile positioning has become useful in several fields. Mobile telephones are widespread and they can be used as sources for collecting data for different purposes. For example, mobile data has been used for studying social interaction (Calabrese et al. 2011), urban development (Ratti et al. 2010), tourism (Shoval & Isaacson 2006; Ahas et al. 2008; Tiru et al. 2010; Versichele et al. 2012), migration (Silm & Ahas 2010), and emergency management (Bengtsson et al. 2011).

As capitals, Tallinn and Helsinki are homes to the most important harbours and airports in Estonia and Finland, and most of the traffic between the two cities takes place through these harbours and airports. This means that the people travelling between Tallinn and Helsinki need not necessarily originate from Tallinn or go to Helsinki but may come from or go somewhere inland instead. While the data we have collected enables us to study the geographical distribution of the movements within Estonia, we could only detect the arrival to, stay in and departure from Finland. Like any data, mobile positioning has several drawbacks, for instance, with regard to sampling and data management issues, which will be discussed in connection to the method.

The authors would like to thank Positium LBS and EMT for their support in methodological and technical development and data provision and Anto Aasa, Margus Tiru, Liis Murov for helping with data and analysis. We would also like to thank all anonymous mobile subscribers, whose data was used in this study. The methodological and theoretical development of research based

on mobile positioning in the University of Tartu has been supported by the Estonian Information Technology Foundation (EITSA) and the Target Funding Project No. SF0180052s07 of the Estonian Ministry of Education and Research grants No. ETF7562 and ETF7204 of the Estonian Science Foundation.

Privacy issues

The privacy of the phone owners is strictly protected in this study according to the EU data protection regulations. The requirements specified in the EU directives on processing personal data (Directive 95/46/EC) and the protection of privacy in the electronic communications sector (Directive 2002/58/EC) were strictly implemented and evaluated by the Estonian Data Protection Inspectorate. The phone numbers used in the sample of this study were made anonymous in the mobile operator's system and cannot be decoded. The identity of respondents cannot be disclosed by random identification codes or spatiotemporal behaviour patterns, as only aggregated data was used for the study. The main principle followed was to keep the identity of all respondents unknown.

2. Methodology

2.1. Data and methods

Passive mobile positioning data means location data that is automatically recorded in the mobile operators' memory files as the locations of telephones or as the call activities in the network (Ahas & Mark 2005; Ahas et al. 2008). Passive mobile positioning data can be collected by means of various methods from the mobile operator's core network. The most common method is to collect Call Detail Record (CDR) information from an invoice database or a data warehouse. In real-time, it is possible to collect CDR information from data mediation services or to store real-time data from a radio access network (e.g. A-bis interface).

In this study, we used CDR data from the memory files of the biggest Estonian mobile operator EMT. The market share of EMT is considered to be 40–45% in Estonia; its radio coverage is spread over 99.9% of Estonian territory.

We exploited data about the use of foreign telephones (roaming) in the EMT network for incoming tourists and the use of EMT phones in foreign countries for outgoing visits. The management of data was handled by Positium LBS, who used the special software Positium Data Mediator, which develops databases, procedures and data management software for mobile operators. The methodology for segmenting tourism data was developed in cooperation with the Bank of Estonia in order to obtain statistics for the calculation of travel items for balance of payment (Positium 2009).

For the Estonian phones abroad, we used the data on age groups and gender from the operator's database and calculated the home anchor point network cell in Estonia using the anchor point model (Ahas et al. 2010). Because of data protection and privacy regulations, it is not possible to position phones more precisely in Finland. Therefore, the phone use is recorded for the entire territory of Finland; we cannot distinguish locations inside Finland. Due to population geography and logistical networks, the majority of Estonian-Finnish traffic still occurs between the two capital cities: Helsinki and Tallinn.

We used the databases of call activities in the EMT network (Table 1). Call activity is any active use (incoming or outgoing; voice, text, internet, services) of a mobile phone. The database used for the study consists of call activities (time, location) of random IDs. The country of origin or nationality of visitors is determined here on the basis of the registration country of the mobile phone. So a phone registered in Estonia may be used by a person of any nationality. Still, the

registration of a mobile phone shows the place where the person is spending most of their time or has strong connections with. Random IDs are not identifiable, but a certain phone number is always given the same ID by the operator.

Table 1. Data recorded on the call activity used in the study.

Phone user	ID	Time	Location
Foreign (roaming) phone in Estonia	Country; Random ID	ss:mm:hh dd:mm.yy	Network cells
Estonian phones (roaming) abroad	Random ID	ss:mm:hh dd:mm.yy	Country

Based on this passive positioning data we generate various statistics to describe mobility: number of visitors, number of visits, number of days, number of nights. In the following section we describe the following statistics.

Visitor – unique person (mobile phone user) who is travelling to another country, have done call activity(ies) there.

Visit – unique visit to another country by a person. One visit is normally composed by 2 trips: one into destination and second back home from the destination. One person can make a number of visits. We use the visits, which have done directly from Estonia to Finland in case of Estonians and directly from Finland to Estonia in case of Finns, without transit or stopping in a third country.

Trip – unique one way trip to another country by a person, for example trip from Estonia to Finland; or trip from Finland to Estonia.

Number of days – duration of one visit in days.

Number of nights – duration of one visit in nights. The formula for calculating the number of nights in one visit is: nights = days – 1.

We have used different segments of visits/visitors based on visit duration, number of visits per year and number of days spent in another country per year.

Visits. We have divided visits on the basis of the length of stay. 1) Transit visits – visits to another country (Finland/Estonia) for a short period (may be <3...<12 hrs) and leaving to a third

country on the same day. 2) Visits to the destination divided on the basis of the number of visited days: one day visits, 2–4 day visits, 5 or more days' visits.

Visitors. Based on the number of visits to another country, we divide visitors as follows: one time visitors, 2–4 time visitors, 5 or more time visitors. Based on the total number of days spent in other country, visitors are divided into 1 day visitors, 2–30 day visitors and 31+ day visitors and 183+ day visitors. According to the common definition (WTO), a visitor who is staying in other country for 183 days or more is considered a foreign labourer.

The geographical resolution for the analysis in Estonia is the city of Tallinn, Harju County and the entire Estonia. Finnish visitors in Estonia are studied on the basis of the locations of call activities. In case of Estonian phone users, the locations of home and work districts are measured with the anchor point model (Ahas et al. 2010).

Using mobile positioning data in scientific research also has several shortcomings that we have to keep in mind when interpreting the results. One of the weaknesses of such quantitative statistical data is that we do not know the exact motivations and relations lying behind those visits. The most important question is related to sampling: Who have phones? Are they using phones during travels? How often do visitors use phones in a foreign country? As roaming calls are expensive, it is likely that wealthy tourists and businessmen use their phones more often than less active people with a lower income (children, students, pensioners). This means that sampling issues are also related to lower income and age groups. Calling is also connected with cultural differences, such as calling regulations and traditions. Another problem that arises in case of using mobile positioning data is its quantitative structure – we know the locations of calls (dots), but we do not know who is really making the calls, what kind of visit he/she is on, and what kind of transportation he/she is using. The huge amount of quantitative data also poses a problem for data processing and cleaning; the databases are too large to enable using traditional software and data preparation options.

2.2. EMT customer profile

TNS Emor conducted a telephone CATI survey in 2008, 2009 and 2010 in order to determine allocation between mobile operators and the customer profile and distinctive features of EMT customers compared to the customers of other operators. CATI-bus is an Omnibus-type regular

data collection technique, in which data collection is performed using the CATI (Computer Administrated Telephone Interview) method. In case of a CATI-interview, the questionnaire questions are displayed on a computer screen, and the answers are immediately inserted. The course of the interview and sample proportions are controlled by a special software — Bellview Fusion.

The population of the survey comprises the permanent residents of Estonia between the ages 15–74. The TNS Emor CATI-bus includes both mobile and landline numbers. 40% of the sample consists of people who can be contacted only by mobile telephone (they do not own a landline phone). These respondents have been selected randomly from the TNS Emor database of the pre-recruited. The landline phone owning respondents were selected from the strain number register by simple random selection. The last three digits of the telephone number are computer-generated, which enables also private numbers to participate in the survey. In Estonia, 56% of people in towns and 42% of people in the country are supplied with landline phones (Emor CAPI-bus, 2009).

The “young men’s rule” was applied in the households that own the telephone numbers that were generated as selected respondents (the youngest men between the ages 15–74 currently at home were interviewed. If no men in that age group lived at the respective address or if they were not at home, the youngest women between the ages 15–74 were interviewed).

It may be generally assumed that a phone survey enables balanced access to the entire target group and that it proportionally describes the Estonian population between the ages of 15–74. 2004 people were interviewed in the year 2008, 2001 in 2009 and 4000 in 2010.

According to the survey conducted in 2008, 95% of the respondents used a mobile phone, while in 2009 and 2010 the ratio was 96%. Approximately 45% use EMT, followed by Tele2 with over 30% and Elisa (Figure 1). In 2010, the ratio of EMT fell by 1.7 percentage points compared to 2009. However, the ratios of both Elisa and Tele2 have risen by 2.0 and 0.7 percentage points respectively.

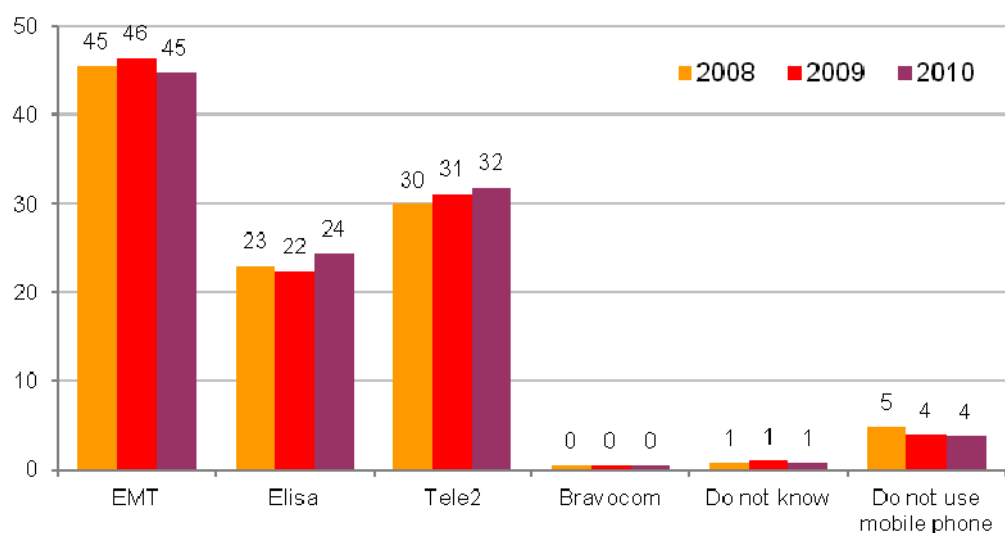


Figure 1. The distribution of mobile operators in 2008, 2009 and 2010.

The ratio of men and women among EMT users is more equal when compared to other operators (Figure 2). In 2008, the distribution was 49% men and 51% women; in 2009 and 2010, it was 48% men and 52% women. According to the census of 2000, there are 46% men and 54% women living in Estonia.

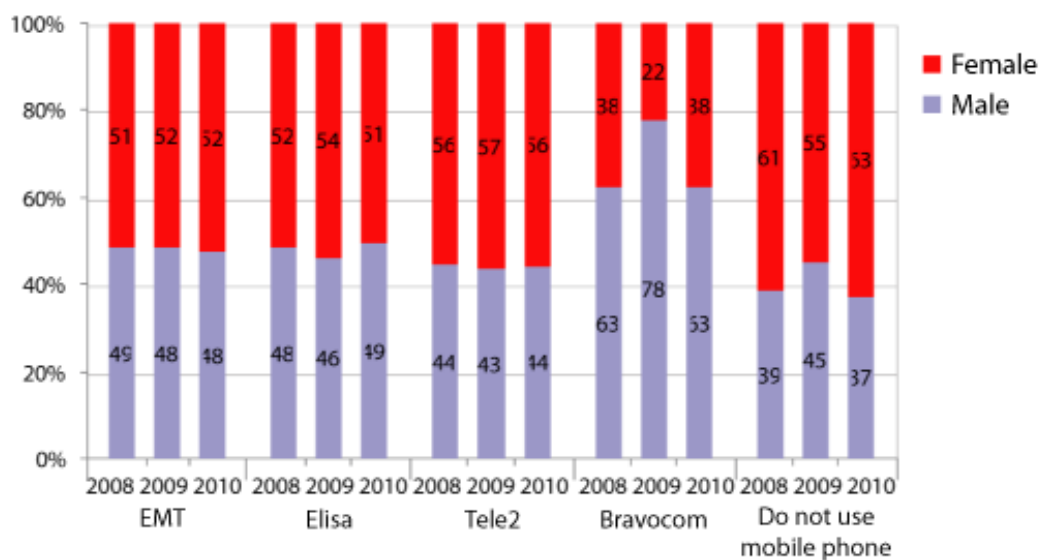


Figure 2. The distribution of mobile operator customers according to gender in 2008, 2009 and 2010.

The majority of EMT customers are people between the ages 40–49, with a three-year average of 21%, followed by customers between the ages 30–39 (Figure 3); while 20–29-year-olds

comprise the majority of the customers for Elisa and Tele2, with a three-year average of 24% in Elisa and 20% in Tele2.

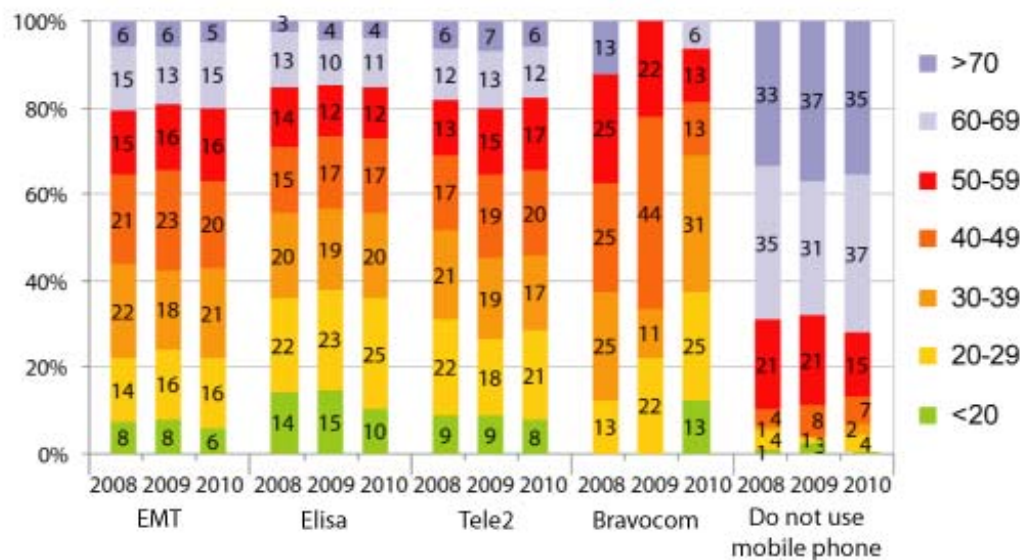


Figure 3. The distribution of mobile operator customers according to age in 2008, 2009 and 2010.

The majority of EMT customers are Estonians (with a three-year average of 83%), while 15% are Russians and 2% from other nationalities (Figure 4). The ratio of Estonians is lowest for Tele2 customers (with a three-year average of 58%) and the ratio of Russians is highest (with a three-year average of 38%).

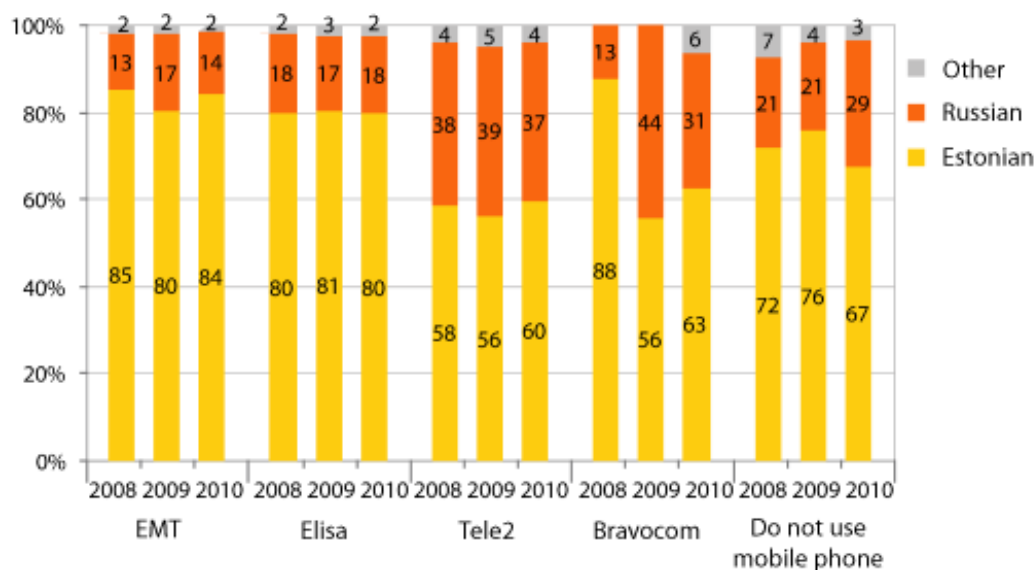


Figure 4. The distribution of mobile operator customers by nationality in 2008, 2009 and 2010.

In terms of level of education, there are more people with higher education among EMT customers compared to other mobile operators, with a three-year average of 28% in EMT and 20% in Elisa and Tele2 (Figure 5). However, the majority of EMT customers have vocational education (with a three-year average of 32%), the three-year average ratio of which was also largest for Elisa and Tele2.

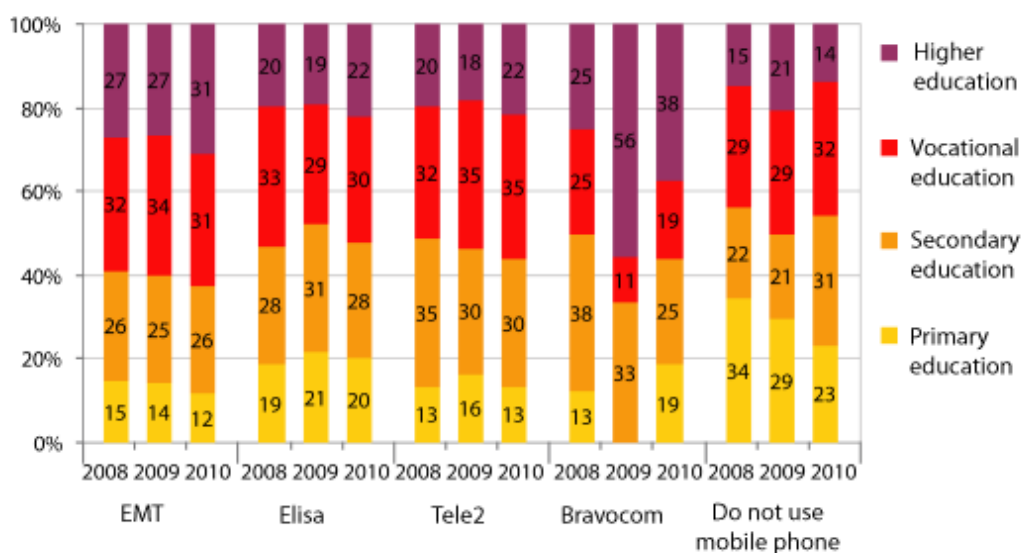


Figure 5. The distribution of mobile operator customers by education in 2008, 2009 and 2010.

For EMT, as well as the other mobile operators, the net income per person for the majority of the customers was under 4000 kroons (255 euros) for the month preceding the questionnaire, with a three-year average of 32% for EMT, 37% for Elisa and 41% for Tele2 (Figure 6). For EMT, the ratio of customers who received more than 10 000 kroons (640 euros) in the month preceding the questionnaire was higher compared to the other mobile operators, with a three-month average of 16% for EMT, 12% for Elisa and 9% for Tele2.

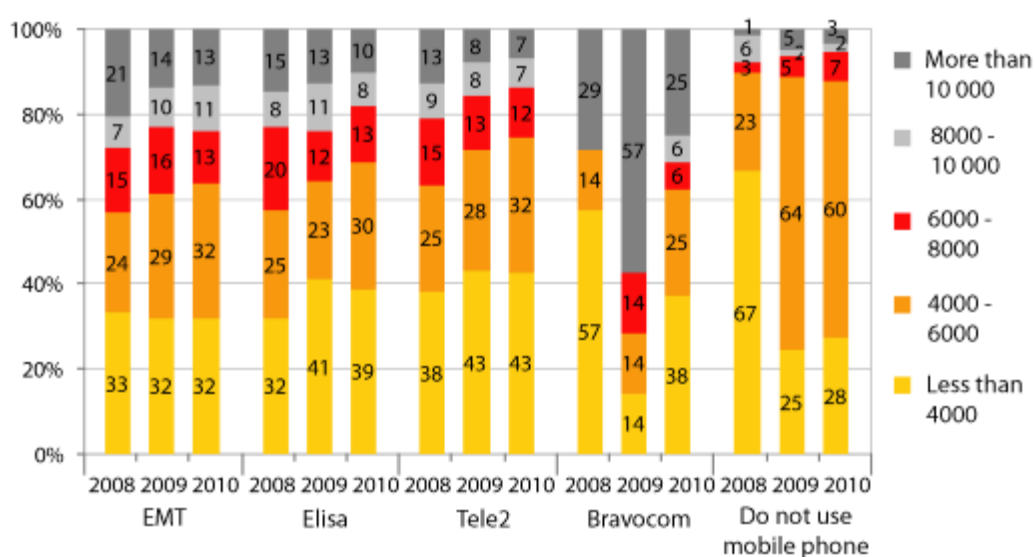


Figure 6. The division of mobile operator customers by income in 2008, 2009 and 2010.

3. Estonians to Finland

3.1. The number of Estonian visits to Finland

On the average, Finland is annually visited by 328 152 Estonians, who are doing an average 1 368 120 visits per year. 210 625 (64%) of the people live in the Harju County and 154 970 (47%) in Tallinn (Table 2). An average of 535 589 visits are made to Finland from Tallinn, 98% of which are made directly from Estonia to Finland with no stops to other countries on the way. From Estonia as a whole, an average of 1 347 176 trips are made directly from Estonia to Finland per year. Residents from all over Estonia spend an average of 6 110 115 days and 4 902 651 nights in Finland, while people from Tallinn spend 1 767 930 days and 1 309 777 nights there. Tallinn's ratio among Estonians who visit Finland is approximately 37% and that of the Harju County is 55%.

Table 2. Annual average indicators of visits made to Finland by Estonians, by region of residence.

	Tallinn	Harju County	Estonia
Number of Estonian visitors	154 970	210 625	328 152
Number of visits made by Estonians	535 589	789 500	1 368 120
Number of trips made by Estonians from Estonia to Finland	523 666	773 677	1 347 176
Number of trips made by Estonians from Finland to Estonia	523 794	773 869	1 347 406
Number of days Estonians spent in Finland	1 767 930	2 844 284	6 110 115
Number of nights Estonians spent in Finland	1 309 777	2 161 018	4 902 651

3.2. The duration of visits

The duration of the visits Estonians make to Finland is on the average 4.5 days. For people living in the Harju County and Tallinn, the figure is significantly lower, being respectively 3.6 and 3.3 days. Estonians make the majority of the visits from Estonia to Finland last for one day (Table 3). The ratio of one day visits for people living in Tallinn is 33%, while it is 31% for people living in the Harju County and 27% for people all over Estonia. The one day visits are followed by two day visits and then transit visits. The ratio of the visits that last for 5 or more days is quite high among Estonians, being 18% for people living in Tallinn, 20% for those living in the Harju County and 27% for people all over Estonia.

Table 3. The duration of visits made to Finland by Estonians by region of residence.

Duration of visits	Tallinn		Harju County		Estonia	
	Number of visits	%	Number of visits	%	Number of visits	%
Transit	73 748	14.1	103 594	13.4	156 576	11.6
1 day	170 843	32.6	243 655	31.5	368 798	27.4
2 days	103 932	19.8	150 466	19.4	243 663	18.1
3 days	48 752	9.3	71 048	9.2	126 207	9.4
4 days	31 747	6.1	47 245	6.1	88 676	6.6
5 days	21 115	4.0	33 084	4.3	63 911	4.7
6 days	12 762	2.4	19 791	2.6	41 389	3.1
7 days	8 225	1.6	12 680	1.6	28 689	2.1
8 days	6 908	1.3	11 086	1.4	25 544	1.9
9 days	5 748	1.1	9 543	1.2	23 235	1.7
10+ days	39 886	7.6	71 484	9.2	180 487	13.4
Total	523 666	100.0	773 678	100.0	1 347 176	100.0

3.3. The frequency of visits

On the average, Estonians make 4.2 visits to Finland per year, while people from the Harju County make 3.7 visits and people living in Tallinn 3.5 visits. The majority of Estonians travel to Finland once a year (Table 4), 50% of all Estonians and 44% of the people living in Tallinn. 18% of Estonians travelling to Finland and 19% of the people from Tallinn travel to Finland twice a year. The ratio of Estonians who visit Finland 5 or more times per year is 19% for people all over Estonia and 22% for Tallinn.

Table 4. Annual frequency of visits made to Finland by region of residence.

Frequency of visits	Tallinn		Harju County		Estonia	
	Number of visitors	%	Number of visitors	%	Number of visitors	%
1	68 488	44.1	95 674	45.3	164 093	49.9
2	29 725	19.1	39 764	18.8	58 789	17.9
3	14 650	9.4	19 351	9.2	27 190	8.3
4	8 180	5.3	10 809	5.1	15 052	4.6
5	5 374	3.5	6 960	3.3	9 558	2.9
6	3 727	2.4	4 856	2.3	6 680	2.0
7	2 876	1.9	3 707	1.8	5 104	1.6
8	2 207	1.4	2 929	1.4	4 163	1.3
9	1 913	1.2	2 523	1.2	3 570	1.1
10+	18 116	11.7	24 446	11.6	34 767	10.6
Total	155 256	100.0	211 018	100.0	328 966	100.0

3.4. The length of stay in Finland

The average number of days Estonians annually spend in Finland is 18.6 days for people all over Estonia, 13.5 days for people from the Harju County and 11.4 for people from Tallinn. The majority of Estonians who have visited Finland have spent less than 30 days in Finland per year (Figure 7). 85% of people from all over Estonia, Tallinn and the Harju County alike have spent less than 30 days in Finland a year, while 24% have stayed there for only one day. The ratio of Estonians who stay in Finland more than 30 days per year is 15% for people from all regions. The average number of Estonians who spend more than 183 days in Finland per year, i.e. temporary workers, is 5 260 (3%) for the people living in Tallinn and 13 652 (4%) for the people from all over Estonia.

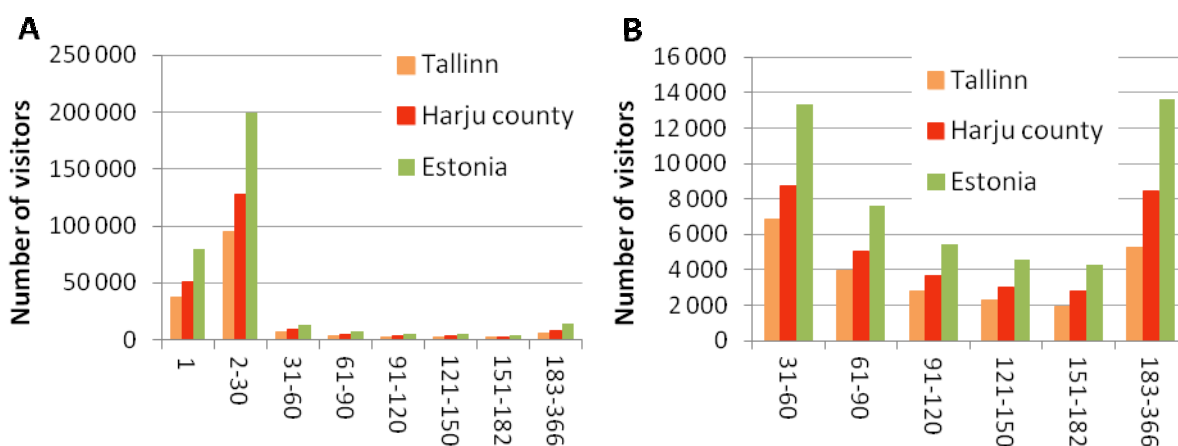


Figure 7. Number of Estonians in Finland by number of days spent in Finland each year and by region of residence: A: 1–366 days, B: 31–366 days.

3.5. The timing of visits

Years

Estonians from all over Estonia make an average of 1 347 176 visits from Estonia to Finland per year, while the same ratio for the Harju County is 773 677 and 523 666 for Tallinn. The number of visits made to Finland from all the studied regions has increased over the observed years (Figure 8). In 2009, Estonians made 1 255 743 visits to Finland per year, while in 2011 the number of visits was 1 437 273 or 14% more. As compared to 2009, the number of visits made to Finland by people from Tallinn grew in 2011 by 15% and by 16% for people from the Harju County.

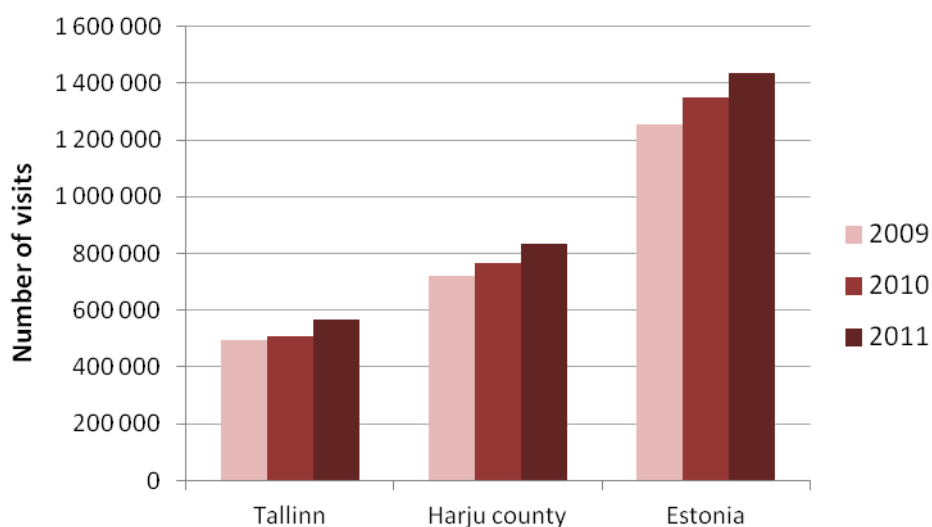


Figure 8. The number of visits made by Estonians to Finland each year, by years (by the starting time of the visits) and regions of residence.

The duration of the visits made by Estonians from Estonia to Finland has also increased over the observed years: in 2009, the visits Estonians made to Finland lasted for 4.2 days on the average, while in 2011 the duration was 4.6 days. The duration of the visits made from Estonia to Finland by people from Tallinn was on the average 3.1 days in 2009, and 3.5 days in 2011.

The amount of visits made by Estonians from Tallinn to Finland has increased (Figure 9). The change has been most perceivable concerning the visits that last for 5 or more days, which grew from 82 882 visits in 2009 to 110 430 or 33% more in 2011. The amount of visits that last 2–4 days has increased by 16% and the amount of one-day visits by 10% in 2011, as compared to 2009. The amount of transit visits, similarly to other visit duration groups, was highest in 2011, but lowest in 2010, not in 2009.

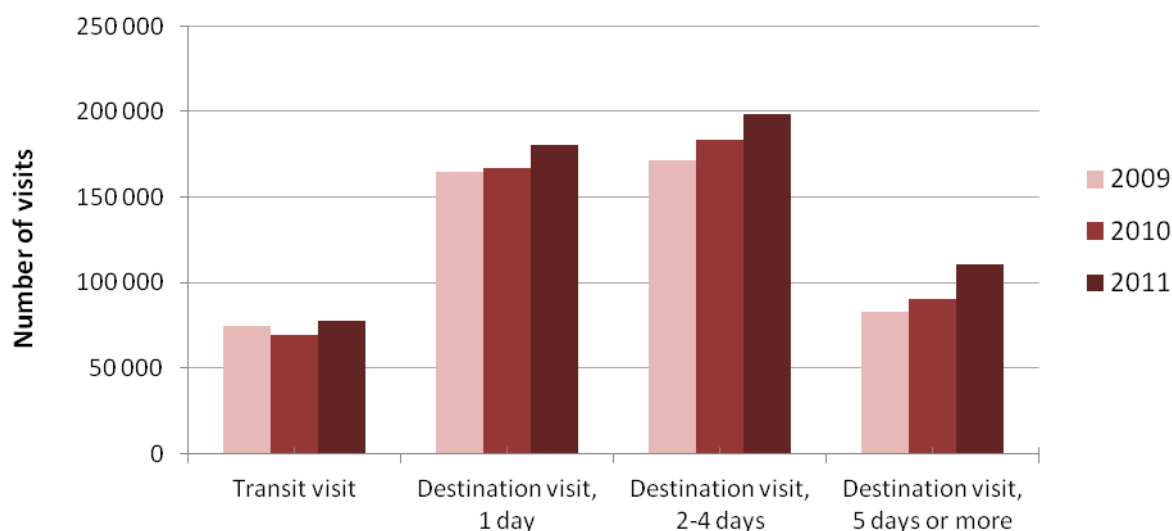


Figure 9. The number of visits made to Finland by Estonians from Tallinn, by years (by the starting time of the visits) and the duration of visits.

The frequency of visits Estonians make to Finland has increased over the years: 3.9 visits per year were made to Finland from all over Estonia in 2009 and 4.3 visits in 2011. The number of visits made to Finland per year has also increased for people living in Tallinn and Harju County. The average number of visits made to Finland by people from Tallinn was 3.3 visits in 2009 and 3.6 visits in 2011.

The number of people making 5 or more visits to Finland per year has increased (Figure 10) the most over the observed years. The people living in Tallinn who visit Finland 5 or more times per year made 315 300 visits to Finland in 2009, and 383 863 visits or 22% more in 2011. The number of people visiting Finland one and 2–4 times per year was lowest in 2010 and highest in 2011, increasing by 8% for people making one visit to Finland, and by 7% for people making 2–4 visits.

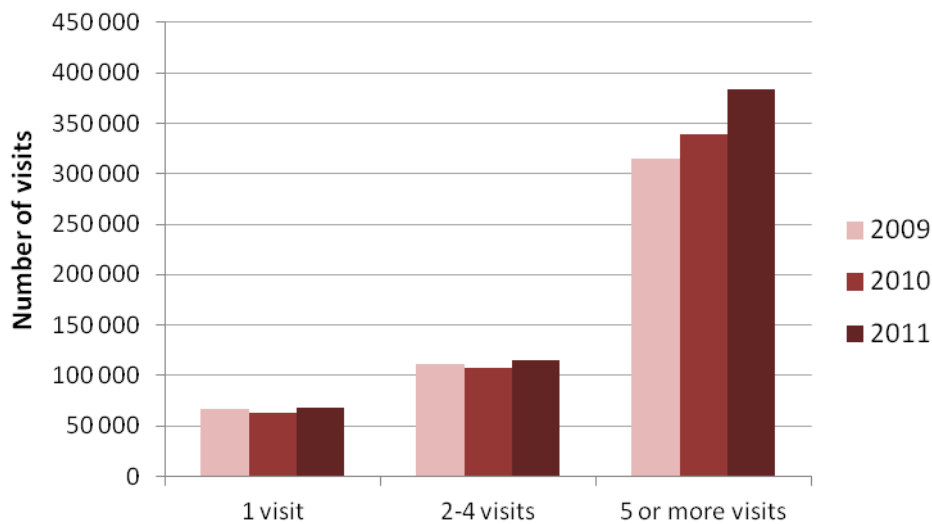


Figure 10. The number of visits made to Finland by Estonians from Tallinn, by years (by the starting time of the visits) and the yearly number of visits.

The number of days Estonians spend in Finland has increased by over 20%. Estonians who made a visit to Finland spent on the average 16.4 days there in 2009, but 20.2 days in 2011; people living in Tallinn spent 10.3 days in Finland in 2009 and 12.5 days in 2011.

The number of visits to Finland that last 30 or more days per year made by people living in Tallinn has increased the most over the observed years (Figure 11). The number of 30 or more day visits that people from Tallinn made to Finland was 248 425 in 2009 and 302 525 or 22% more in 2011. The number of visits by people who spend 183 or more days in Finland has increased by 31% over the years. The number of visits by people from Tallinn who spend less than 30 days in Finland was lowest in 2010 and highest in 2011, differing approximately 10%.

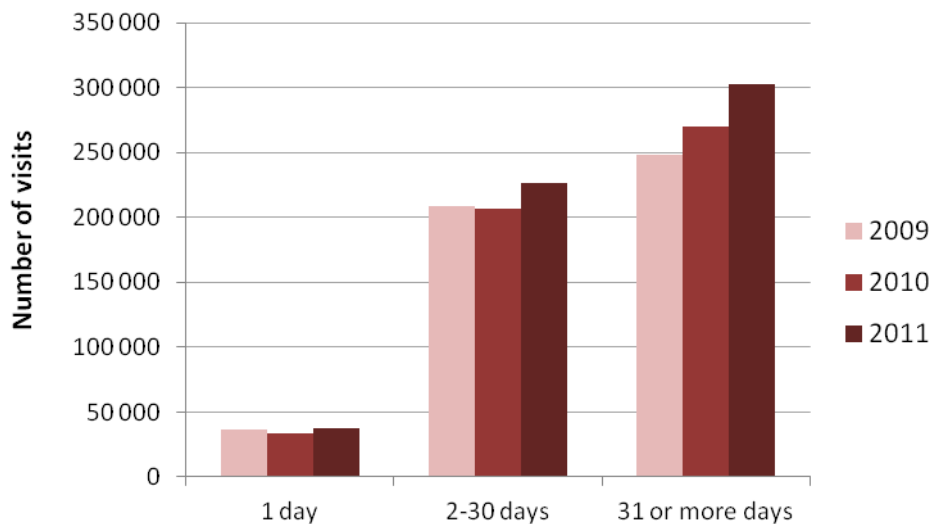


Figure 11. The number of visits made to Finland by Estonians from Tallinn, by years (by the starting time of the visits) and the number of days spent in Finland per year.

Months

The number of visits made to Finland by Estonians varies according to months; more visits are made to Finland during the summer months than in the winter period (Figure 12). In all the observed regions and years, most visits have been made to Finland in August. In August, Estonians make on the average 137 318 visits and people from Tallinn make 51 215 visits to Finland. The minimal and maximal number of visits per month varies by 44 360 visits for all Estonians, by 22 306 visits for people in the Harju County and by 44 360 visits for people from Tallinn. In addition to the larger number of visits during summer months, there is also a peak in March, which is especially dominant in 2010. In 2009, the month with the lowest number of visits was December, in 2010, it was February (April in case of Tallinn) and again February in 2011. The difference between the minimal and maximal monthly figures for Estonia as a whole is 48%, for the Harju County 41% and 36% for Tallinn.

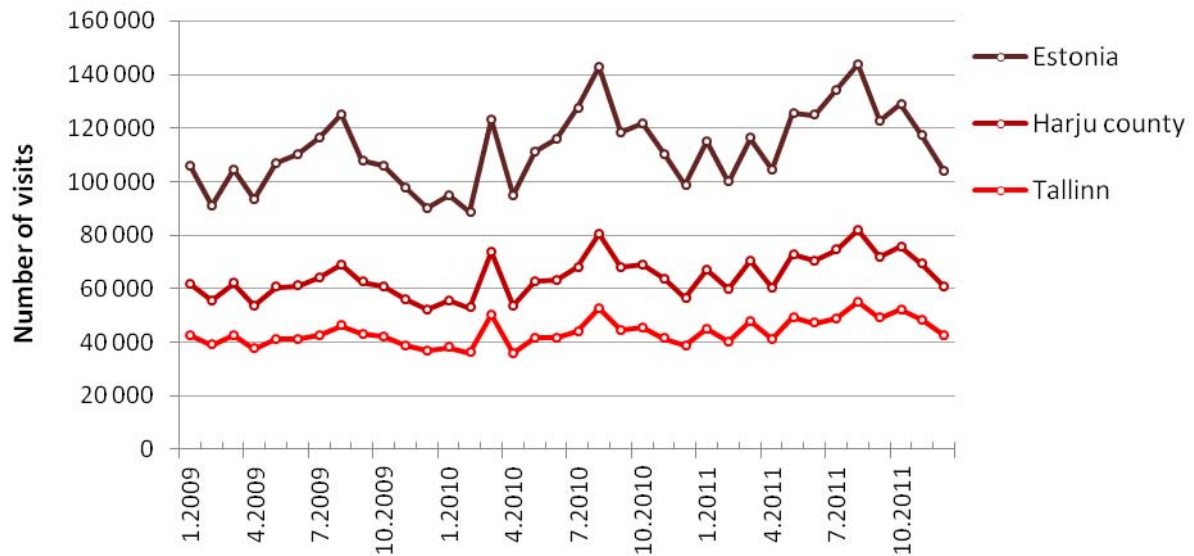


Figure 12. The number of visits made to Finland by Estonians, by regions of residence and by months (by the starting time of the visits).

Depending on the duration of visits made to Finland by people living in Tallinn, seasonal differences emerge concerning one day visits and visits lasting for 2–4 days (Figure 13). During all the observed years, the month with the highest number of one day and 2–4 day visits is August. The month with the lowest number of visits varies depending on the region and year from December to April. The highest number of 5 or more day visits occurred in July (2009) or August (2010 and 2011), but the lowest number of visits was in December during all the observed years. No seasonal rhythm or the same month of minimal or maximal figures does not emerge with regard to transit visits.

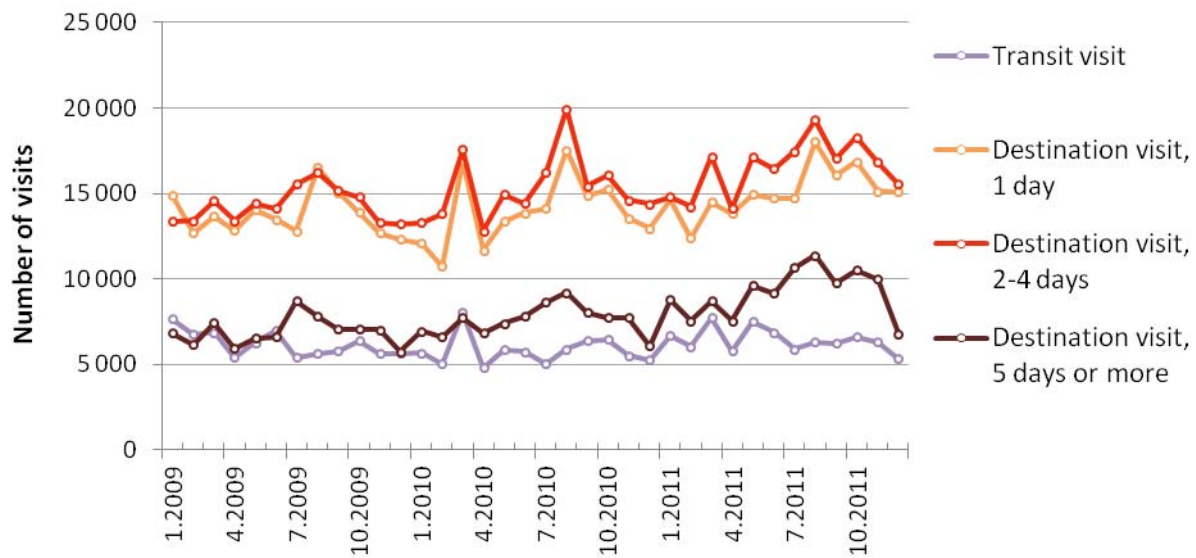


Figure 13. The number of visits made to Finland by Estonians from Tallinn, by duration of visits and by months (by the starting time of the visits).

No similar yearly variety with regard to the number of visits emerges (Figure 14). The number of people from Tallinn who visit Finland once or 2–4 times per year varies similarly in the course of months. No months with the same minimum or maximum number of visits emerge across the observed years. The difference between the maximum and minimum absolute figures of monthly visits is largest for people who make 5 or more visits to Finland per year; percentage-wise, the greatest difference emerges regarding people who make one visit to Finland per year.

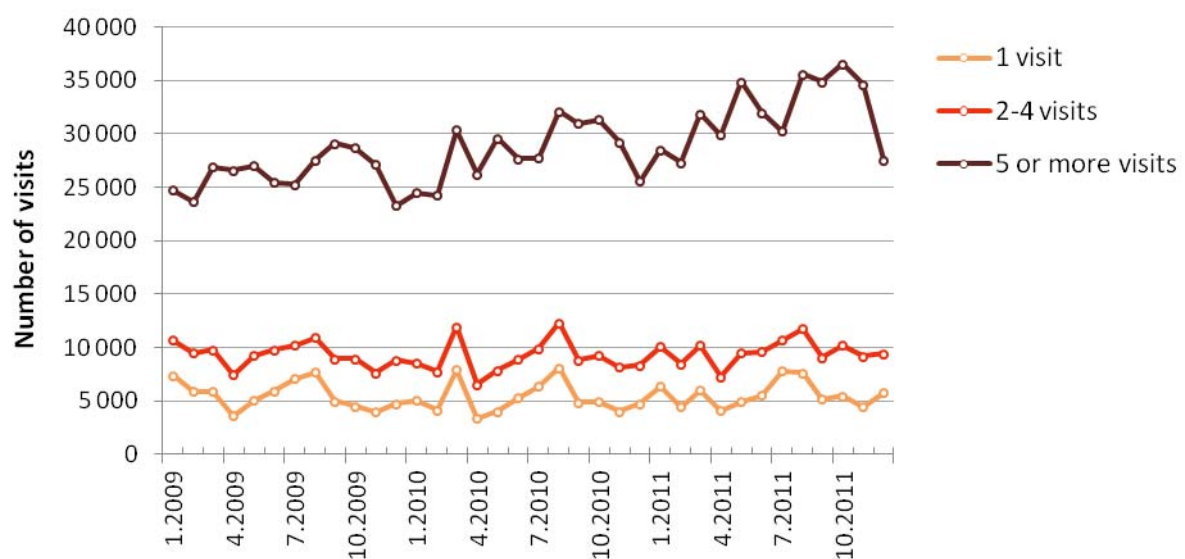


Figure 14. The number of visits made to Finland by Estonians from Tallinn, by the yearly number of visits and by months (by the starting time of the visits).

No clear seasonal variety emerges in any groups concerning the number of days people living in Tallinn spend in Finland during their visits (Figure 15). The maximum number of visits to Finland that last 2–30 days per year occurred in August in all the observed years, while the minimum occurs in different months. The smallest number of visits to Finland that last over 30 days per year was made in February during all the observed years, while the peak was in August (2010), September (2009) or October (2011). However, regarding one day visits to Finland by people living in Tallinn, both the minimum and maximum occur during different months.

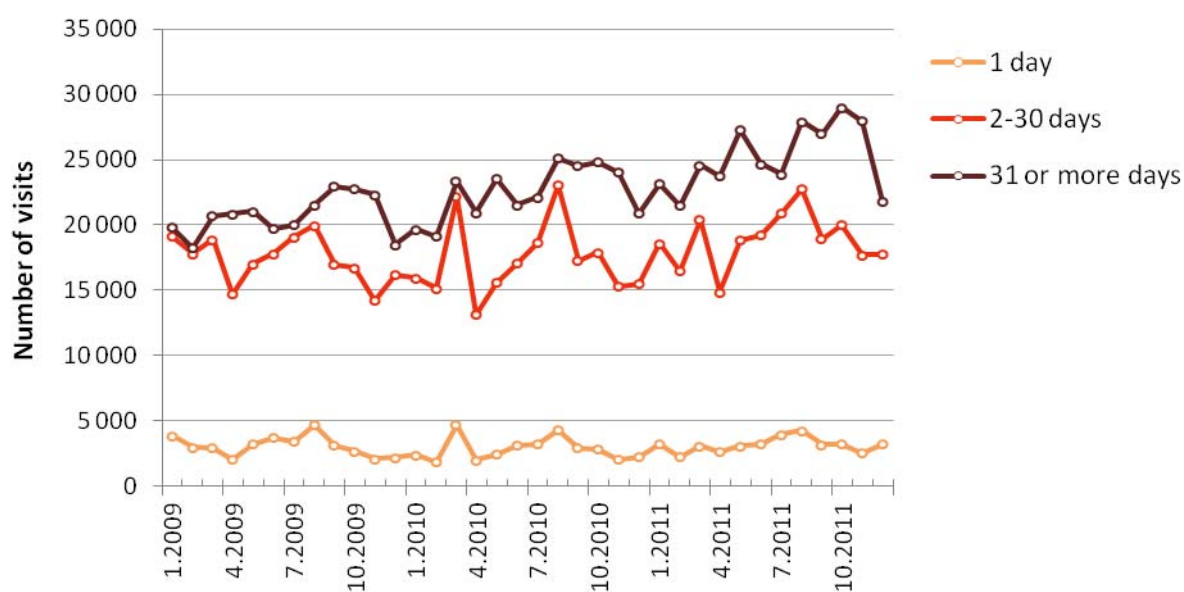


Figure 15. The number of visits made to Finland by Estonians from Tallinn, by the number of days spent per year and by months (by the starting time of the visits).

No clear trend emerges concerning the number of visits that last 183 or more days per year made by people from Tallinn to Finland (Figure 16). The month in which the number of visits peaked was September in 2009, August in 2010 and May in 2011. The smallest number of visits occurred in December in 2009 and 2011, and in February in 2010.

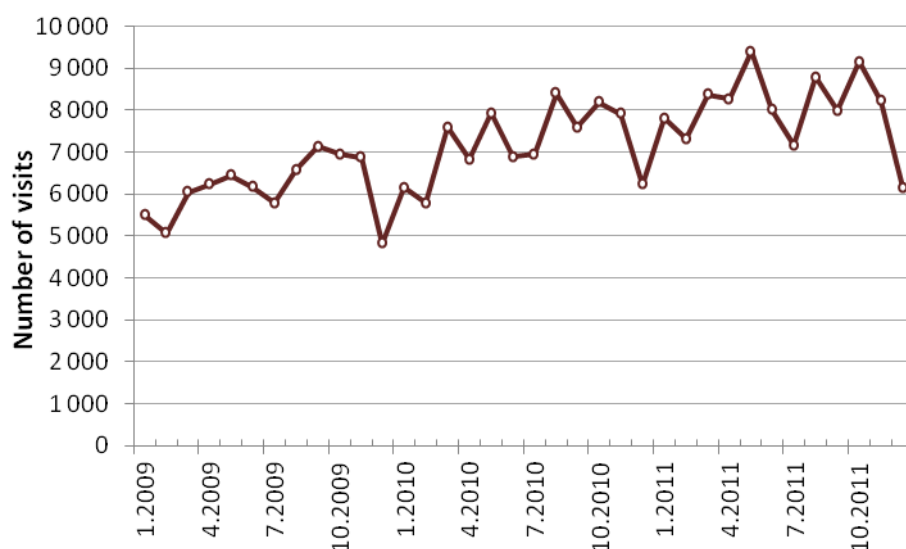


Figure 16. The number of visits that last 183 or more days made to Finland by Estonians from Tallinn, distributed by months (by the starting time of the visits).

Weekdays

There are more Estonians in Finland on working days and less on Saturday and Sunday (Figure 17). The largest numbers of Estonians are in Finland on Wednesdays, while people from the Harju County and Tallinn are there most often on Thursdays; the smallest number of Estonians from all regions are in Finland on Saturdays. On Thursdays, there are on the average 14 983 Estonians in Finland, while on Saturdays on the average 11 547 people or 30% less. The difference between weekdays is slightly smaller concerning the people from Tallinn: on Wednesdays (the maximum day), there are on the average 4 502 Estonians in Finland, while on Saturdays (the minimum), 28% less or on the average 3 513 people.

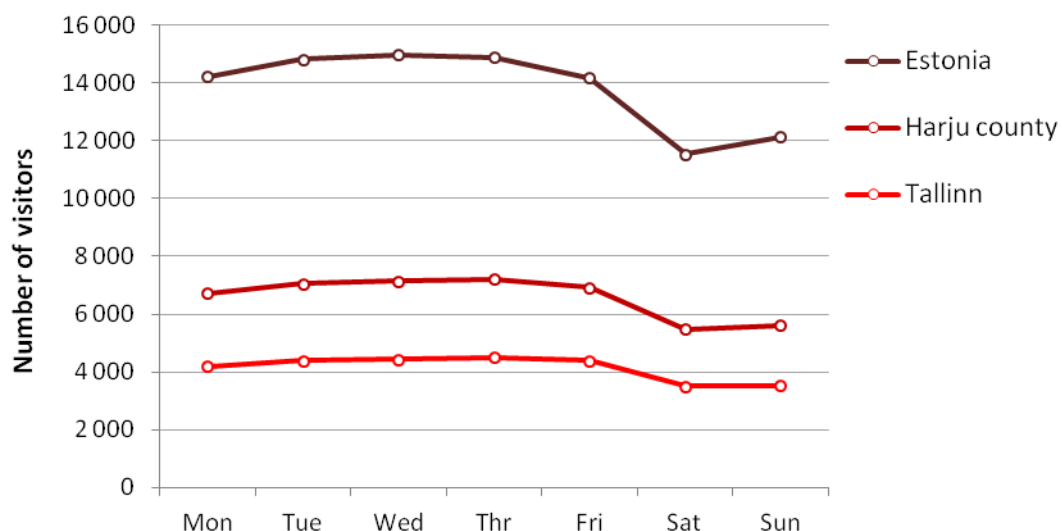


Figure 17. The number of Estonians in Finland by region of residence and day of the week.

People living in Tallinn make most trips from Tallinn to Finland on Mondays and from Finland to Tallinn on Fridays (Figure 18). The smallest number of trips are made from Tallinn to Finland on Saturdays and from Finland to Tallinn on Mondays. There are on the average 1 844 trips made from Tallinn to Finland on Mondays, while only 1 109 trips or 66% less on Saturdays (the minimum day). On Fridays, 1 771 trips are made from Finland to Tallinn, while only 1 208 trips or 80% less on Mondays.

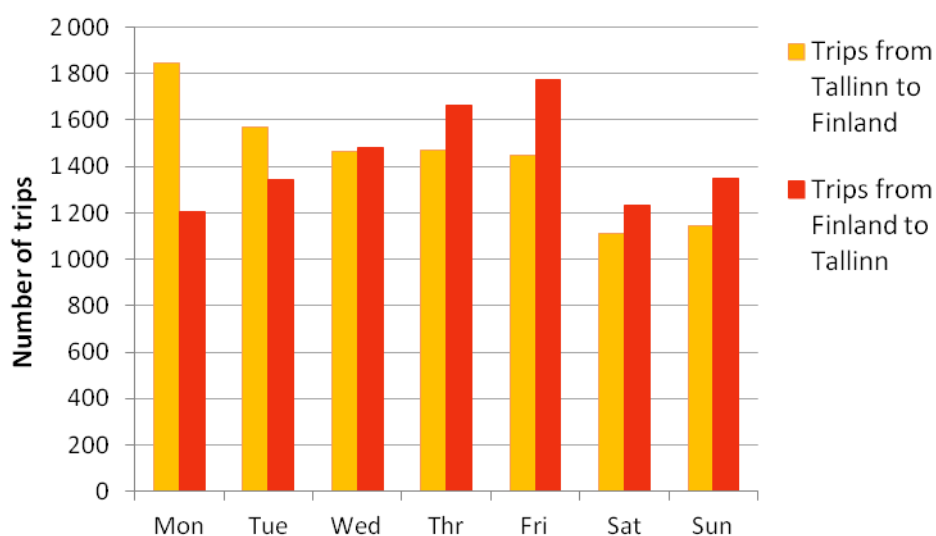


Figure 18. The average number of trips made from Tallinn to Finland and from Finland to Tallinn by Estonians, distributed by the days of the week.

Estonians from all regions similarly make the most trips to Finland on Mondays and the fewest on Saturdays; the most trips from Finland to Estonia on Fridays and the least on Saturdays (Figure 19). Estonians make on the average 5 118 trips to Finland from Estonia on Mondays and 2 597 trips on Saturdays; thus, the difference between the minimal and maximal weekdays is 97%. 4 719 trips are made from Finland to Estonia on Fridays and 57% less or 3 005 trips on Saturdays.

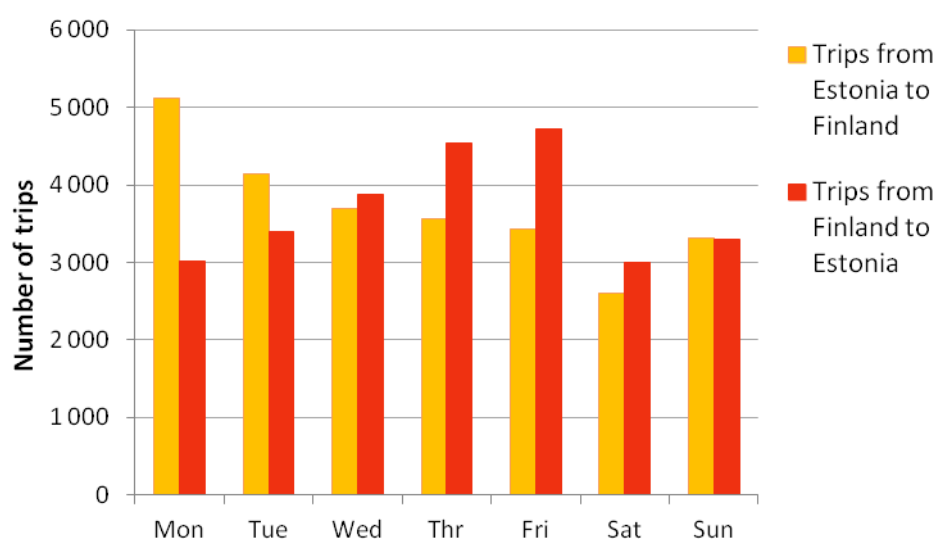


Figure 19. The average number of trips made from Estonia to Finland and from Finland to Estonia by Estonians, distributed by the days of the week.

Depending on the duration of the visit, the weekday that most frequently has the largest number of trips from Tallinn to Finland is Monday, and the day with the least number of trips is Sunday (Figure 20). The largest difference between trips by weekdays emerges concerning the visits that last 5 or more days, where the difference between the days with the maximal (Monday, 502 trips) and minimal (Saturday, 130 trips) number of trips is 287%. In addition to Mondays, another peak concerning 5 or more day visits emerges on Sundays, which is the day with the minimal number of trips for other visit duration groups. The difference between the number of trips from Estonia to Finland made on Mondays and Sundays is 107% for visits that last 2–4 days. The number of trips by weekdays is most consistent concerning transit visits, where the difference between maximal and minimal days is only 29%.

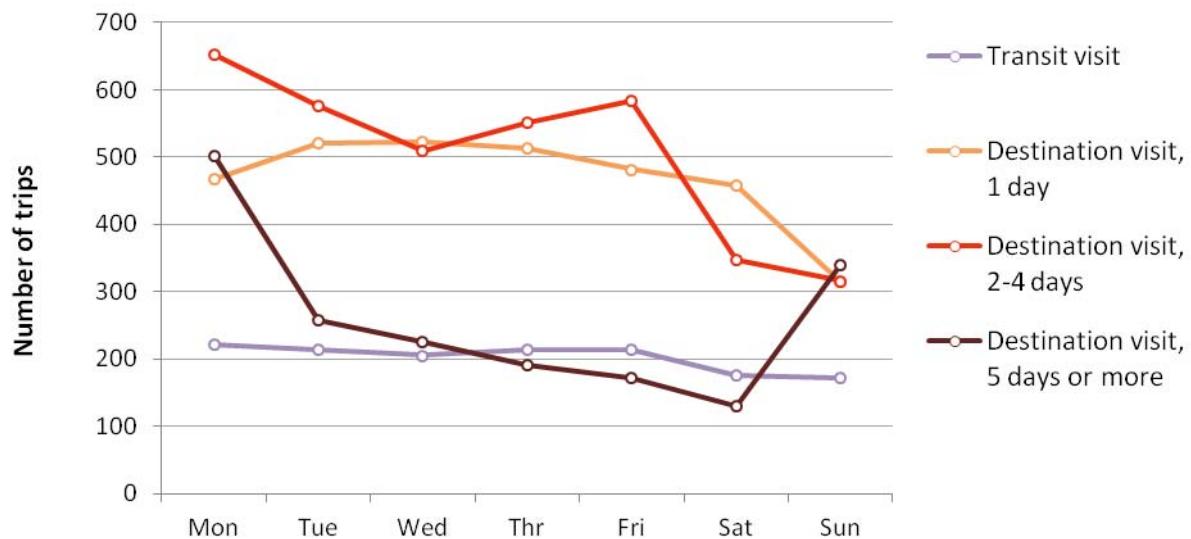


Figure 20. The number of trips made from Tallinn to Finland by Estonians, by the duration of visits and weekdays of the trips.

The people from Tallinn who visit Finland one time or 2–4 times per year are more likely to make a trip from Tallinn to Finland during the weekend than at the beginning of the week (Figure 21). The number of people from Tallinn who make one visit per year to Finland is on the average 242 trips from Tallinn to Finland on Saturdays, compared to the 122 trips on Sundays, or 98% less. The number of trips by people who make 2–4 visits to Finland per year is largest on Fridays (384 trips), and smallest on Sundays (214 trips). The number of trips made to Finland by people from Tallinn who make 5 or more visits to Finland per year varies by weekdays much more significantly than the number of trips made by people who make 1 or 2–4 visits to Finland per year: the peak is on Mondays (1 424 trips), after which the number of trips gradually falls until Saturday, when people make 173% fewer trips than on Mondays. The number of trips from Tallinn to Finland on Sundays for people who make 5 or more visits to Finland per year is on the same level as the number of trips on Fridays.

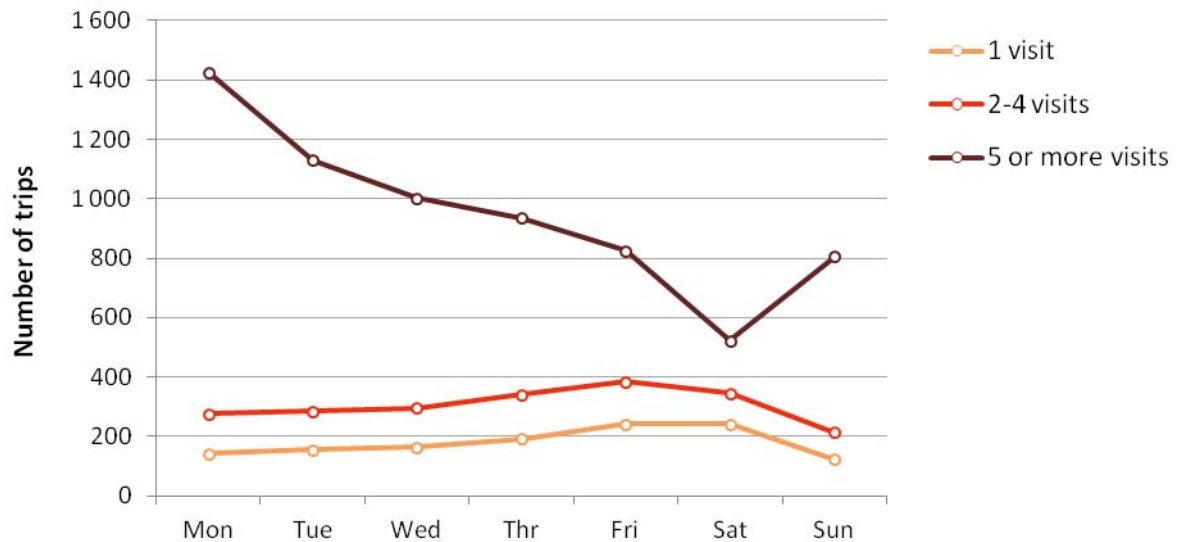


Figure 21. The number of trips made from Tallinn to Finland by Estonians by the yearly number of visits and weekdays of the trips.

Similar tendencies to those evident concerning the number of trips, also emerge with regard to the days spent in Finland within a year (Figure 22). The number of people from Tallinn staying in Finland for 1 day per year is greatest on Saturday (151 trips) and smallest on Sunday (71). The number of trips from Tallinn to Finland by people who spend 2–4 days in Finland per year is maximal on Friday (736 trips) and 95% less on the minimal day (Sunday). The people from Tallinn who spend 30 or more days in Finland per year make the largest number of trips from Tallinn to Finland on Monday (1 223 trips), while only 366 or 235% less trips on Saturday.

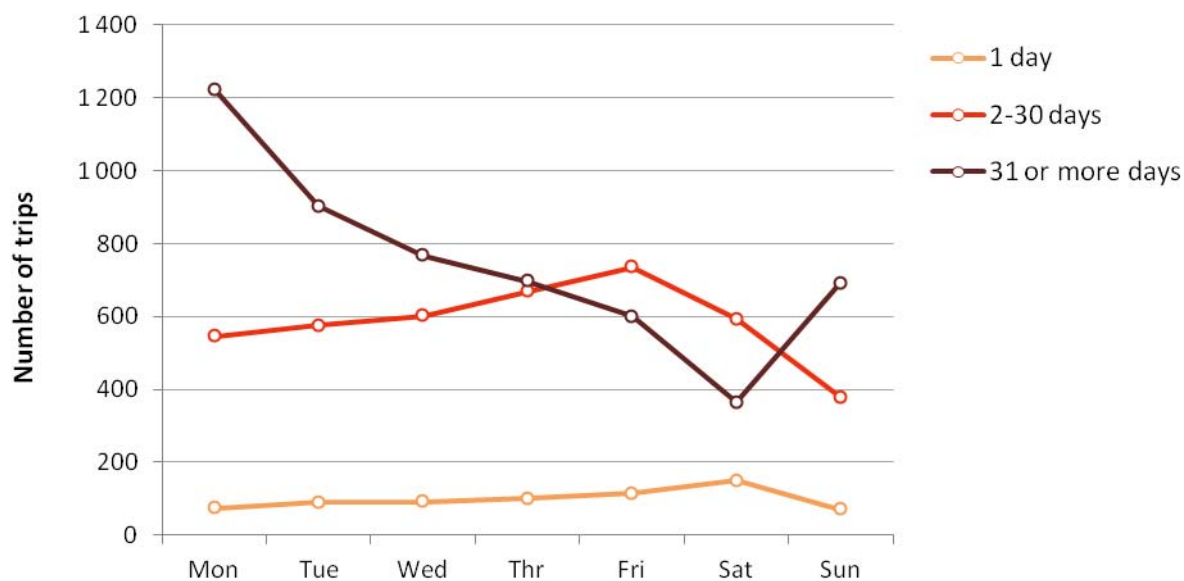


Figure 22. The number of trips made by Estonians from Tallinn to Finland, by the number of days spent per year and weekdays of the trips.

People from Tallinn who spend 183 or more days in Finland per year make the most trips from Tallinn to Finland on Monday and the least on Saturday (Figure 23). The number of trips on Sundays is comparable to the number of trips on Tuesdays.

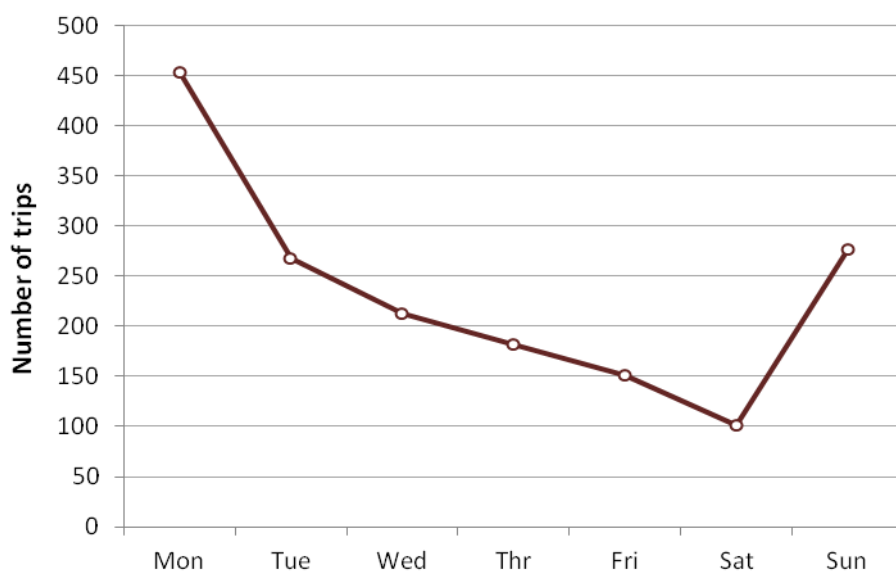


Figure 23. The number of trips made by people from Tallinn who spend 183 or more days in Finland per year, distributed by the days of the week.

Days

With reference to days, it becomes clear that there are fewer Estonians in Finland around Good Friday (April 10 in 2009, April 2 in 2010 and April 22 in 2011), on the days surrounding Midsummer's Day (June 24) and on Christmas Day (December 25) (Figure 24). Each year, on these days the number of Estonians in Finland is considerably lower compared to other days. No sudden increase of visitors to Finland can be pointed out on any certain day. The same days also stand out (although to a lesser extent) concerning the visits made to Finland by people from Tallinn.

The weekly rhythm in the visits Estonians make to Finland is apparent throughout the year and on all the observed years alike.

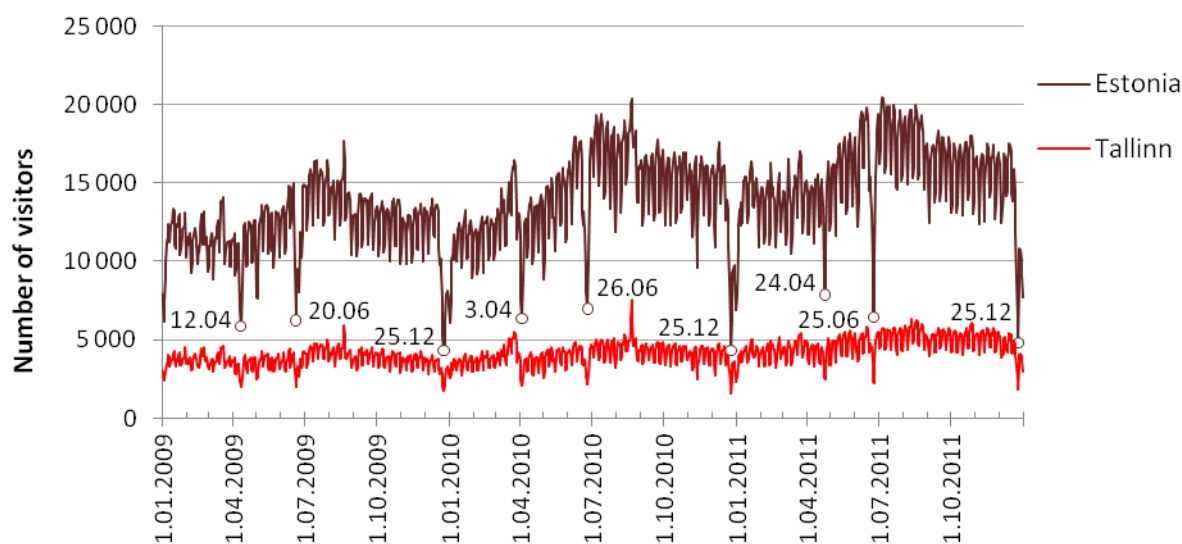


Figure 24. The number of Estonians from Estonia and Tallinn in Finland, distributed by days.

3.6. Home Places of Visitors in Estonia

The highest number of Estonians who have visited Finland come from Tallinn and Tartu, where the number of people who have visited Finland exceeds 10 000 (Figure 25). More than 5000 people from the city of Pärnu and from the parishes of Viimsi, Harku and Rae also visit Finland in a year.

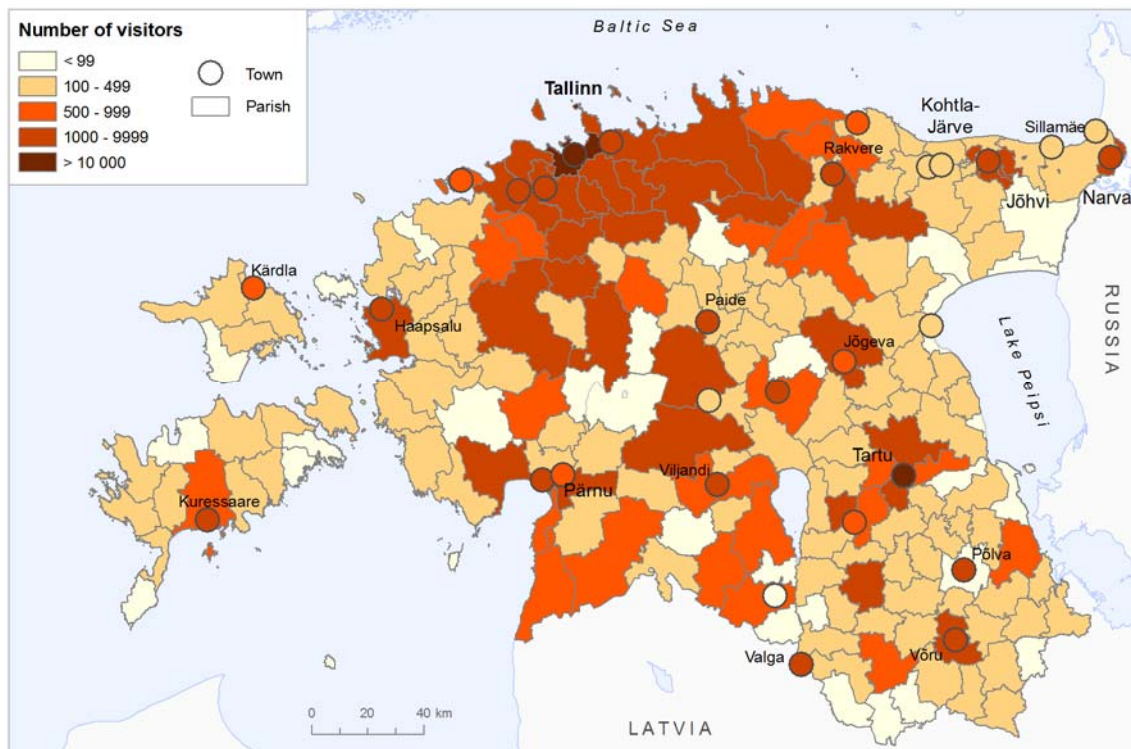


Figure 25. Division of the places of residence of the people from Estonia who have visited Finland by municipalities.

People from Tallinn form 40% of those who have taken a visit to Finland and people from other municipalities in Harju County 17%. When comparing the places of residence of the people who visited Finland to the settlement of Estonian population (home anchor points of Estonians), it appears that the percentage of Tallinn concerning the visitors of Finland exceeds the home percentage by 12 percentage points, i.e. 40% of the people travelling to Finland and 28% of the home anchor points. The largest opposite difference between the anchor points of the people who visited Finland and all other home anchor points is in the Ida-Viru County which contains 11% of home anchor points but only 3% of the homes of the people who visited Finland. Therefore, the people living in Tallinn and Harju County take more and people living in Ida-Viru County fewer visits to Finland than an average Estonian.

On the basis of the time spent in Finland, the percentage of Tallinn is the highest in case of the visitors who only spend one day a year in Finland (45%) and the lowest in case of the people who spend 183 or more days in Finland (25%) (Table 5). The percentage of other municipalities in Harju County is 18% in case of both the people who spend one day as well as those spending 2-30 days in Finland, and a bit lower (13%) in case of those spending 31-182 and 183 and more days in Finland in a year. Thus, those staying in Finland longer are more often from outside of

Tallinn and Harju County, more from all over Estonia, as well as from smaller municipalities (Figure 26-29).

Table 5. Percentages of the places of residence of the people from Estonia who have visited Finland by county, by the number of days spent in Finland per year.

County name	1 day	2-30 days	31 - 182 days	183 and more days	All
Tallinn	45,2	41,5	27,1	24,5	39,8
Harju County outside of Tallinn	17,7	18,4	13,3	12,6	17,3
Tartu County	10,8	11,0	10,3	10,2	10,8
Pärnu County	4,5	5,1	8,4	9,0	5,5
Lääne-Viru County	3,4	3,7	6,0	6,6	4,1
Viljandi County	2,6	2,9	5,9	6,4	3,4
Ida-Viru County	3,1	2,8	3,1	3,1	2,9
Rapla County	2,6	2,6	3,8	3,9	2,8
Saare County	1,8	1,9	3,7	3,9	2,2
Võru County	1,4	1,8	3,7	4,1	2,1
Jõgeva County	1,4	1,8	3,8	4,2	2,1
Järva County	1,5	1,6	2,8	2,9	1,8
Lääne County	1,5	1,6	2,6	2,7	1,7
Põlva County	1,2	1,5	2,8	2,9	1,7
Valga County	1,0	1,2	2,0	2,1	1,3
Hiiu County	0,5	0,5	0,8	0,7	0,5
<i>Total</i>	<i>100,0</i>	<i>100,0</i>	<i>100,0</i>	<i>100,0</i>	<i>100,0</i>

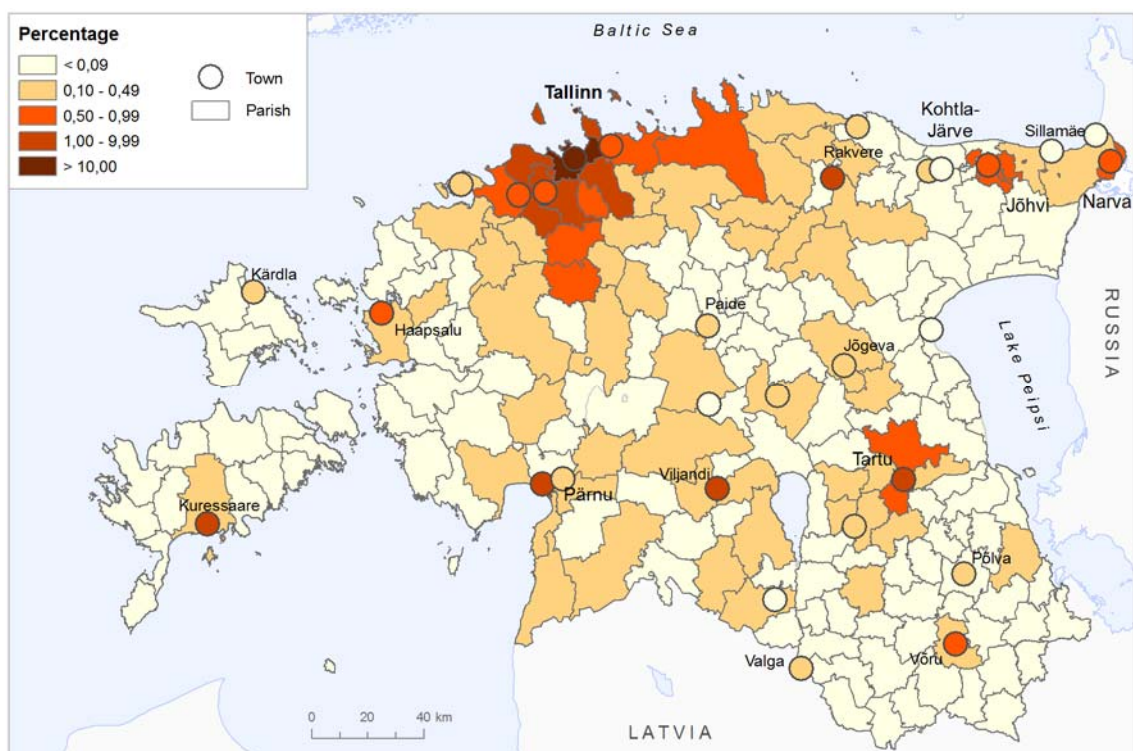


Figure 26. Percentage share of the local governments of the places of residence of the people from Estonia who have spent 1 day in a year in Finland.

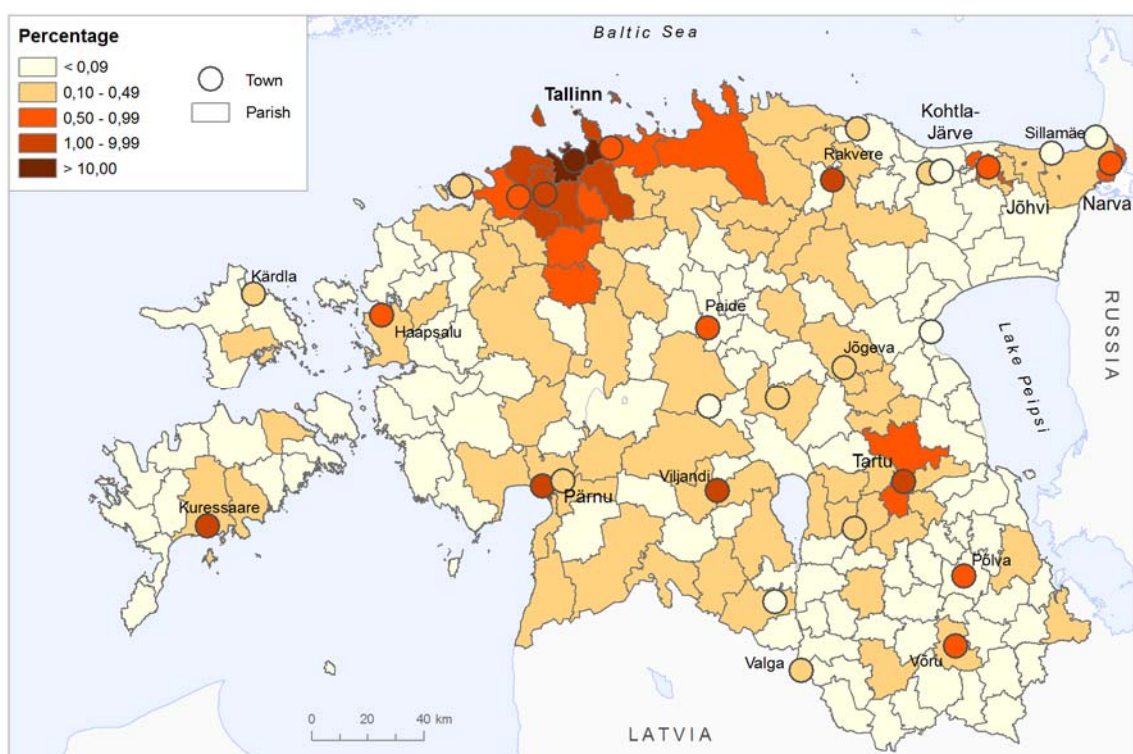


Figure 27. Percentage share of the local governments of the places of residence of the people from Estonia who have spent 2-30 days in a year in Finland.

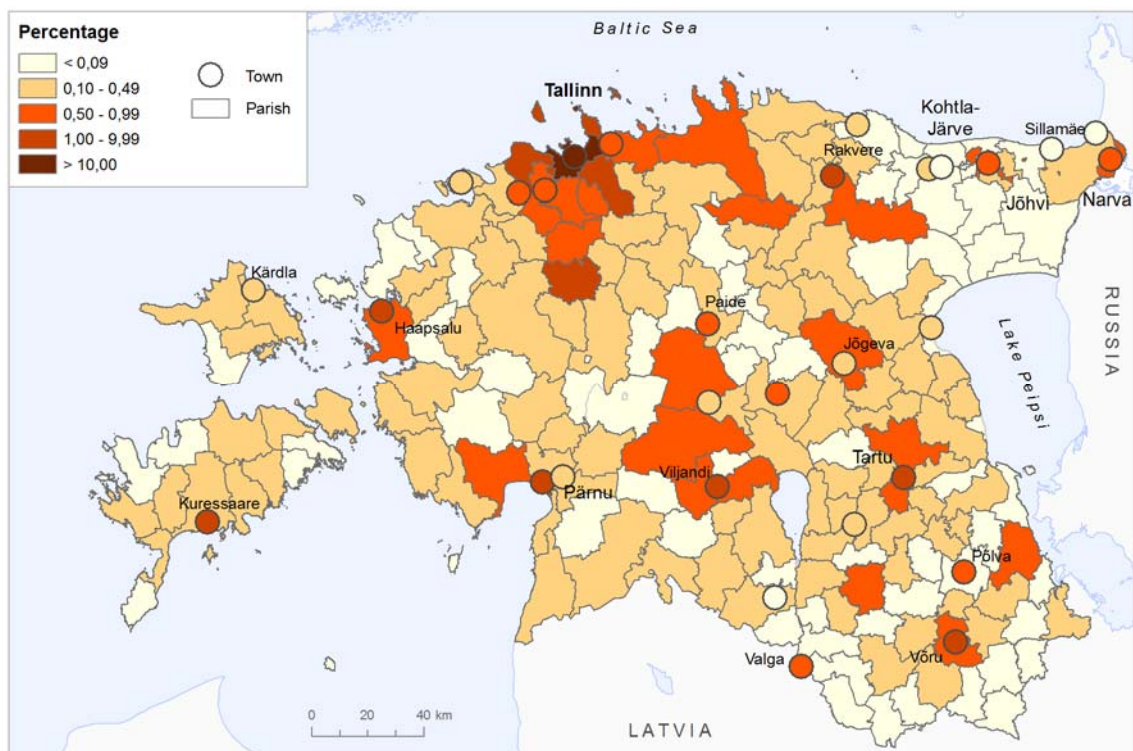


Figure 28. Percentage share of the local governments of the places of residence of the people from Estonia who have spent 31-182 days in a year in Finland.

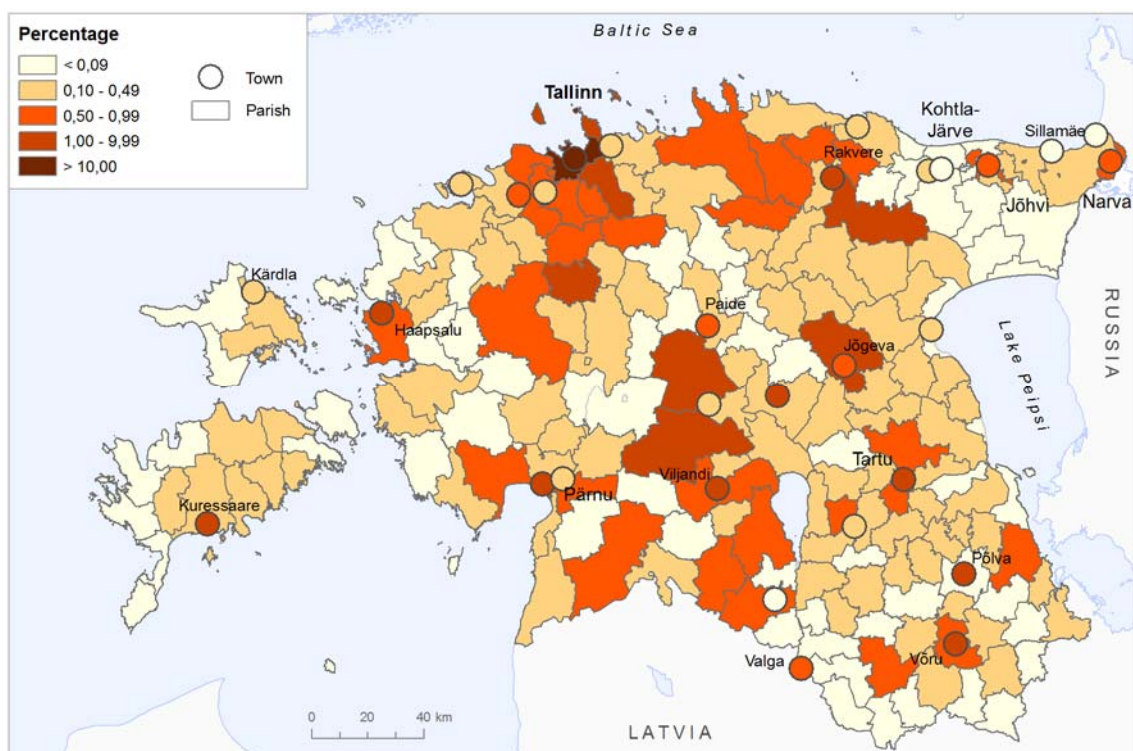


Figure 29. Percentage share of the local governments of the places of residence of the people from Estonia who have spent 183 days or more in a year in Finland.

3.7. The Socio-demographic Profile of Visitors

The relative importance of men and women varies across the different visitor segments. From among all the viewed areas, men take most often 2–4 day visits, while women take 1 day visits (Figure 30). Estonia as a whole forms an exception, as women take slightly more 2–4 day visits than 1 day visits. The importance of 2–4 day visits is on the average 35% for men and 32% for women. The importance of 1 day visits is 28% for men and 36% for women. The relative importance of men is also greater regarding visits that last 5 or more days, reaching 20% for men and 14% for women living in Tallinn, and 32% for men and 25% for women all across Estonia.

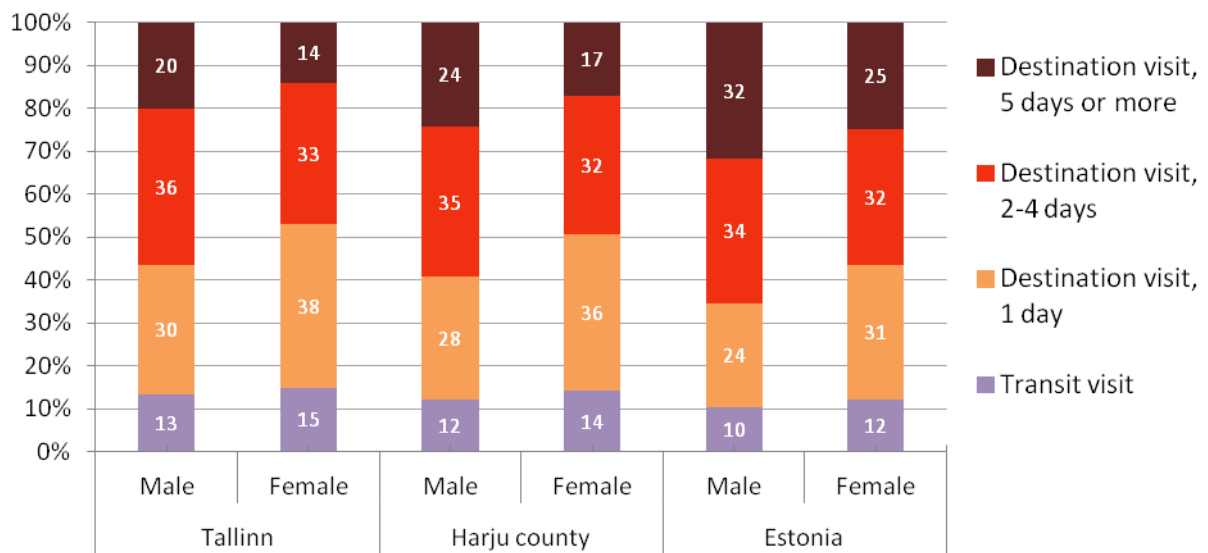


Figure 30. The duration of the visits to Finland scale according to gender and place of residence.

Frequent visits to Finland are taken more often by men; 28% of the men in Tallinn and 26% of the men across Estonia visit Finland 5 or more times a year, while the respective indicators for women are 14% and 12% (Figure 31). The importance of women is greater among people who visited Finland once a year: 50% of the women living in Tallinn and 57% of the women across Estonia made a visit to Finland. The relative importance of the men spending 2–4 days in Finland is on the average 33% and 34% for women in the viewed regions.

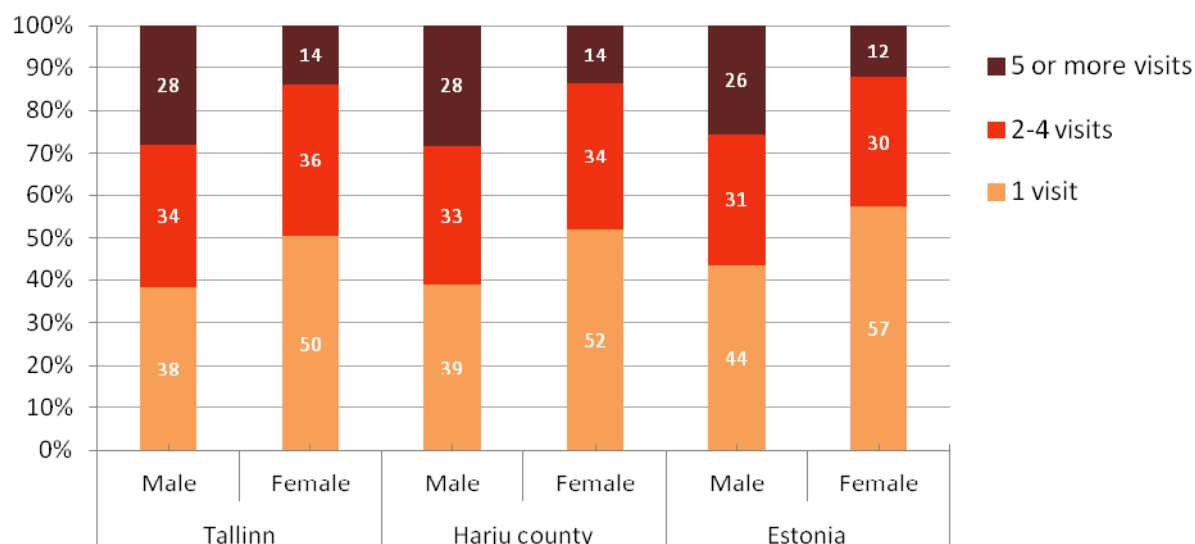


Figure 31. The number of yearly visitors in Finland scale according to gender and place of residence.

Men spend more days in Finland in a year than women do. The relative importance of the men who spend 30 or more days in Finland is on the average 20%, as compared to the 9% for women (Figure 32). An average of 6% of men and only 2% of women spend 183 or more days in Finland per year. The relative importance of women exceeds that of men regarding 1 day stays in Finland, with the average for women being 29% and 20% for men. Men and women who spend 2–30 days in Finland share a more or less similar relative importance, with the indicators across all viewed regions reaching 60% for men and 62% for women.

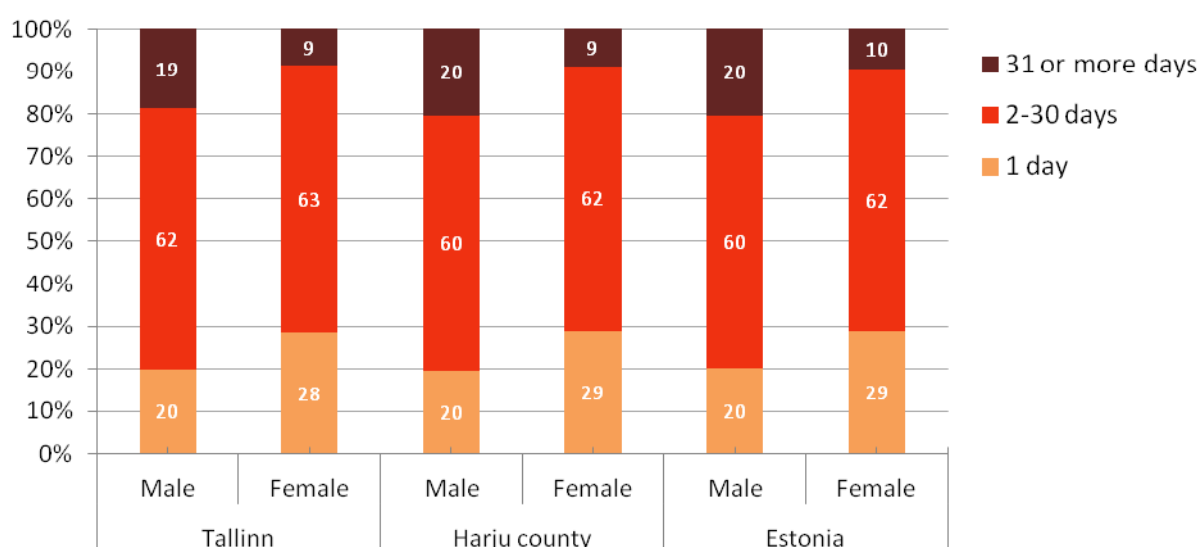


Figure 32. The number of days spent in Finland per year scale according to gender and place of residence.

Nationality reveals certain differences regarding the length of the visits to Finland. The relative importance of the people who do not speak Estonian as their mother tongue is greater regarding transit visits as compared to the Estonian-speaking population; the relative importance of non-Estonian speaking people regarding transit visits is 17%, while the same percentage for the speakers of Estonian is 12% (Figure 33). The relative importance of non-Estonian speaking people is slightly smaller with regard to visits to Finland as a destination, but this difference is very small, remaining at 3 percentage points or less.

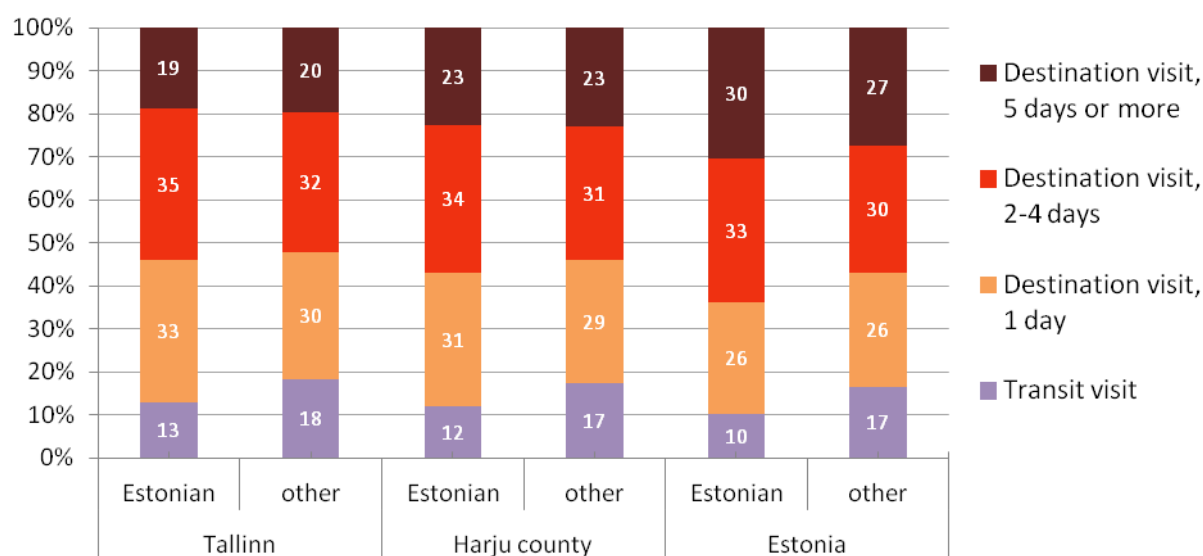


Figure 33. The duration of the visits to Finland scale according to language and place of residence.

Non-Estonian speaking people have a slightly greater relative importance among the people who travel to Finland once a year, the average in the viewed regions for Estonian-speaking people who travel to Finland once a year is 46% as compared to the 50% among non-Estonian speaking people (Figure 34). The difference in the number of visits made to Finland during the rest of the year among the groups is even smaller than the average.

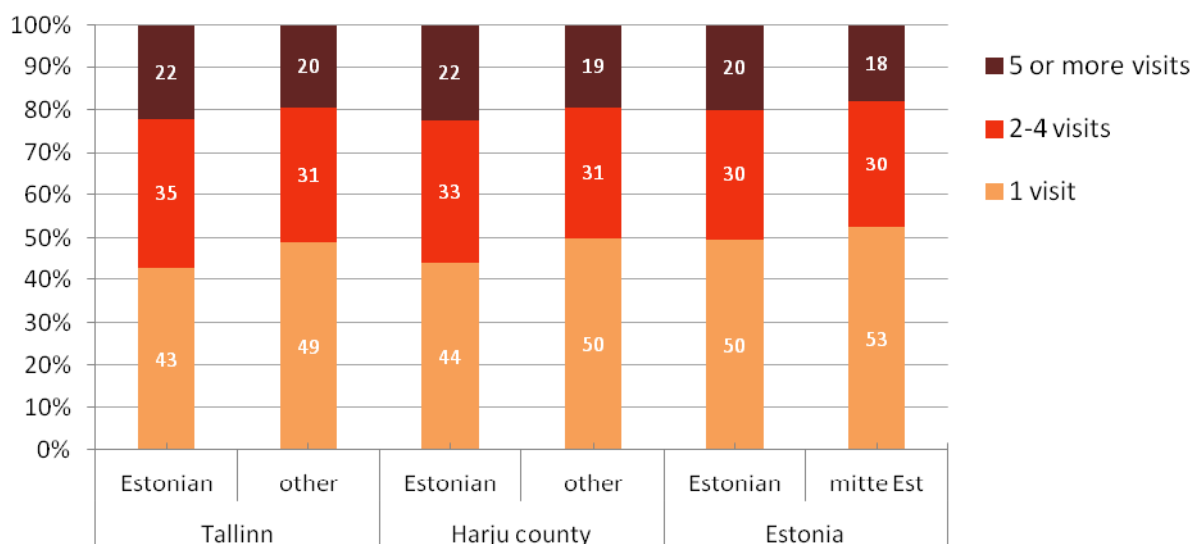


Figure 34. The number of yearly visitors in Finland scale according to language and place of residence.

The difference in the division according to language is greatest regarding the people who stay in Finland for 1 day; 23% of Estonian-speaking people who have visited Finland spend one day per year in Finland, as compared to the 30% of non-Estonian speaking people (Figure 35). The relative importance of Estonian-speaking people exceeds that of the non-Estonian speaking people with regard to both 2–30 day and above 30 day stays in Finland.

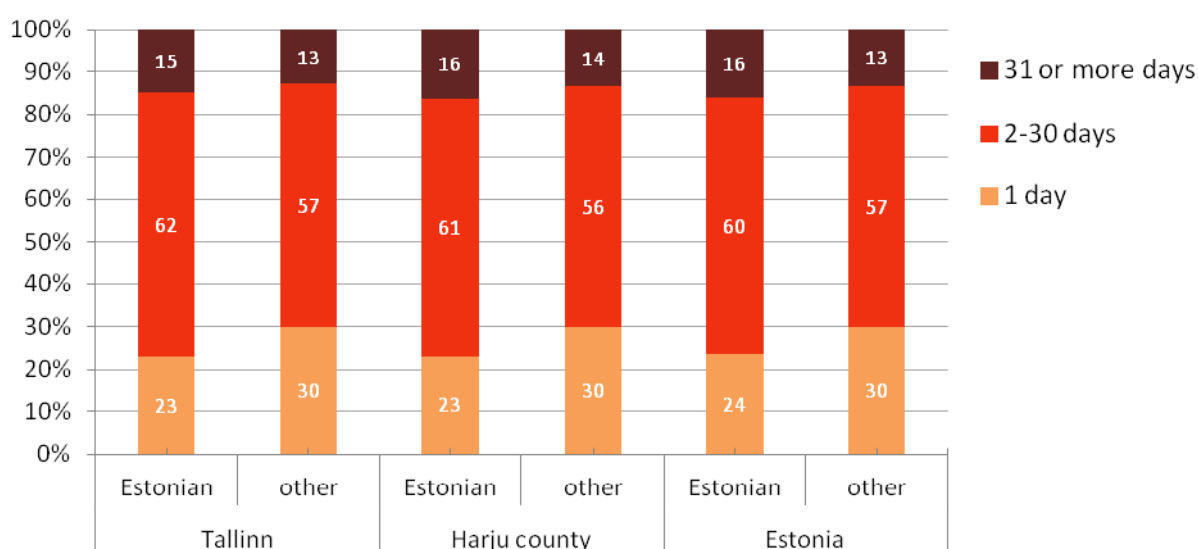


Figure 35. The number of days spent in Finland per year scale according to language and place of residence.

The greatest differences between the visitor groups become evident with reference to age. The relative importance of 20-year-olds or younger people, from Tallinn travelling to Finland is

greatest concerning the visits that last 1 day (45%) (Figure 36). 21–30-year-olds take most often visits that last 5 or more days, while 31–40 and 51–60-year-olds take 2–4 day visits. The people from Tallinn who are 60 or more years old, take most frequently one day visits.

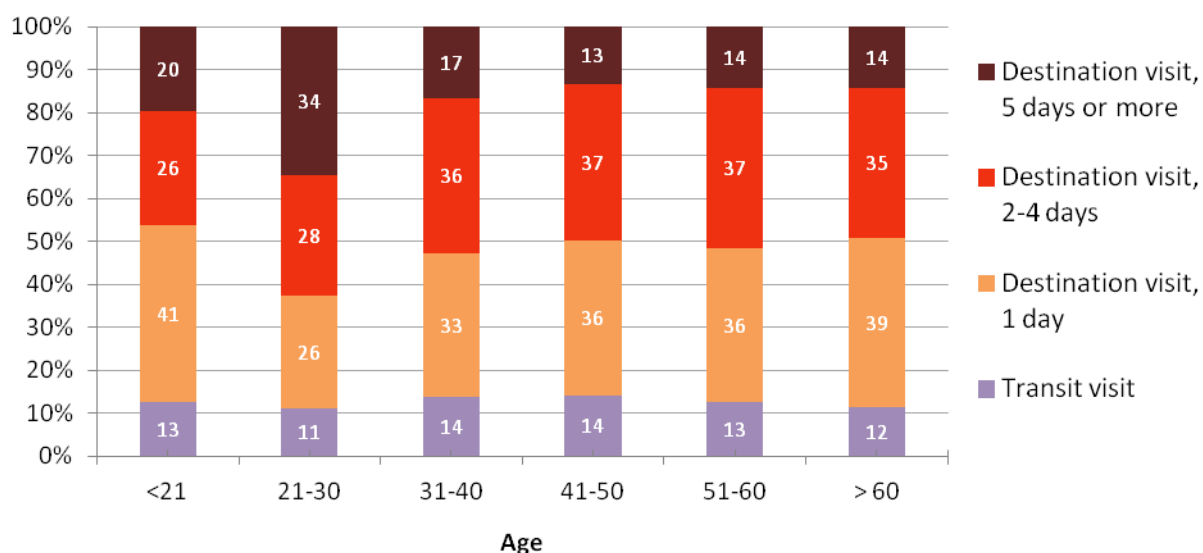


Figure 36.The duration of visits to Finland among the people from Tallinn, according to age.

The frequency of the visits taken to Finland also varies according to age groups (Figure 37). 20-year-olds or younger people most frequently take one visit to Finland per year; the relative importance of the people travelling to Finland 5 or more times a year is 9% in this age group, being lower than in all the other age groups. The relative importance of the people taking 5 or more visits to Finland per year is highest among 21–30-year-olds, reaching 29%.

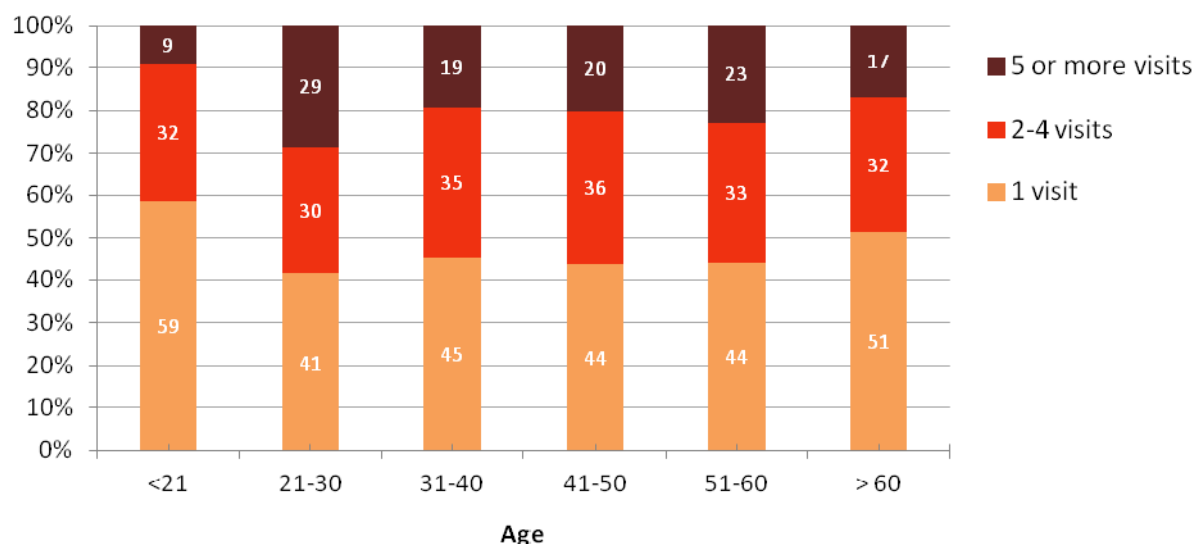


Figure 37. The division of visitors by the yearly number of visits among the people from Tallinn, according to age.

Tendencies similar to the number of visits made to Finland also become apparent concerning the number of days spent in Finland per year. The relative importance of the people staying in Finland for only one day per year is greatest among 20-year-olds or younger people. The relative importance of the people who spend 30 or more days in Finland per year is greatest among 21–30-year-olds, reaching 27% among the people living in Tallinn, while the same indicator is 15% or less among all the other age groups (Figure 38). The relative importance of the people who spend 183 or more days in Finland per year, i.e. temporary workers, is also greatest (9%) among the 21–30-year-old age group, followed by 31–40-year-olds (4%).

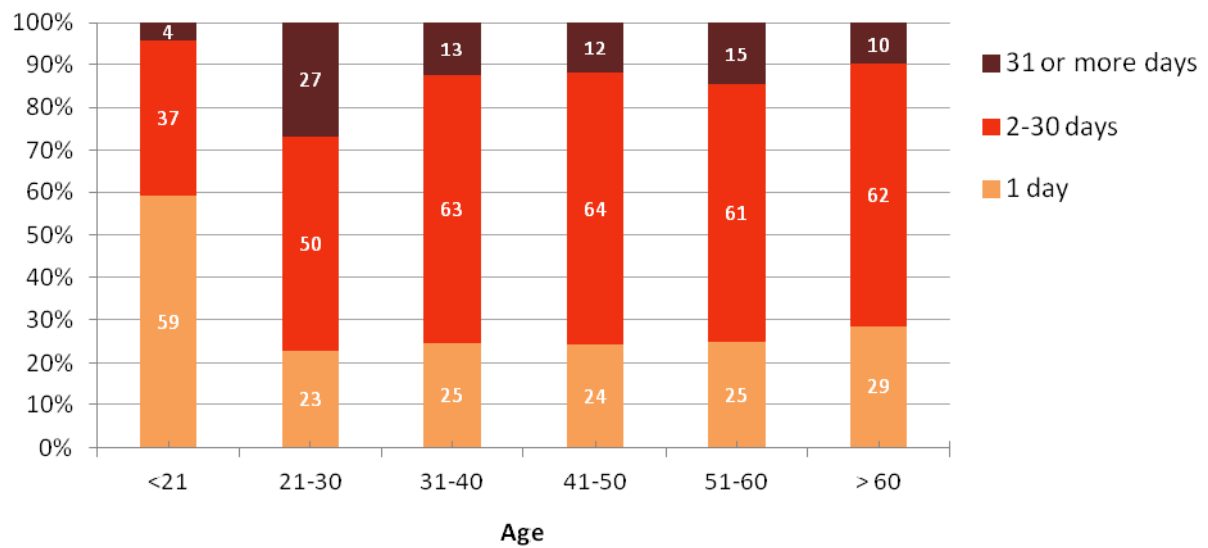


Figure 38. The division of visitors by the number of days spent per year among the people from Tallinn, according to age.

4. Finns to Estonia

4.1. The number of Finns visits to Estonia

On the average 1 594 766 Finns visit Estonia per year, 1 016 981 of whom (64%) only visit Tallinn and 1 295 005 of whom (81%) visit the Harju County (Table 6). Finns make an annual average of 2 520 377 visits to Estonia and 1 327 299 visits to Tallinn. 93% or 2 331 483 of the trips made by Finns are made directly from Finland to Estonia and 1 172 123 or 88% of the trips are made to Tallinn. Finns spend a total number of 6 010 455 days in Estonia and 2 088 871 days in Tallinn. The total number of nights spent per year in entire Estonia is 3 490 078 and 761 572 nights in Tallinn. Tallinn constitutes 35% of the days Finns spent in Estonia and 22% of the nights, the Harju County constitutes respectively 57% and 44%. Thus, nearly half of the visits are made to Tallinn, while it only constitutes 1/3 or less of the days and nights spent in Estonia.

Table 6. The annual average indicators of visits made to Estonia by Finns, according to the visited region.

	Tallinn	Harju County	Estonia
Number of Finnish visitors	1 016 981	1 295 005	1 594 766
Number of visits made by Finns	1 327 299	1 871 945	2 520 377
Number of trips by Finns from Finland to Estonia	1 172 123	1 690 769	2 331 483
Number of trips by Finns from Estonia to Finland	1 171 796	1 690 258	2 330 696
Number of days Finns spent in Estonia	2 088 871	3 408 089	6 010 455
Number of nights Finns spent in Estonia	761 572	1 536 144	3 490 078

4.2. The duration of visits

The average length of the visits Finns make to Estonia is 2.4 days, while it is 1.6 for the visits made to Tallinn. The majority of the visits made last 1 day (Table 7). The visits to Tallinn constitute 52%, the visits to the Harju County 49% and the visits to the territory of Estonia 43% of the one day visits. One day visits are followed by two day and then transit visits. 5 or more day visits constitute only 2% of the visits made to Tallinn and 10% of the visits made to Estonia as a whole.

Table 7. The duration of the visits made by Finns from Finland to Tallinn, the Harju County and Estonia.

Duration of visits	Tallinn		Harju County		Estonia	
	Number of visits	%	Number of visits	%	Number of visits	%
Transit	155 176	13.2	181 176	10.7	188 894	8.1
1 day	605 421	51.7	829 185	49.0	995 209	42.7
2 days	279 844	23.9	437 490	25.9	547 710	23.5
3 days	83 384	7.1	136 066	8.0	249 178	10.7
4 days	19 461	1.7	36 196	2.1	118 419	5.1
5 days	8 017	0.7	16 689	1.0	63 665	2.7
6 days	5 041	0.4	11 242	0.7	38 669	1.7
7 days	4 762	0.4	11 290	0.7	34 649	1.5
8 days	2 983	0.3	7 457	0.4	24 530	1.1
9 days	1 695	0.1	4 606	0.3	12 997	0.6
10+ days	6 339	0.5	19 373	1.1	57 564	2.5
Total	1 172 123	100.0	1 690 769	100.0	2 331 483	100.0

4.3. The frequency of visits

On the average, Finns make 1.3 visits to Tallinn per year and 1.6 visits per year to Estonia. The number of Finns visiting Estonia decreases as the number of visits increases (Table 8). The majority of Finns visit Estonia once a year, which constitutes 72% of the visits made to Estonia and 67% of the visits to Tallinn. Of the Finns visiting Estonia twice a year, 17% visit Estonia and 20% visit Tallinn. Finns who visit Estonia 5 or more times a year constitute 4% of the visits in all viewed regions.

Table 8. The frequency of visits made by Finns to Tallinn, the Harju County and Estonia per year.

Frequency of visits	Tallinn		Harju County		Estonia	
	Number of visitors	%	Number of visitors	%	Number of visitors	%
1	676 248	66,5	901 351	69,6	1 150 877	72,2
2	201 032	19,8	236 936	18,3	265 630	16,7
3	68 727	6,8	77 338	6,0	86 411	5,4
4	28 010	2,8	31 237	2,4	35 460	2,2
5	13 889	1,4	15 512	1,2	18 124	1,1
6	8 211	0,8	9 156	0,7	10 784	0,7
7	5 103	0,5	5 779	0,4	6 909	0,4
8	3 507	0,3	3 982	0,3	4 741	0,3
9	2 674	0,3	3 000	0,2	3 488	0,2
10+	9 579	0,9	10 714	0,8	12 343	0,8
Total	1 016 981	100,0	1 295 005	100,0	1 594 766	100,0

4.4. The length of stay in Estonia

On the average, Finns spend 3.8 days in Estonia, 2.6 days in the Harju County and 2.1 days in Tallinn. 99% of the Finns spend up to 30 days in Estonia (Figure 39). Approximately half of the Finns who have visited Estonia stay in Estonia only one day per year. The ratio of the Finns who stayed in Estonia one day per year is greatest in Tallinn (46%) and in the Harju County (45%). 41% of the Finns who visited entire Estonia stayed here for one day. A little over 1% of the Finns stay in Estonia for over 30 days. 1155 Finns stayed in Estonia (including Tallinn) and 591 in Tallinn 183 days or more, which amounts to 0.1% of the visitors for both areas.

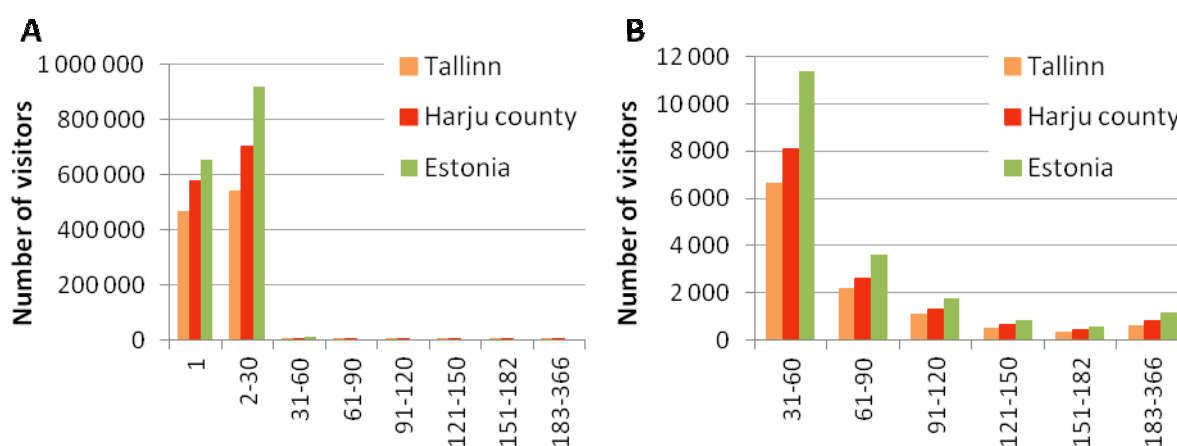


Figure 39. Number of Finns in Tallinn, Harju county and Estonia by number of days spent per year; A: 1–366 days, B: 31–366 days.

4.5. The timing of visits

Years

On the average, Finns make 2 334 483 visits to Estonia, 1 690 769 to the Harju County and 1 172 123 to Tallinn per year. The number of visits by Finns is larger in all the viewed areas in 2010 and 2011, compared to 2009 (Figure 40). Over the three viewed years, Finns made most visits to Tallinn in 2010 (1 220 505), but to the Harju County and Estonia as a whole in 2011, with 1 772 757 visits to the Harju County and 2 407 010 visits to the entire territory of Estonia. Finns have made the least visits to all the viewed areas in 2009, when the number of visits to

Tallinn was 1 094 041, 1 571 525 visits to the Harju County, and 2 187 597 visits to Estonia as a whole.

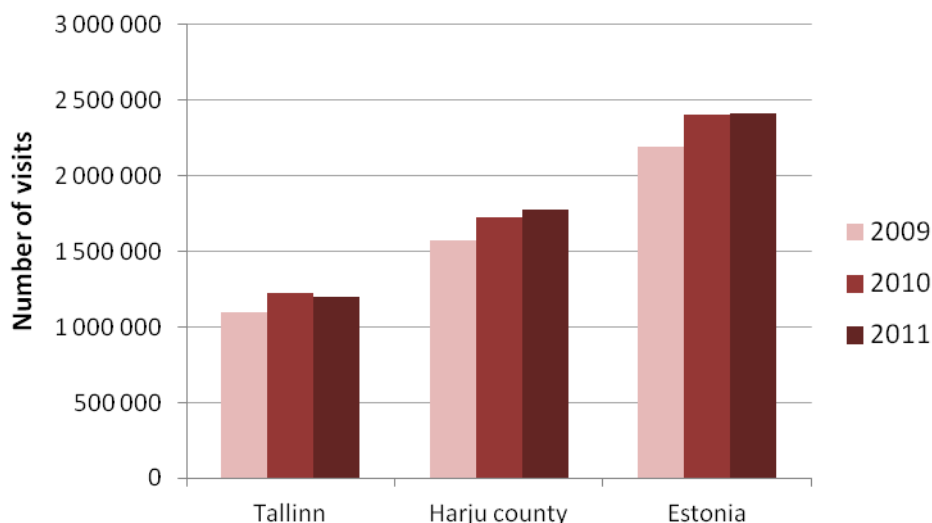


Figure 40. The number of visits made by Finns from Finland to Tallinn, the Harju County and Estonia by years (by the starting time of the visits).

The duration of the visits made by Finns to Estonia has not changed over the viewed years: the length of the visits to Estonia is on the average 2.4 days, but 1.5 days for the visits made to Tallinn in 2009 and 1.6 days in 2010 and 2011.

The number of 2 or more day visits made by Finns to Tallinn has increased (Figure 41). In 2009, Finns made 336 137 visits to Tallinn that lasted 2–4 days, while in 2011 they made 21% more or 407 646 visits. 5 or more day visits were made 25 868 times in 2009 and 31 670 times in 2011. The number of one day visits has changed the least over the viewed years, there were 7% more visits made in 2010 (619 975), the year with the largest number of one day visits, than during 2009, the year with the minimal number of visits (578 311). Finns made the most transit visits from Finland to Estonia in 2010 (167 273) and the least in 2011 (144 530).

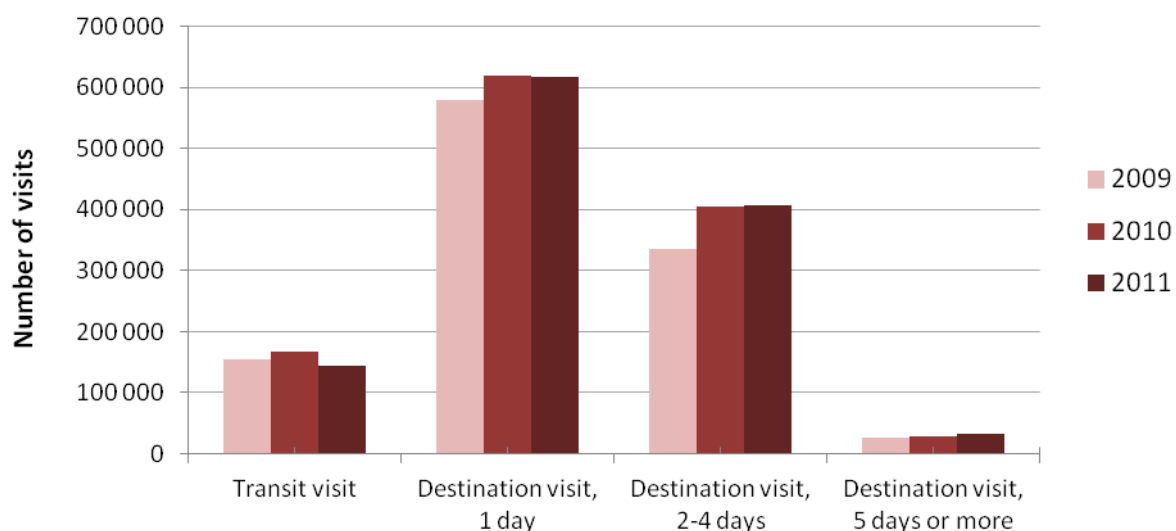


Figure 41. The number of visits made by Finns from Finland to Tallinn, by years (by the starting time of the visits) and the duration of the visits.

The frequency of the visits Finns make to Estonia has not changed over the viewed years: on the average, Finns made 1.6 visits to Estonia and 1.3 visits to Tallinn per year in all the viewed years.

The number of visits by Finns who visit Estonia frequently has slightly increased (Figure 42). The number of Finns who make 2–4 visits to Tallinn per year was 395 143 in 2009 and 460 097 or 16 % greater in 2011. The number of Finns who make 5 or more visits to Tallinn increased by 21% over the viewed years: in 2009 Finns made 133 729 such visits to Tallinn, while the same indicator was 161 860 in 2011. The number of one day visits by the Finns to Tallinn was greatest in 2010 (621 087 visits) and smallest in 2009 (565 168 visits).

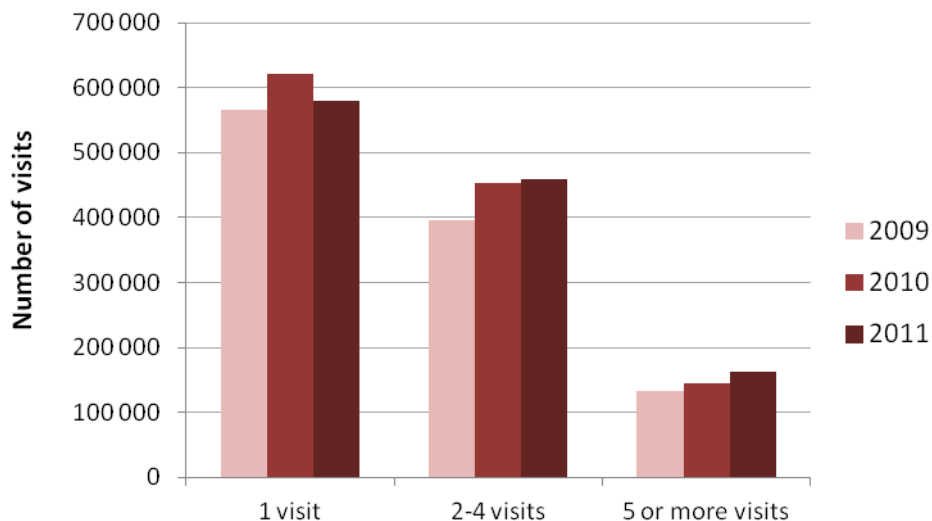


Figure 42. The number of visits made by Finns from Finland to Tallinn, by years (by the starting time of the visits) and the yearly number of visits.

The average number of days Finns spend in Tallinn per year has increased in 2011 as compared to 2009 and 2010. On the average, Finns spent 2.0 days in Tallinn in 2009 and 2.1 days in 2011. The number of days Finns spent in the whole of Estonia was 3.7 in 2009 and 2010, but 3.9 days in 2011.

The number of visits by Finns who travelled to Tallinn one day per year was smallest in 2011 (370 772) and largest in 2010 (405 035). The Finns who spent 2–30 days in Tallinn made the least visits over the viewed years in 2009 (667 551) and most visits in 2011 (776 542) (Figure 43). The number of visits made by Finns who spend above 30 days in Tallinn, increased in 2011 by 11 214 visits or 26% as compared to 2009. The number of visits by Finns that spend 183 or more days in Tallinn per year, i.e. the visits of workers, was 1 904 in 2009 and 2 847 in 2011, thus increasing by 50%.

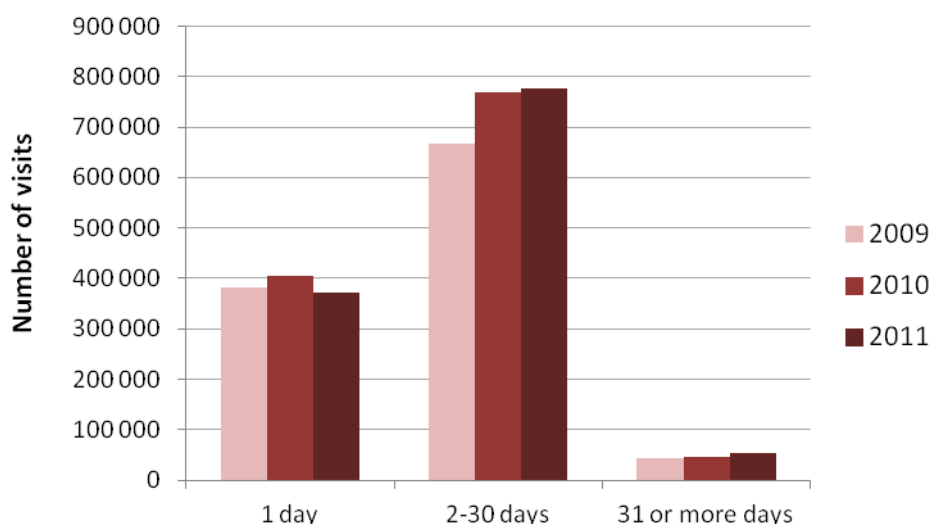


Figure 43. The number of visits made by Finns from Finland to Tallinn, by years (by the starting time of the visits) and the number of days spent in Estonia per year.

Months

The number of visits Finns make from Finland to Estonia has a seasonal rhythm: there are more visits in summer months and less during the winter period (Figure 44). Finns make on the average 326 848 visits from Finland to Estonia and 144 630 visits to Tallinn in July, the month with the maximal number of visits. The number of visits in July was greater than the number of visits in June by 42% in 2009, by 58% in 2010 and by 29% in 2011. The number of visits by Finns visiting Tallinn and the Harju County is also greatest in July, but it is not as dominating compared to the other months. Aside from the larger number of visits in July, a second peak is apparent in October. The month with the minimal number of visits in all the viewed regions and years is January, when Finns made an average of 96 616 visits to Estonia and 51 755 visits to Tallinn. The difference between the months with the greatest and smallest numbers of visits is on the average 87 565 visits in Tallinn, 119 977 visits in the Harju County and 220 027 visits in the whole of Estonia.

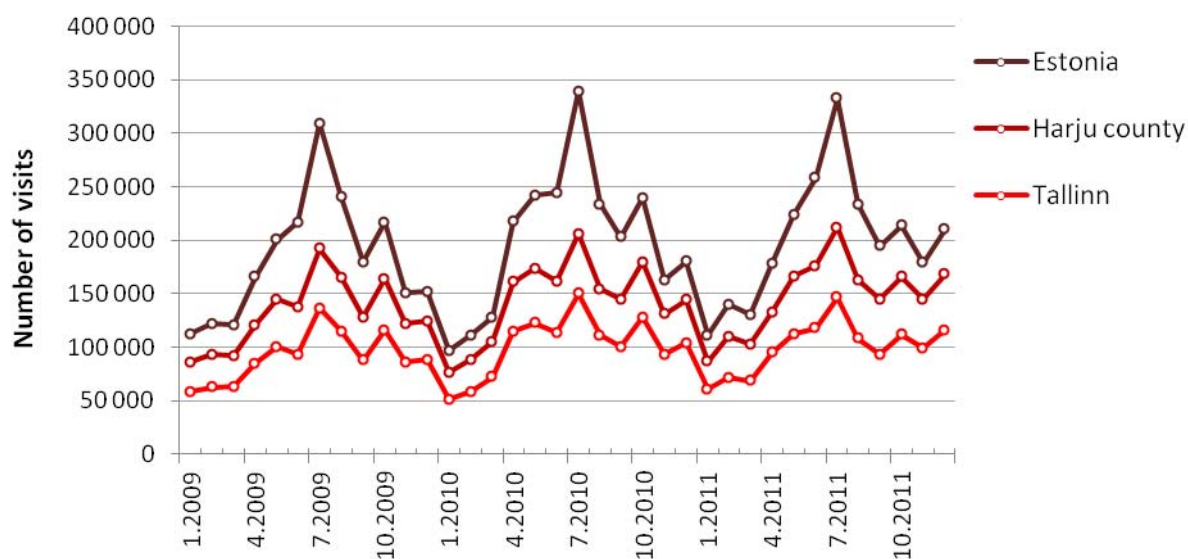


Figure 44. The number of visits made by Finns from Finland to Tallinn, the Harju County and Estonia by months (by the starting time of the visits).

The seasonal rhythm of the Finns' visits to Tallinn is most apparent concerning one day visits (Figure 45), where the difference between the maximal month (July) and minimal month (January) is on the average 182% over the viewed years. July is not as dominating concerning 2–4 day visits, but the difference compared to January (to March in 2009) is 170%. Similarly to other visit duration groups, the month with the maximal number of transit visits by the Finns in 2011 is July but in 2009 and 2010, the month is October. The month with the minimal number of transit visits in all the viewed years is January.

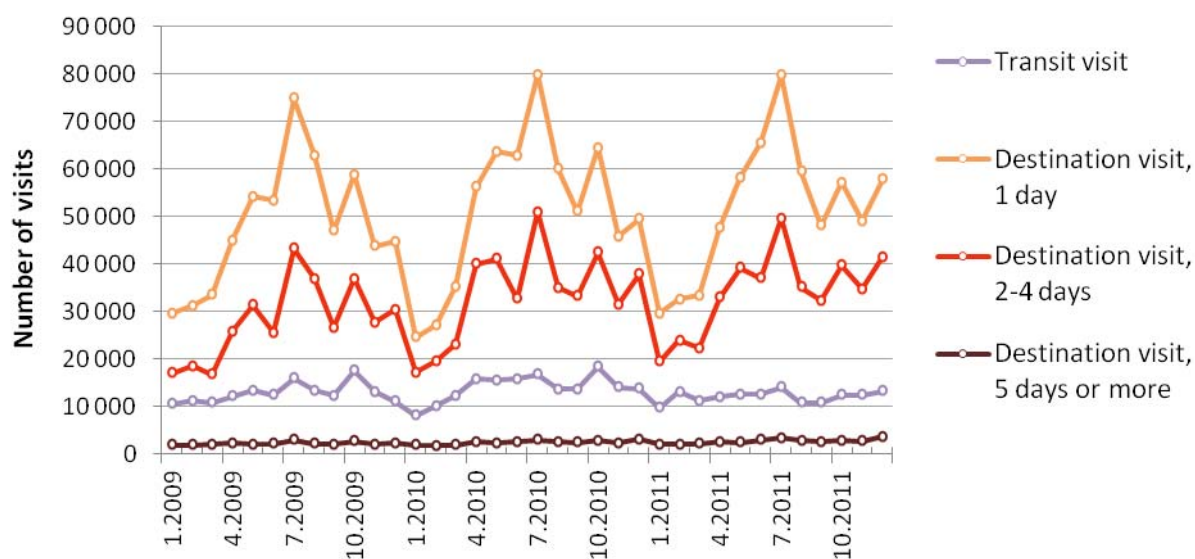


Figure 45. The number of visits made by the Finns from Finland to Tallinn, by the duration of visits and months (by the starting time of the visits).

Some differences become apparent concerning the frequency of the Finns' visits to Tallinn (Figure 46). The clearest seasonal rhythm is apparent with the Finns who visit Tallinn once a year, where the difference between the minimal month (January) and maximal month (July) is 248%. The minimal and maximal months for Finns who visit Tallinn 2–4 times per year are the same as for the people who visit Estonia once a year, but the difference is smaller (115%) and July is not as dominating compared to the other months. The distribution of the visits made by Finns who visit Tallinn more than four times per year is more even over the years and no seasonal rhythm can be detected.

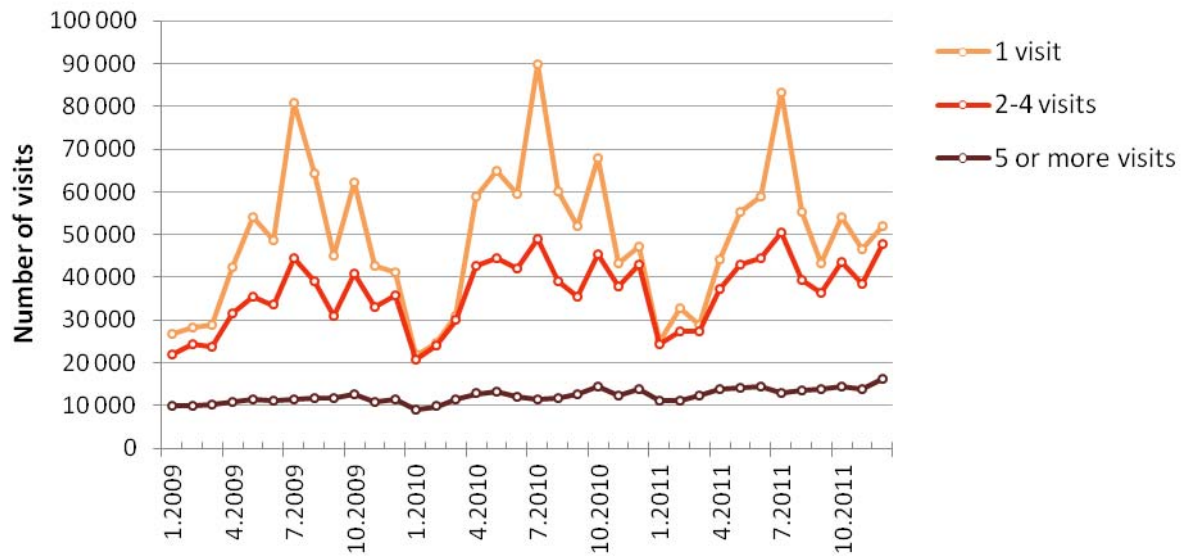


Figure 46. The number of visits made by Finns from Finland to Tallinn, by the yearly number of visits and by months (by the starting time of the visits).

The greatest annual variety with regard to the time the Finns travelling from Finland to Tallinn spend in Tallinn per year becomes apparent concerning the Finns who only visit Tallinn one day per year (Figure 47); the difference between the minimal month (January) and maximal month (July) is 247%. The distribution of the visits of the Finns who spend 2 to 30 days in Tallinn has a similar seasonal rhythm, but the difference between the minimal and maximal month is on the average 132%. The visits of the Finns who spend over 30 days in Tallinn per year vary the least during the year.

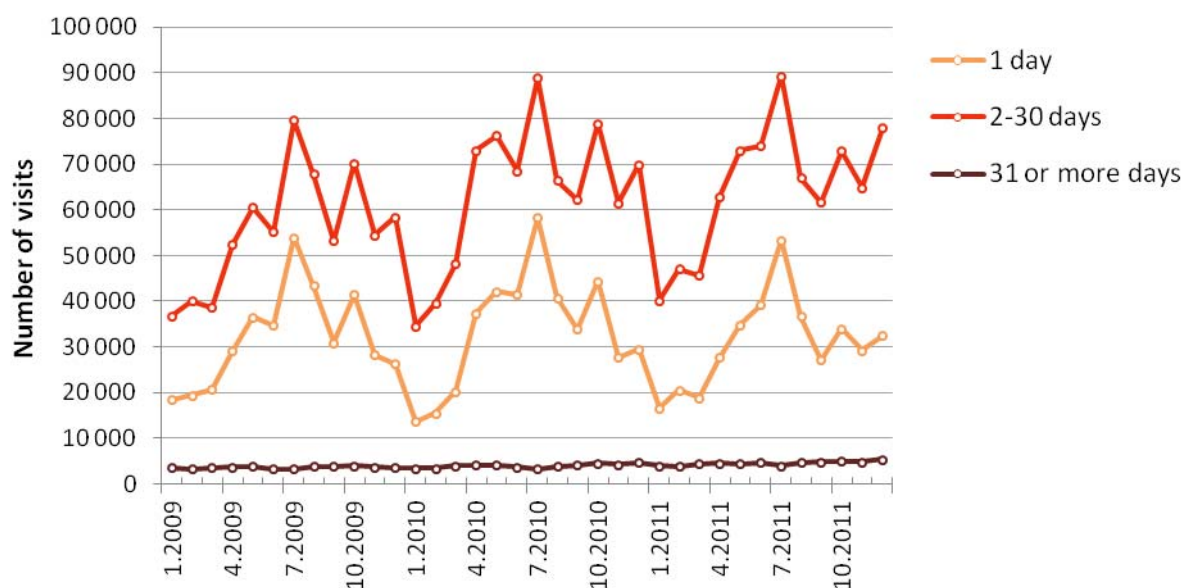


Figure 47. The number of visits made by the Finns from Finland to Tallinn, by the number of days spent per year and by months (by the starting time of the visits).

No clear annual rhythm becomes apparent concerning the Finns who spend 183 or more days in Tallinn per year, i.e. temporary workers (Figure 48). The months with the minimal and maximal number of visits vary over the viewed years.



Figure 48. The number of visits made by Finns who spend 183 or more days in Tallinn, distributed by months (by the starting time of the visits).

Weekdays

The largest number of Finns visit Tallinn, the Harju County and Estonia as a whole on Saturdays (Figure 49). On Saturdays there are on average 9 272 Finns in Tallinn, 14 119 in the Harju County and 22 022 in Estonia. On Monday, the day with the minimal number of Finns, there are on the average 4 023 Finns in Tallinn, 6 862 in the Harju County and 13 229 in Estonia.

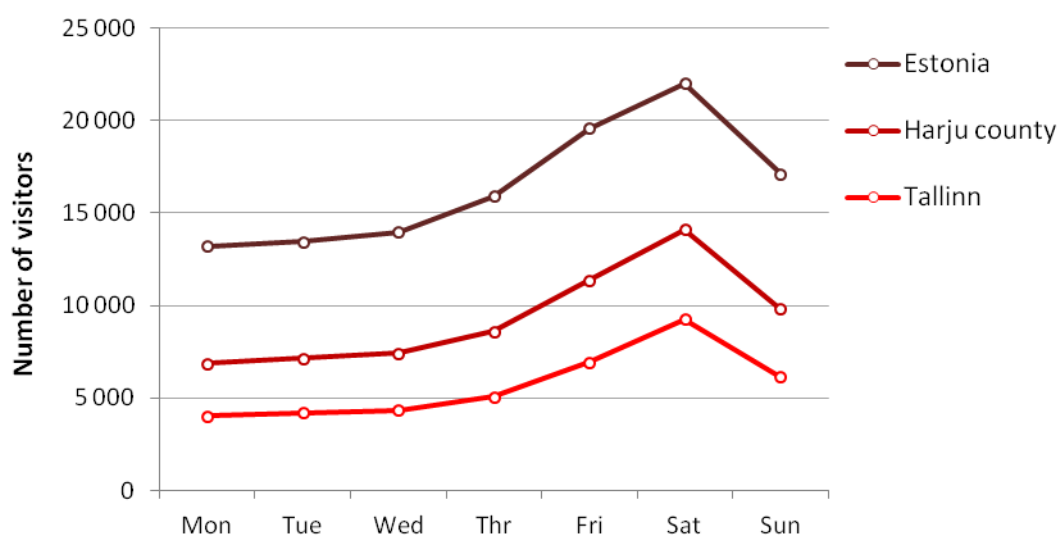


Figure 49. The number of Finns in Tallinn, the Harju County and Estonia distributed by the days of the week.

Finns make most trips from Finland to Tallinn as well as from Tallinn to Finland on Saturdays (Figure 50). On the average, there are 5 551 trips made from Finland to Tallinn and 5 232 from Tallinn to Finland on Saturdays. Saturdays are followed by Fridays with 4 400 trips concerning the trips from Finland to Estonia and from Tallinn to Finland by Sundays with 4 219 trips. Finns make the least trips from Finland to Tallinn on Sundays (2 304 trips) and from Tallinn to Finland on Mondays (2 163 trips).

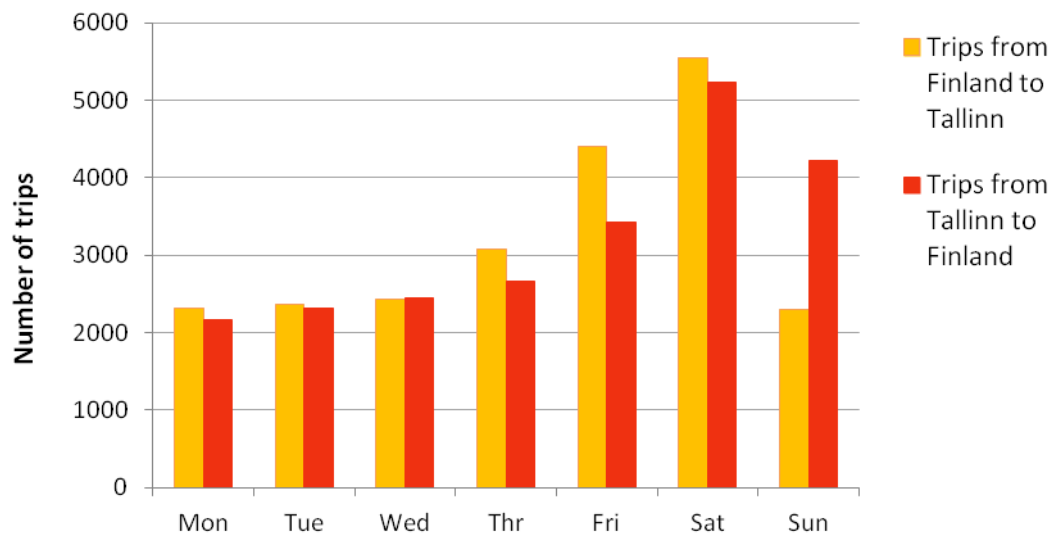


Figure 50. The average number of trips made by Finns from Finland to Tallinn and from Tallinn to Finland, distributed by the days of the week.

The number of trips Finns make from Finland to Estonia and from Estonia to Finland is also greatest on Saturdays (Figure 51). Yet Saturdays are not as dominating with regard to the Finns' Tallinn-related trips. On the average, Finns make 9 148 trips from Finland to Estonia on Saturdays; the number of trips is also similar on Fridays (9 030 trips). The average number of trips made from Estonia to Finland is 9 317 on Saturdays, which is only slightly greater than the number of trips on Sundays (6 918 trips). Similarly to Tallinn, Finns also make the least trips from Finland to Estonia on Sundays (4 700 trips), while on the opposite direction, from Estonia to Finland, the day with the least number of trips concerning the entire territory of Estonia is Tuesday (4 566 trips).

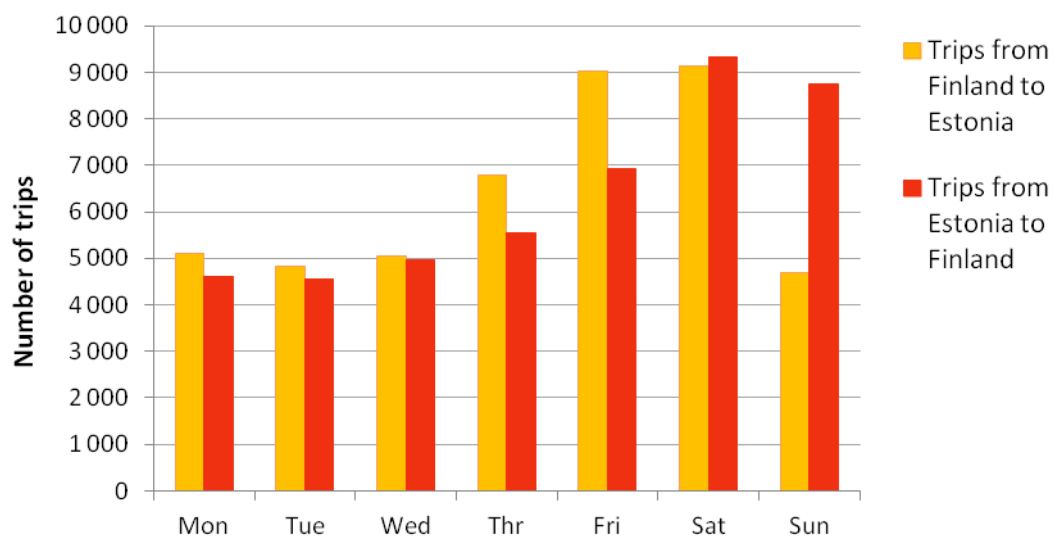


Figure 51. The average number of trips made by Finns from Finland to Estonia and from Estonia to Finland, distributed by the days of the week.

Based on the duration of the visits, the largest number of transit and one day visits are made on Saturdays (Figure 52). The number of transit visits on Saturdays is 26% greater than on Fridays, while the same indicator is 36% for one day visits. Finns make the most 2–4 day visits from Finland to Tallinn on Fridays (1 885 trips per day), and only slightly less on Saturdays (1 787 trips per day). The number of trips in all the mentioned visit duration groups is low from Monday to Wednesday, beginning to rise from Thursday. The weekdays with the lowest number of 5 or more day visits are Tuesday and Saturday (66 and 67 trips per day), while the most trips are made on Thursdays (89 trips per day).

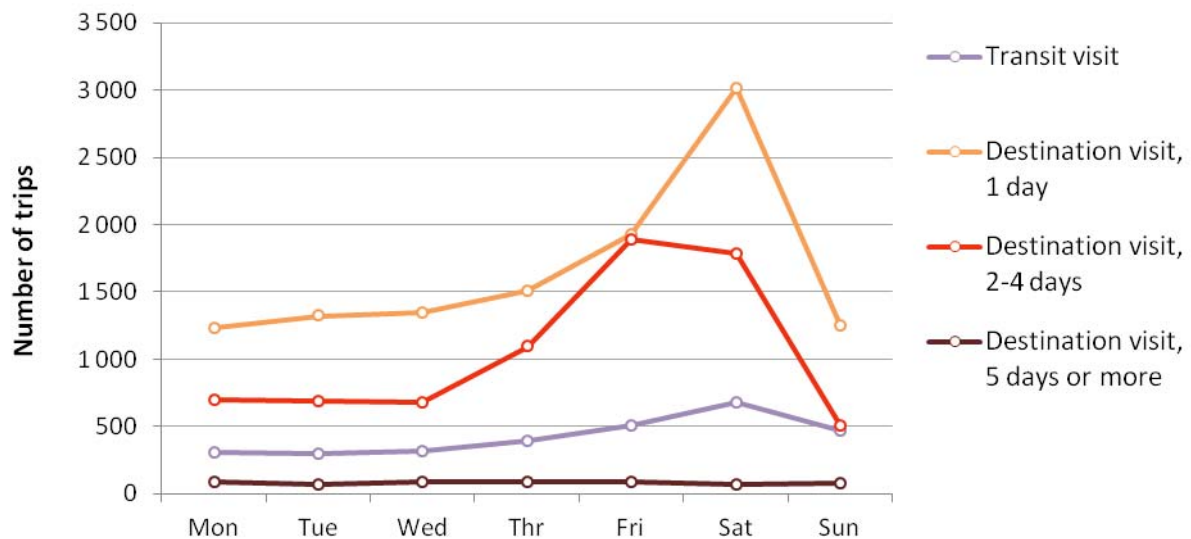


Figure 52. The number of trips made by Finns from Finland to Tallinn by the duration of the visits and weekdays of the trips.

The Finns who visit Tallinn once or 2–4 times per year make the most trips on Saturday (Figure 53). The number of trips by the Finns who visit Tallinn once a year increases on Saturday by 25% compared to Friday and by 22% for people visiting Tallinn 2–4 times per year. The number of trips made by the Finns who visit Tallinn frequently is greatest on Friday, followed by Saturday and Thursday.

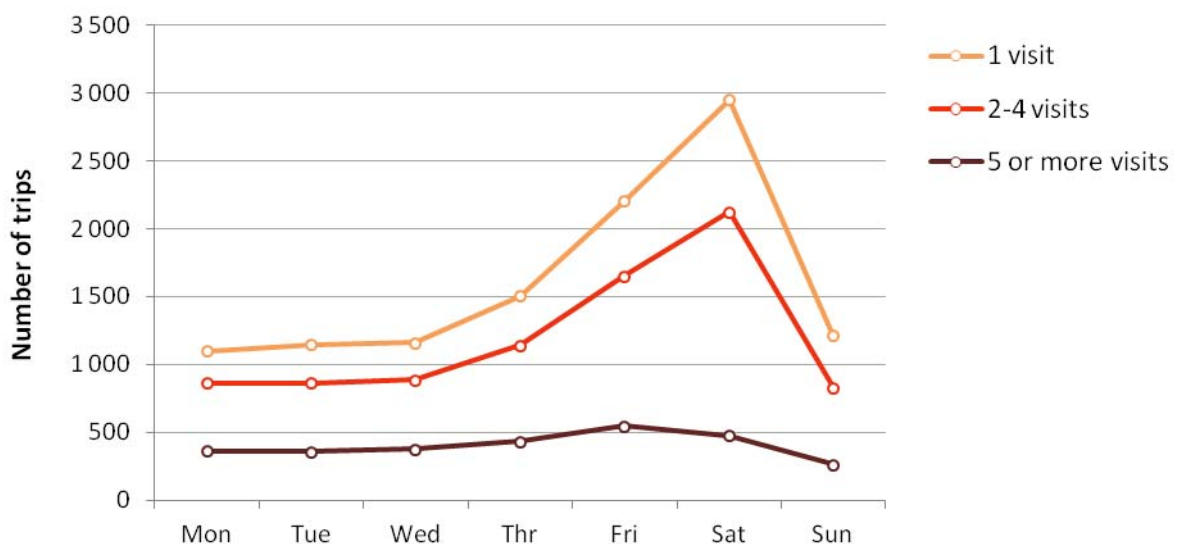


Figure 53. The number of trips made by Finns from Finland to Tallinn, by the yearly number of visits and weekdays of the trips.

Similar tendencies become also apparent concerning the duration of the stays in Tallinn by different visitor segments. Saturday is the day with the maximal number of trips for Finns who visit Tallinn one or 2–30 days per year (Figure 54). Aside from Saturday, the people who stay in Tallinn for 2–30 days also make significantly more trips from Finland to Tallinn on Friday. The Finns who stay in Tallinn for more than 30 days make the most trips from Finland to Tallinn on Friday, followed by Thursday, while the number of visits on Saturday is on the same level with the days at the beginning of the week.

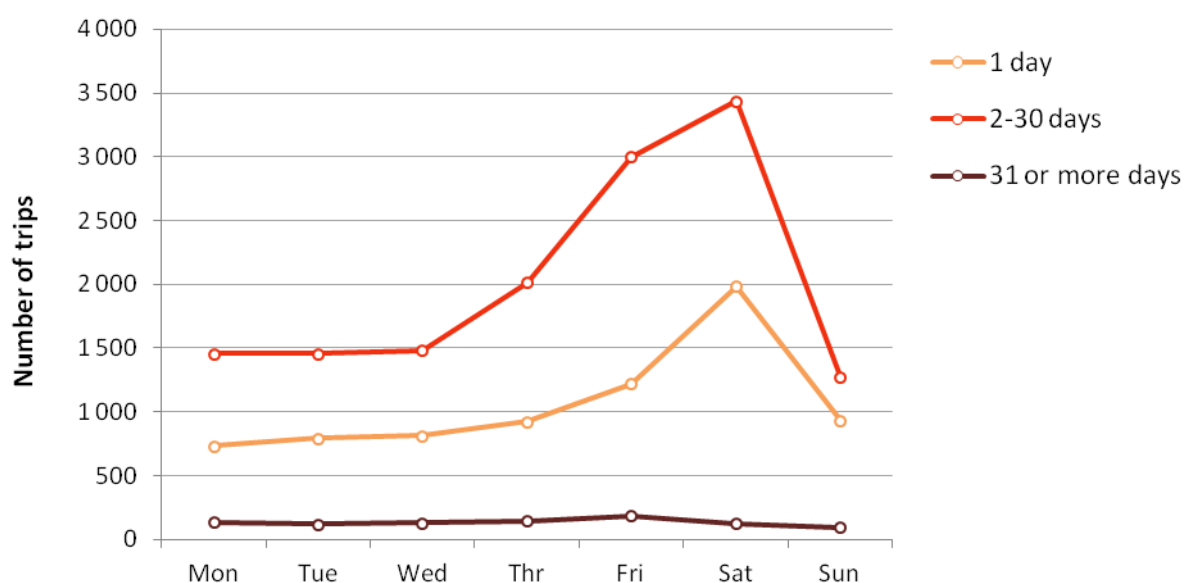


Figure 54. The number of trips made by Finns from Finland to Tallinn, by the number of days spent per year and weekdays of the trips.

Temporary workers, or Finns who spend 183 or more days in Tallinn per year, make the most trips from Finland to Tallinn on Monday and Friday (Figure 55). The least trips are made on Saturday and Sunday.

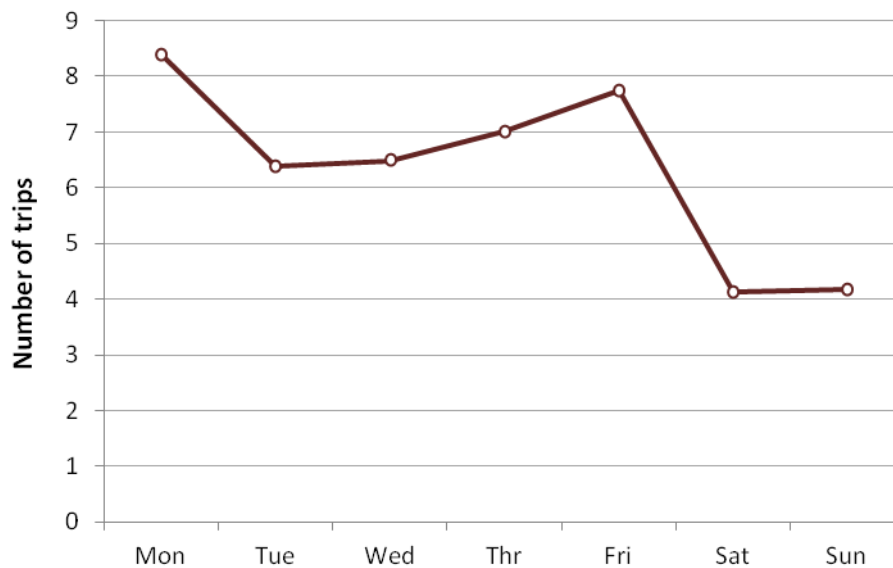


Figure 55. The number of trips made from Finland to Tallinn by Finns who stay in Tallinn for 183 or more days per year, distributed by the days of the week.

Days

Good Friday (on April 10 in 2009, April 2 in 2010 and April 22 in 2011) stands out among holidays as a day with a larger number of Finns being in Estonia (Figure 56). No such peak is apparent on Midsummer's Day or the period around Christmas and New Year's. August 4, 2009, the day Madonna performed in Tallinn, stands out as a single event. In addition, several other dates can be noted when a significantly larger number of Finns travelled from Finland to Estonia, but relating them with a certain event proves problematic.

Contrary to the Estonians' visits to Finland, no dates can be noted in the Finns' visits to Estonia when the number of visits would be significantly lower than on other days.

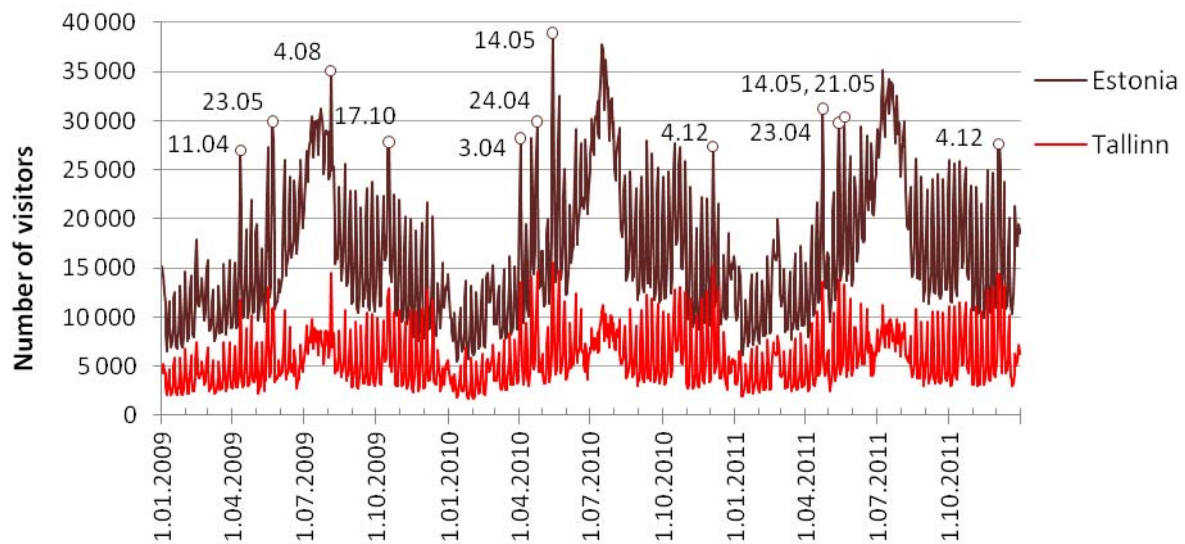


Figure 56. The number of Finns in Tallinn and Estonia by days.

Finns do not travel to Estonia similarly on the weekends throughout the year. Finns arrive on weekends especially during two seasons – spring and autumn. In summer the division between the people who arrive on weekdays and weekends is much more even. A clear change can be noted in the middle of August when children in Finland go to school. From there on, weekends begin to be more dominant again.

If we examine the visits to Tallinn more closely, it appears that the rhythm of visits differs from the rest of Estonia. The visits Finns make to the entire territory of Estonia, i.e. outside Tallinn, have greater seasonal variety. The visits made to Tallinn are distributed more evenly across the year; instead, a weakly rhythm is what prevails most.

4.6. Places of visits in Estonia

From all the places in Estonia, Finnish people have most visited Tallinn – over 1.3 million Finns. Over 100,000 of Finns have also visited Pärnu as well as Viimsi and Harku municipalities (Figure 57). In addition to the abovementioned, over 10,000 of Finns have also visited 27 other municipalities.

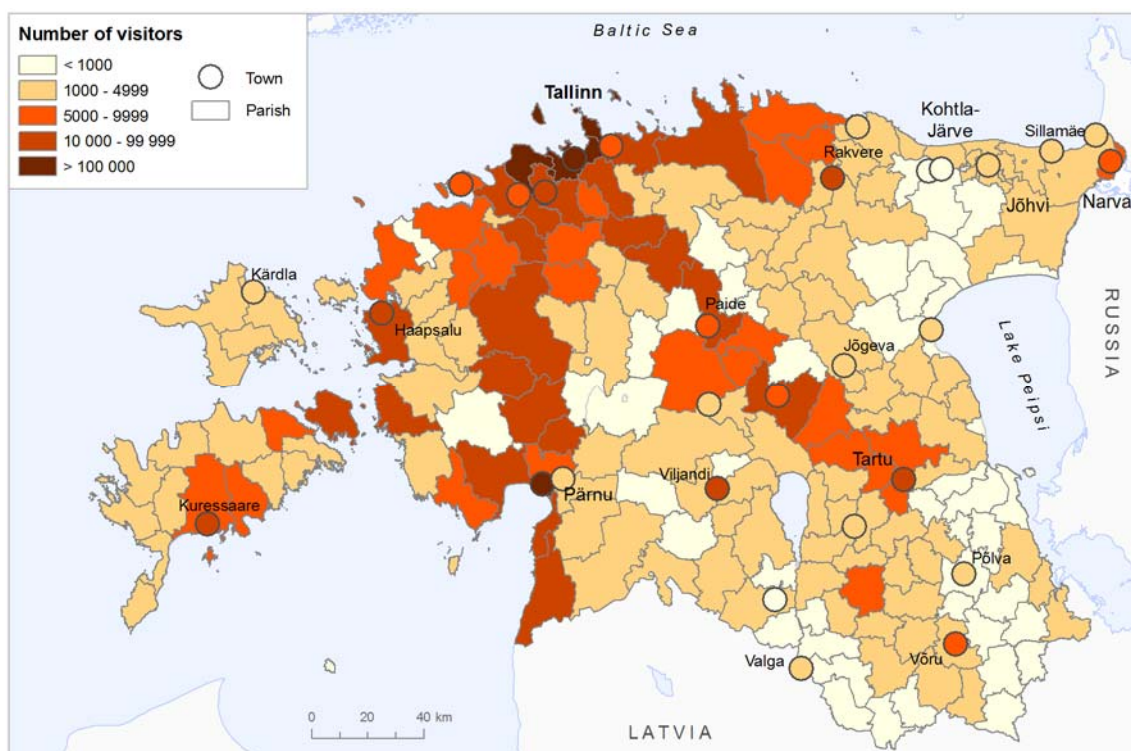


Figure 57. Geographical distribution of visits of Finns in Estonian municipalities (annual average calculated by location of call activities).

87% of the Finns visiting Estonia have visited Tallinn, 33% have visited the rest of Harju County. Right after Harju County comes Pärnu County, which has been visited by 12% of the Finns who have visited Estonia. In the rest of the counties, the percentage of Finns who have visited Estonia is less than 5%.

Almost all Finns, who have stayed in Estonia for 183 days or more, have been in Tallinn and Harju County, 98% and 95% respectively (Table 9). 85% of the Finns who have stayed in Estonia for one day a year have visited Tallinn. For the rest of the counties, the longer the visitors have stayed in Estonia per year, the greater the percentage of their visits to the respective county.

Table 9. The county-based division of the Finns by number of days spent per year.

County name	1 day	2-30 days	31-182 days	183 and more days	All
Tallinn	84.9	87.6	95.3	98.0	86.6
Harju County outside Tallinn	17.9	42.4	86.6	94.5	32.9
Pärnu County	4.8	16.9	30.7	38.9	12.1
Tartu County	1.4	6.6	28.1	37.0	4.8
Saare County	1.4	5.7	15.1	14.5	4.0
Lääne County	1.0	5.5	20.2	21.9	3.8

Rapla County	0.7	3.6	20.5	27.9	2.6
Lääne-Viru County	0.8	3.5	18.3	27.4	2.6
Järva County	0.4	3.0	21.8	29.3	2.1
Jõgeva County	0.4	2.5	17.8	24.1	1.8
Ida-Viru County	0.5	2.1	10.2	16.6	1.6
Viljandi County	0.3	1.9	12.5	17.6	1.4
Valga County	0.3	1.5	8.5	12.6	1.1
Võru County	0.2	1.1	6.8	8.2	0.8
Hiiu County	0.2	1.0	4.5	4.6	0.7
Põlva County	0.1	0.9	7.2	9.2	0.7

Most of the Finns, who stay in Estonia for one day a year, mainly visit Tallinn, its nearby municipalities and bigger cities (Tartu, Pärnu) (Figure 58). In addition to the abovementioned municipalities, Finns who stay in Estonia for 2–30 days, also visit the smaller municipalities in Northern Estonia (Figure 59). Over 1% of the Finns, who stay in Estonia for 31–182 days, visit most of the Estonian municipalities, except for the smaller municipalities near the Southern Estonian border and Lake Peipus (Figure 60). Finns, who stay in Estonia for 183 or more days, visit Tartu, Pärnu and Kuressaare as well as municipalities in the direction of Tartu, Pärnu and Rakvere, which probably shows their movement in the direction of these cities (Figure 61).



Figure 58. The division of municipalities among the Finns, who have visited Estonia for one day a year.

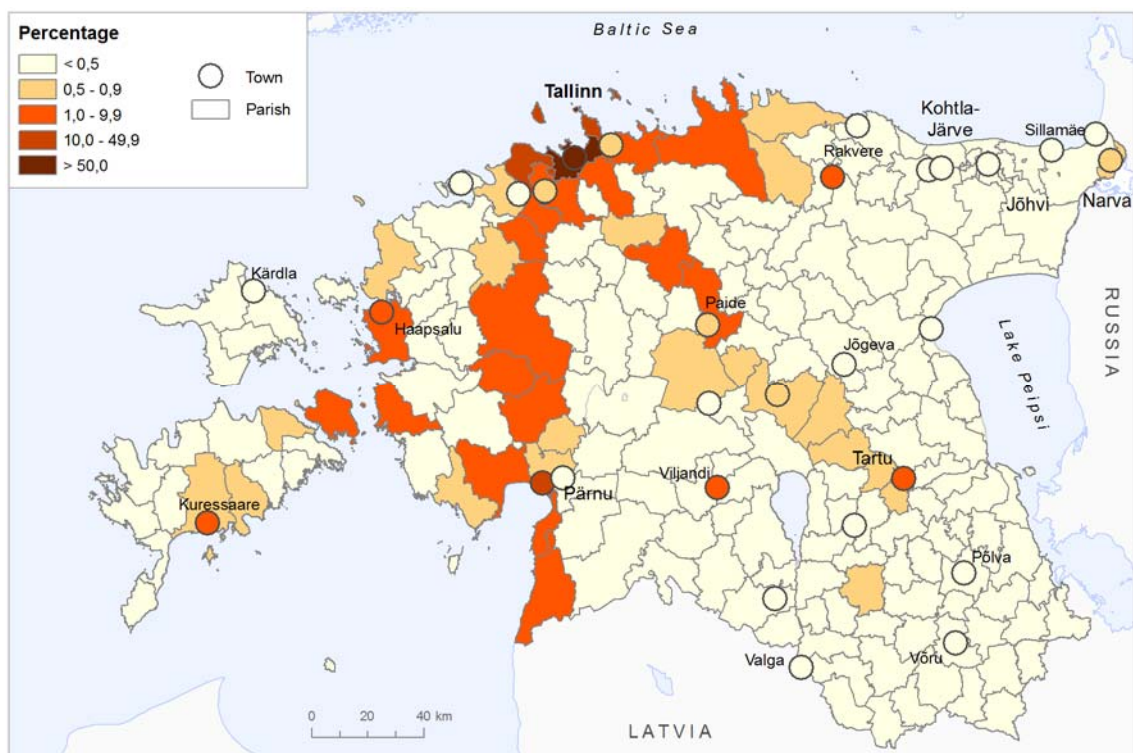


Figure 59. The division of municipalities among the Finns, who have visited Estonia from 2 to 30 days per year.

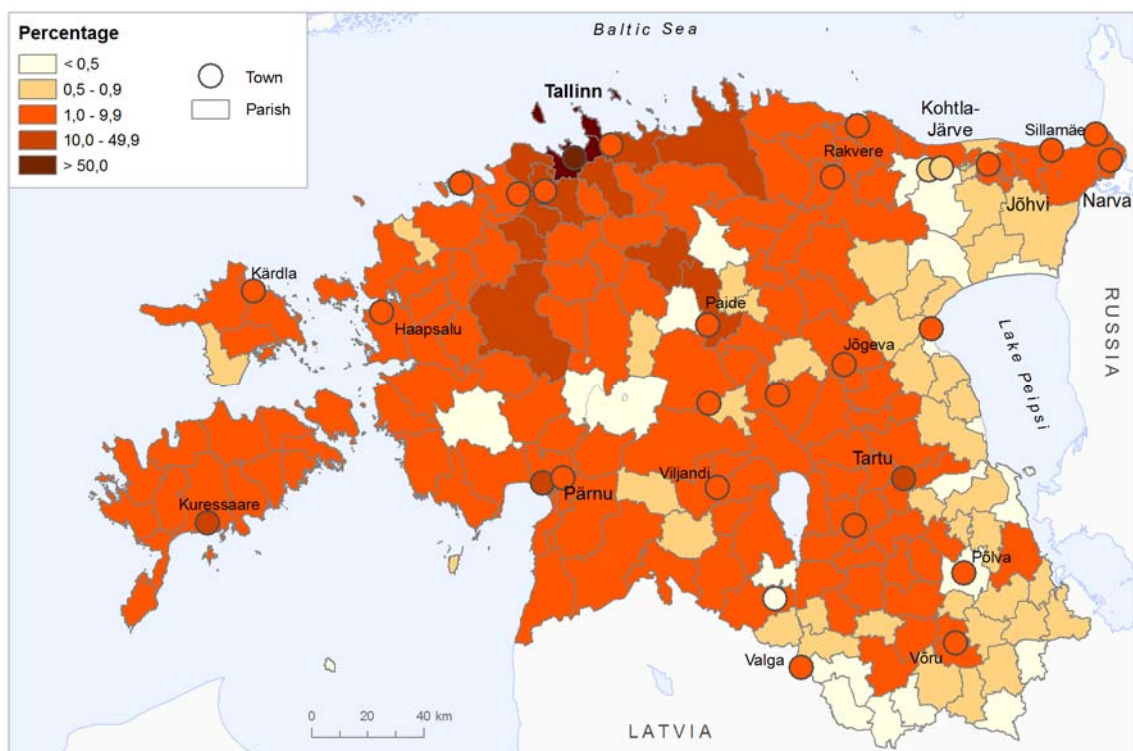


Figure 60. The division of municipalities among the Finns, who have visited Estonia from 31 to 182 days per year.

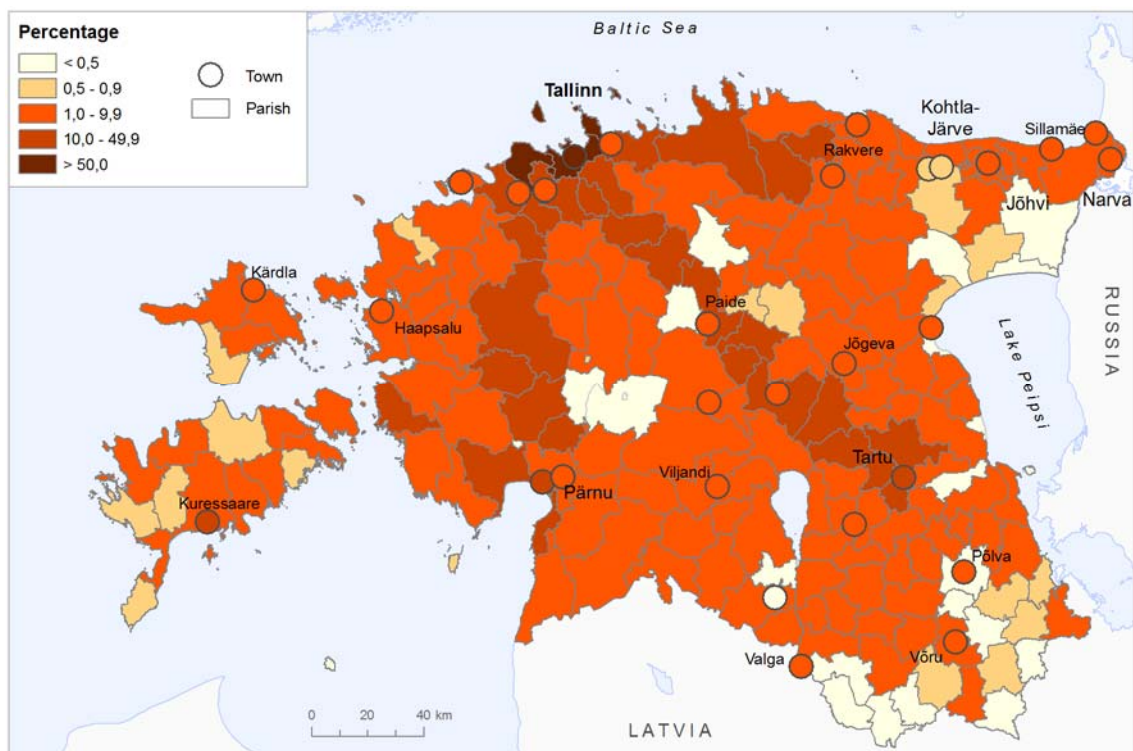


Figure 61. The division of municipalities among the Finns, who have visited Estonia 183 days or more per year.

5. Conclusions

About the method

While various statistics have been used in the past to assess the movement of people between Tallinn and Helsinki, the integration of Finland and Estonia into the European Union resulted in the current situation where there is no systematic counting of border crossing data available. Although data from shipping companies enable to assess traveller numbers and economic statistics in order to evaluate the number of tourists staying overnight, there are many transit and one day visitors between the two cities. The overview presented in this report, which is based on mobile positioning, provides one additional angle to the mobility and connections between the two cities. Certainly these statistics are problematic: the total number of visitors was evaluated based on the market share of one large mobile operator. It must be emphasised that the study includes people that actively use their mobile phone while abroad, i.e., they have maintained an active connection with their homeland. Clearly there are many persons who use much cheaper local mobile phone services or do not use mobile phones at all abroad. Nationality (country of origin) was determined by the country in which the phone is registered and usually people register their phones in a place with which they have a strong connection or where they stay longest. Certainly there is a need for a detailed phone use study in the future.

The data presented in this study is an alternative source for determining international mobility flows. We hope that this will add new knowledge to the research on international connections and relationships between the two cities.

Estonians in Finland

The results indicate that on the average 328 152 Estonians visit Finland per year, making 1 368 120 visits to Finland, including 154 970 people from Tallinn, who make 535 589 visits on the average. The number of visits Estonians make to Finland is slightly larger during summer months (July, August). In August, the month with the largest number of visits, Estonians make on the average 137 318 visits to Finland, including 51 215 visits by people from Tallinn. The month with the smallest number of visits is most frequently February, when Estonians make on the average 88 786 visits to Finland. There are more Estonians in Finland during the working days (Monday to Friday) and less on Saturday and Sunday. During the working days, there are on the average 14 622 Estonians in Finland, compared to the 11 547 on Saturday and 1 213 on

Sunday. Estonians travel from Estonia to Finland most often on Mondays and from Finland to Estonia on Thursdays and Fridays, which indicates that they work in Finland. 88% of all the visits are made to Finland as the country of destination and 12% as the country of transit; the importance of transit visits for people living in Tallinn is 14%. The relative importance of Estonians who visit Finland 5 or more times a year is 19% for the territory of Estonia, while the same indicator is 22% for the people living in Tallinn. From the people who travelled to Finland, the relative importance of the people who spent more than 30 days there is 15% in all areas. The number of the inhabitants of Tallinn who spend 183 days or more in Finland is 5 260 (3%), while for the entire territory of Estonia the indicator is 13 652 (4%). It is very likely that the majority of these people work or have family relations in Finland. 24% of the visitors who spend 183 days or more in Finland live in Tallinn, 37% in the Harju County (including Tallinn) and 63% other counties in Estonia.

Finns in Estonia

An average of 1 594 766 Finns visit Estonia per year, 64% of whom visit only Tallinn and 81% of whom only the Harju County. Finns make an average of 2 520 377 visits to Estonia and 1 327 299 to Tallinn. A seasonal rhythm is apparent in the visits that Finns make to Estonia, including Tallinn: the number of visits is highest in July (an average of 326 848 visits) and lowest in January (an average of 96 616 visits). There are on the average 19 575 and 22 022 Finns in Estonia on Friday and Saturday respectively, which is more than on other weekdays – this clearly indicates that the majority of the visits are made for leisure. An average of 15 224 Finns are in Estonia on working days and 19 570 on weekends. The respective numbers for Tallinn are 4 418 on workdays and 7 701 on weekends. Finns travel to Estonia most frequently on Fridays and Saturdays and from Estonia to Finland on Saturdays and Sundays. The percentage of visits made by Finns to Estonia as the country of destination is 92% and 8% as the country of transit (87% and 13% respectively, of the visits limited to Tallinn). The relative importance of Finns who visit Estonia frequently (5 or more times per year) is 4%. Approximately half of the Finns who have visited Estonia only stay in Estonia one day per year; the percentage of the Finns who stay in Estonia for more than 30 days is slightly over 1%. 1 155 Finns stayed in Estonia (including Tallinn), and 591 stayed in Tallinn for more than 183 days, which amounts to 0.1% of the visitors for both areas.

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