



UNIVERSITY OF TARTU



The experience of studying spatio-temporal patterns of Ukrainian refugees in Estonia based on mobile phone data

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Motivation

- Around seven million refugees have left Ukraine since Russia started invasion to Ukraine in February 2022.
- Estonia is one important destination country for Ukrainian refugees.
- The receiving countries have no clear overview of the residential distribution of refugees and its changes in the receiving country.
- The ministries in Estonia were in spring 2022 interested in finding out where the children of Ukrainian refugees are likely to go to school, that is, where the Ukrainian refugees have settled permanently.

Objective

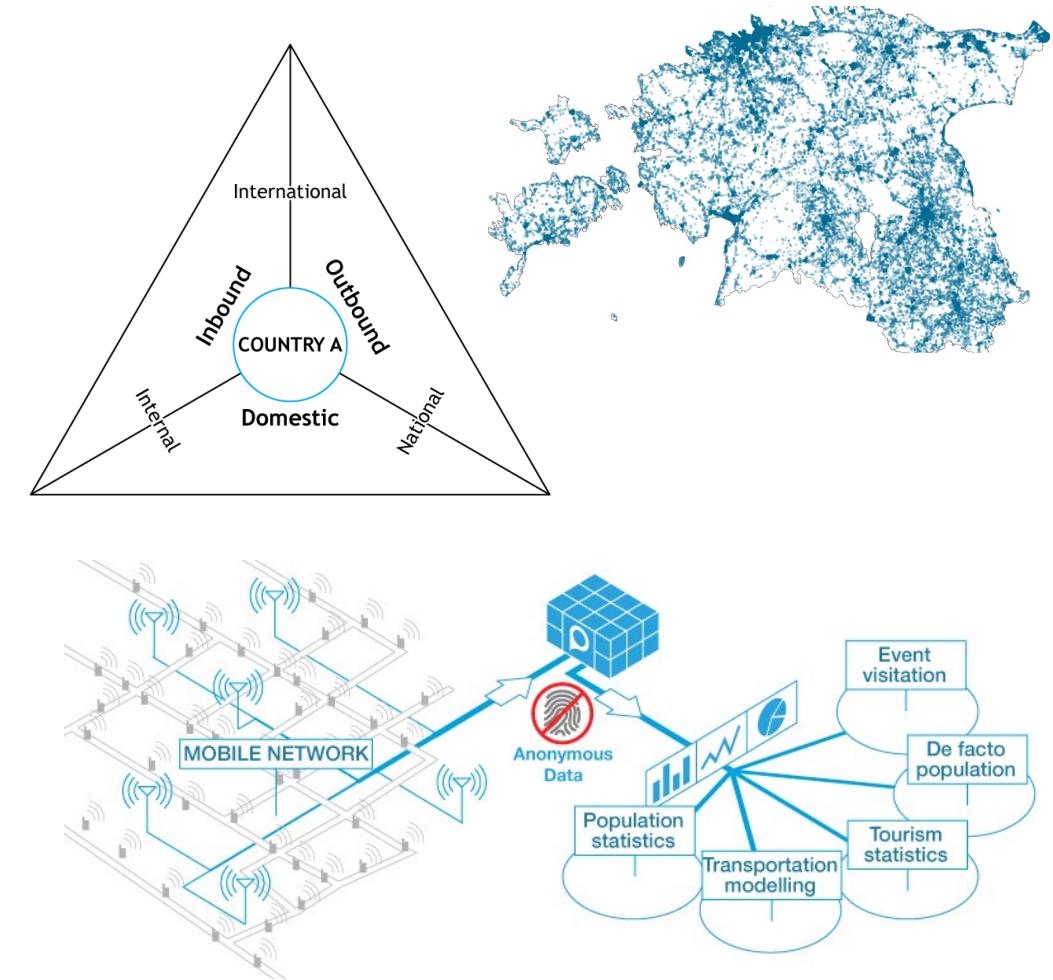
- **How has the visits from Ukraine-origin people in Estonia changed?**
- **Which is the spatial distribution and mobility of Ukraine-origin people and how it has changed?**

Studied periods:

- 1) pre-COVID period (2017-2018)
 - 2) COVID period (2020-2022)
 - 3) period of Russian invasion to Ukraine (1.02.-30.06.2022)
- **Which are the advantages and challenges in using mobile positioning data in studying refugees?**

Passive mobile positioning data

- One mobile network operator
- Inbound roaming data in Estonia (DDR)
 - Time
 - Location
- Joint methodology development with 

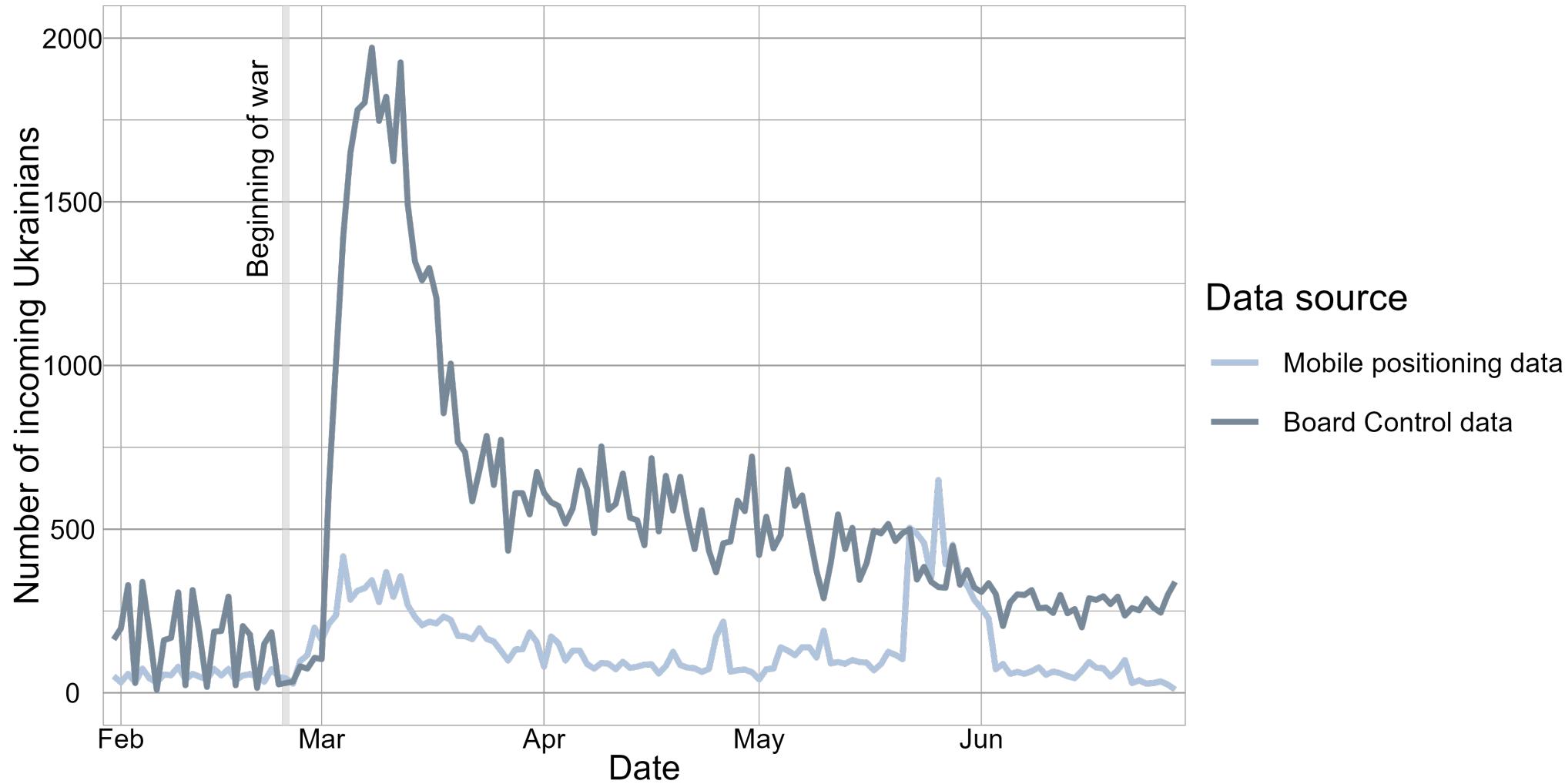


Methodology

- **Visit** - the period from the first call activity until the last call activity in Estonia (Saluveer et.al 2020).
- **Place of residence** - the municipality, where the person has spent the most nights in a 2-week period.
- **Ukrainian refugees** - visitors whose visit to Estonia began after February 1, 2022, and the same visitor had not previously been in Estonia (since February 1, 2020).

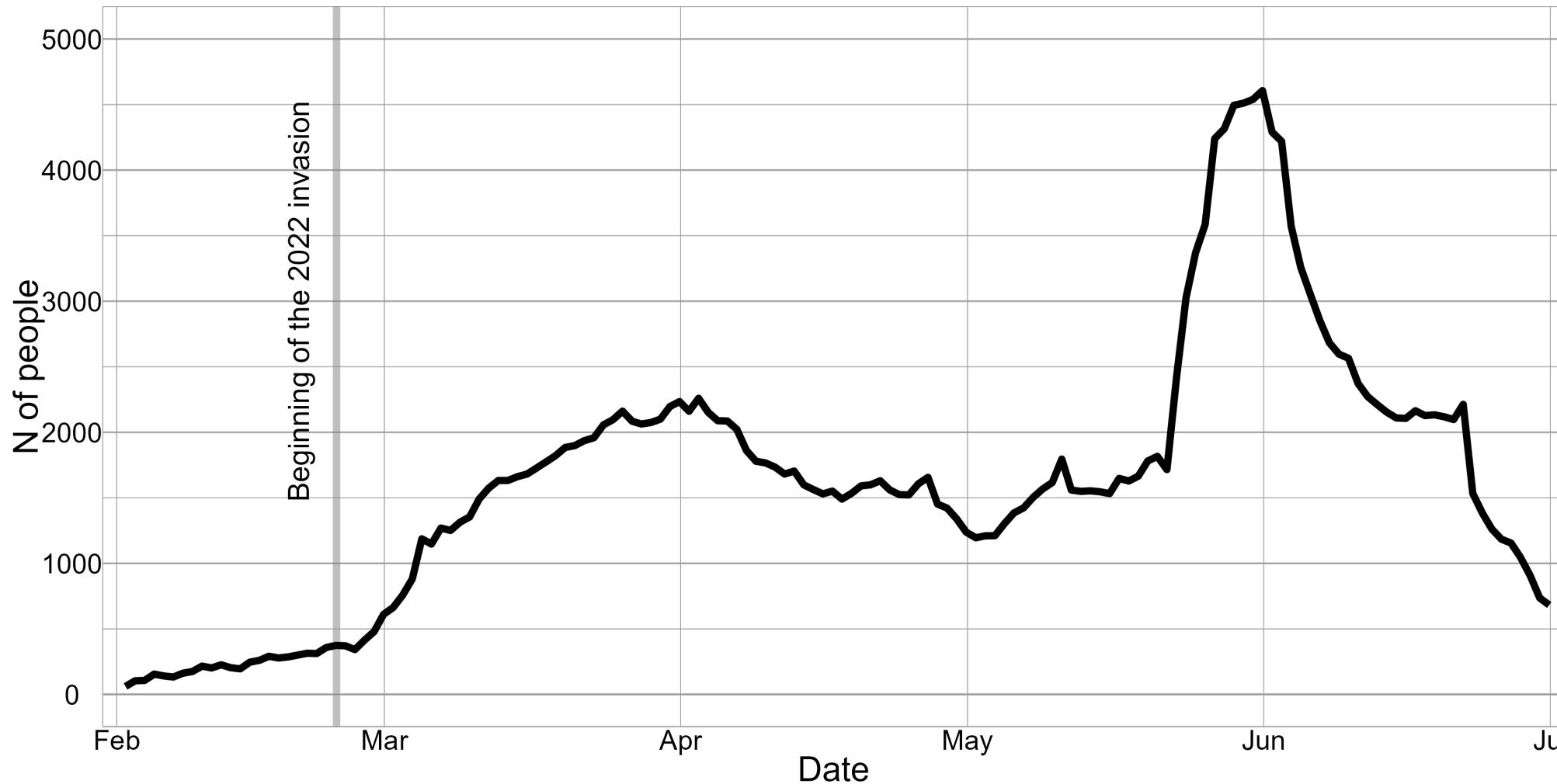


Arrival of people from Ukraine



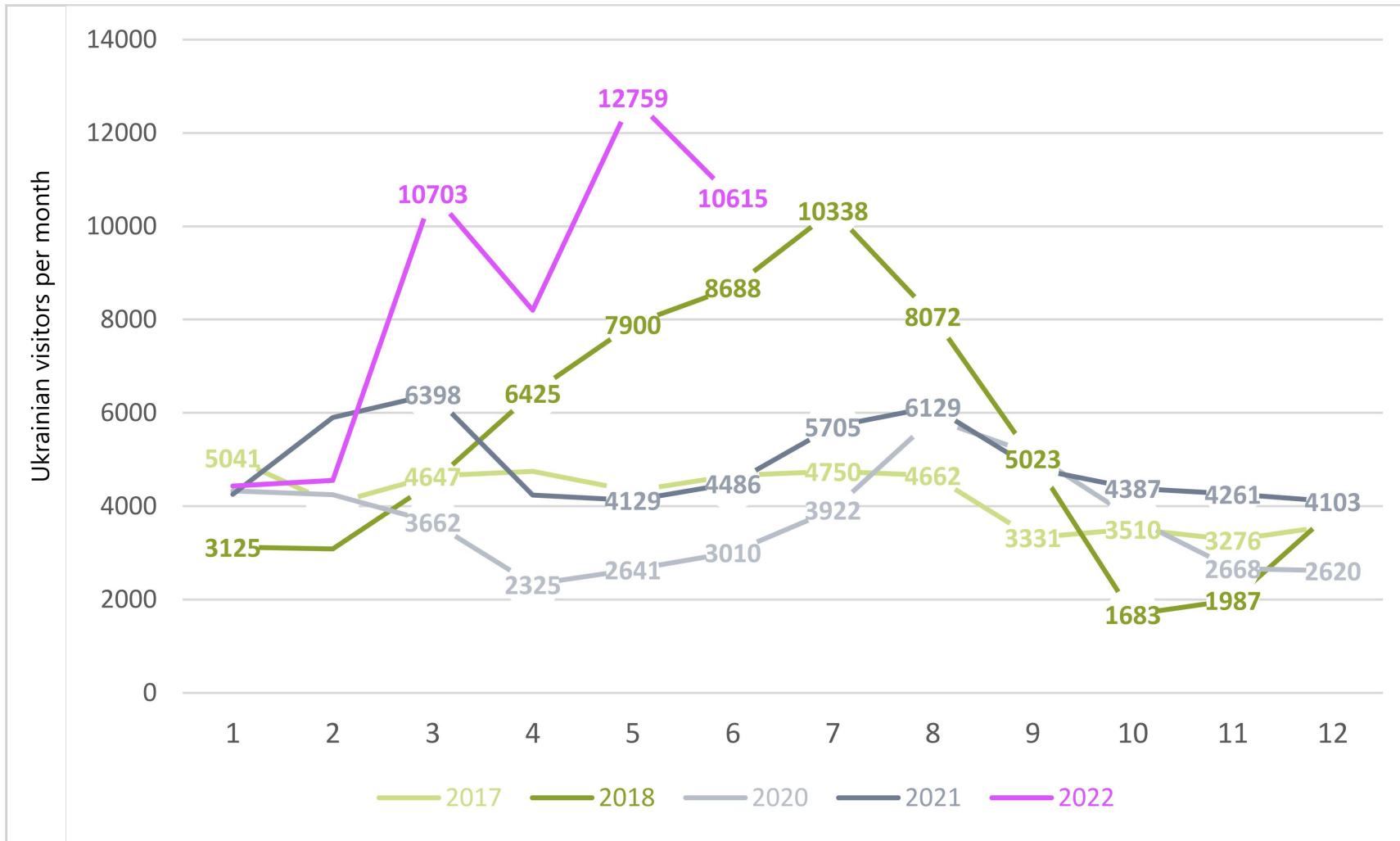


Number of people from Ukraine



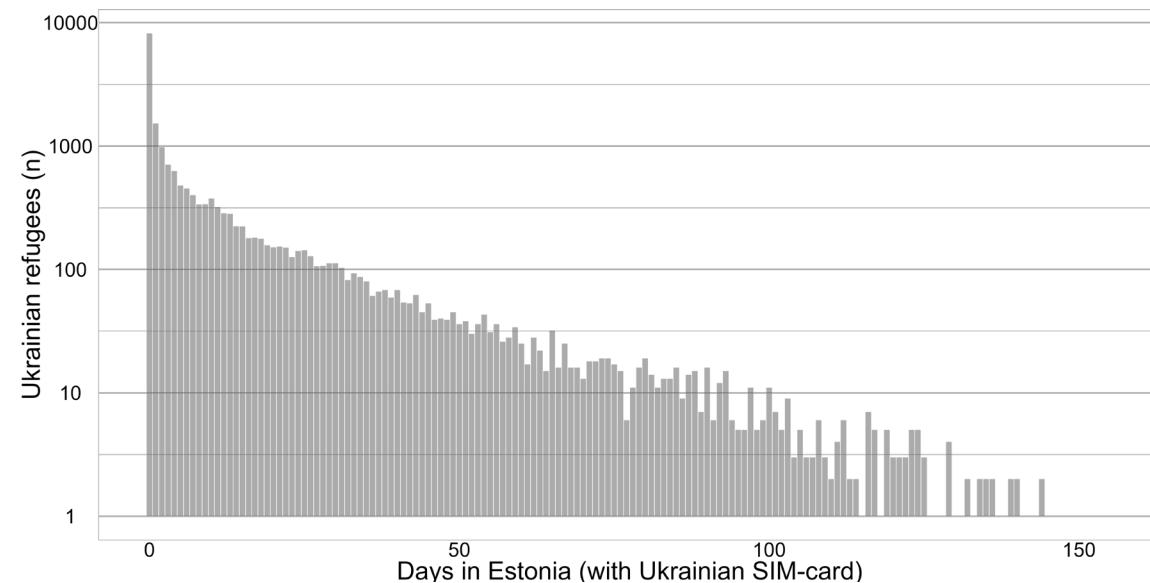


Number of people from Ukraine





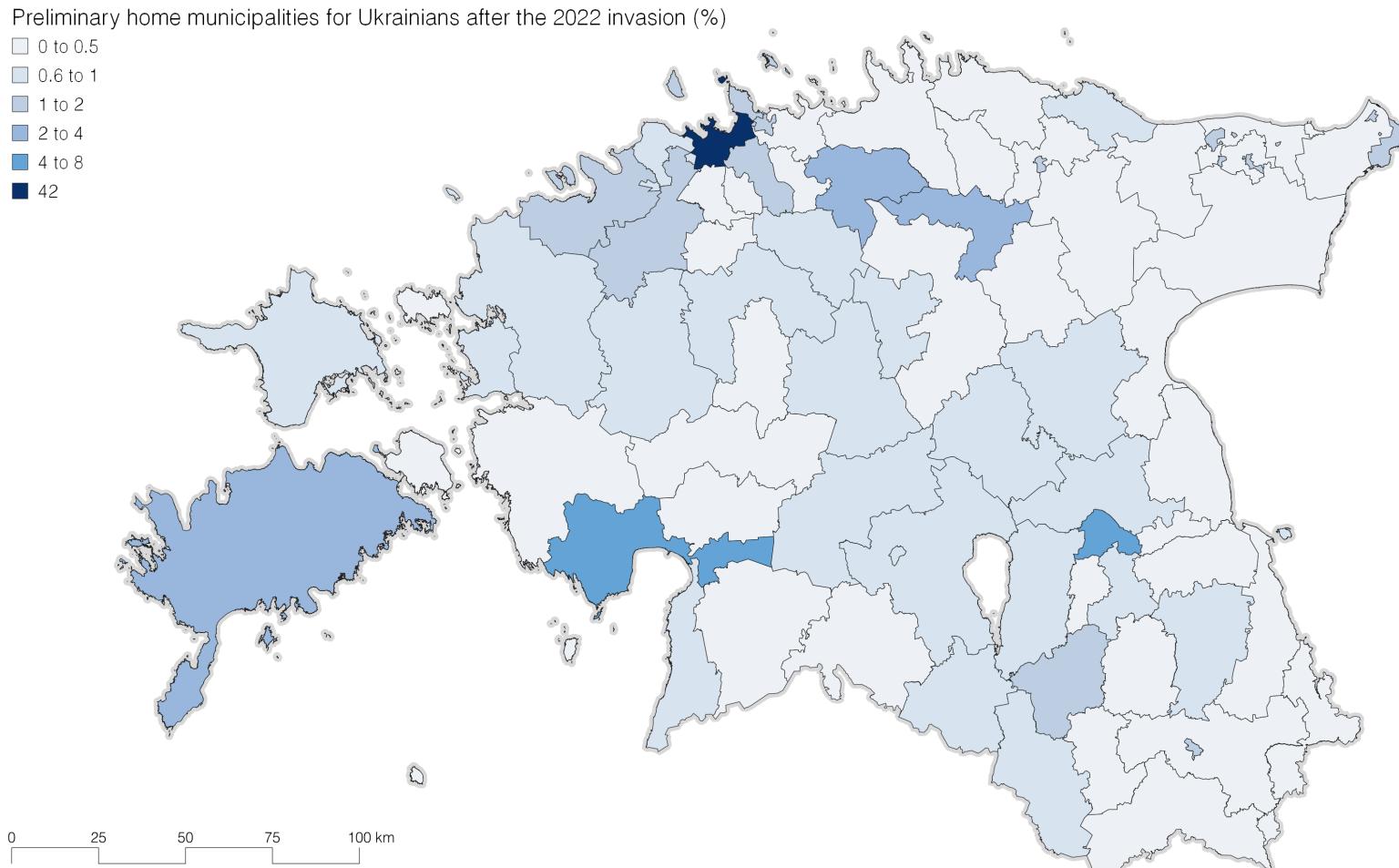
Duration of the visits



	25th percentile	median	75th percentile
Pre-COVID period	2.0 hours	1 day	4 days, 5 hours
COVID period	0.6 hours	23 hours	6 days, 11 hours
Period of Russian invasion to Ukraine	3.4 hours	1 day, 18 hours	8 days, 16 hours



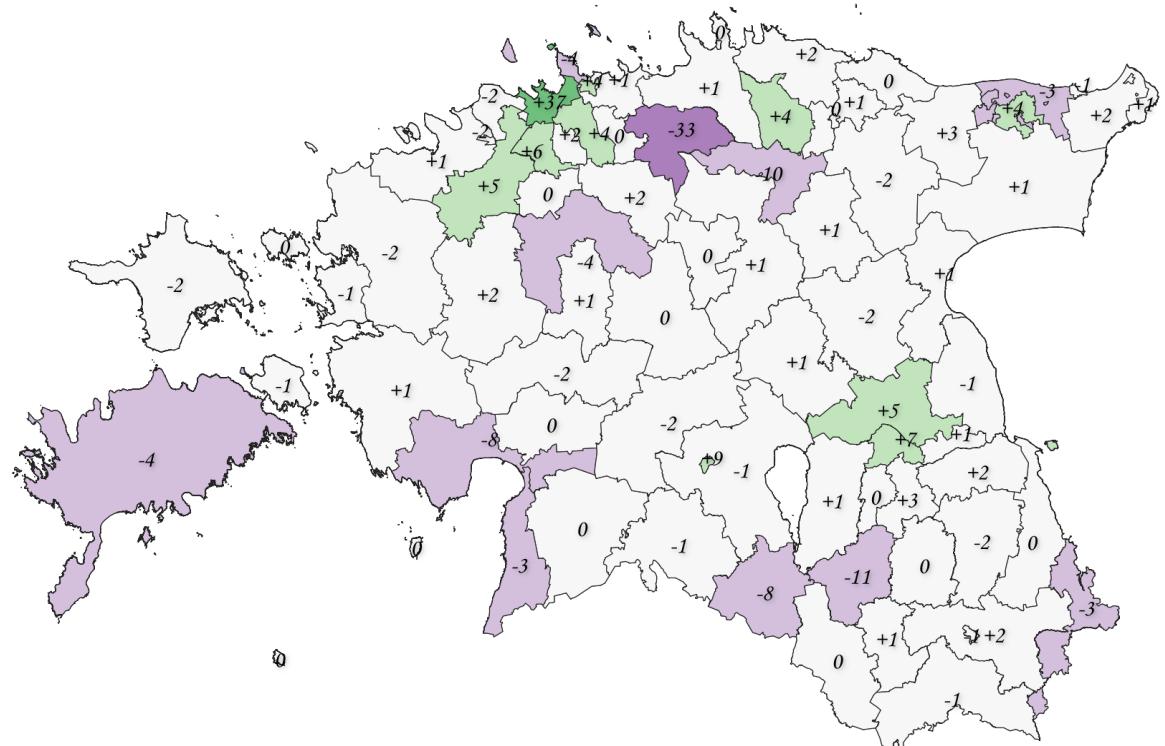
Preliminary home municipality





Changes of home municipalities

- 80% of the refugees stayed in the same settlement unit where they arrived.
 - 90% stayed same municipality
 - 95% stayed same county.





Changes of home municipalities

- 20% of refugees changed settlement unit.
- 5% of refugees changed county.



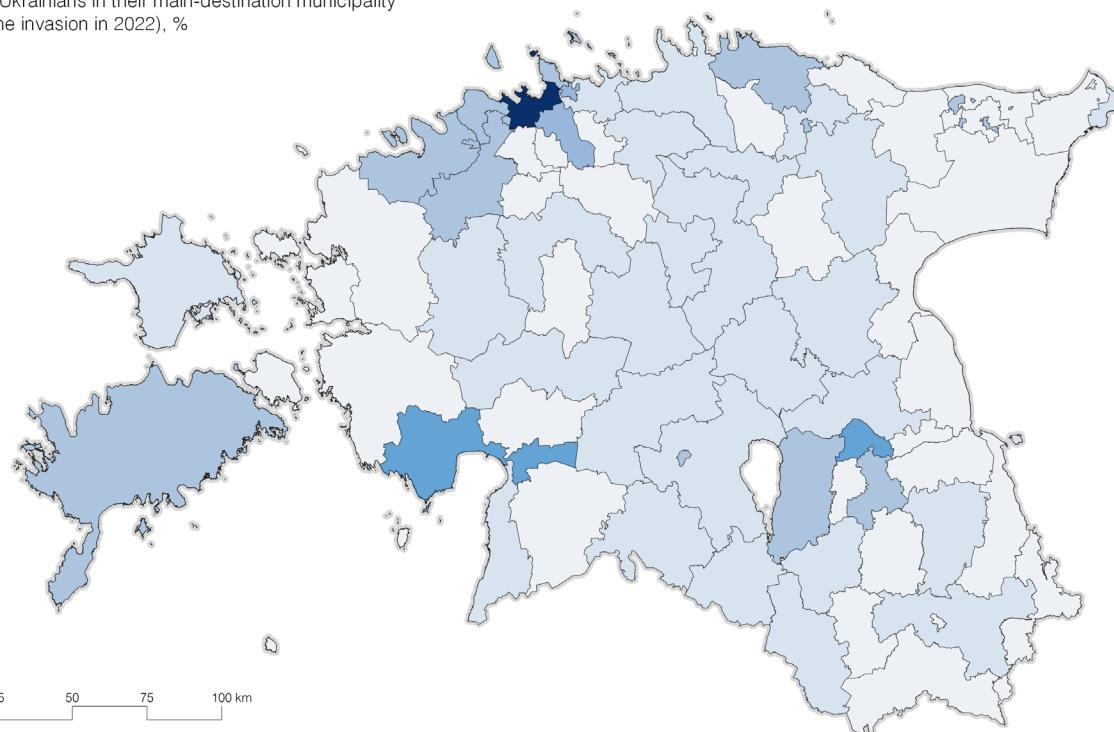


Home municipalities before and after the invasion

Before period of Russian invasion to Ukraine

Share of Ukrainians in their main-destination municipality
(before the invasion in 2022), %

- 0 to 0.5
- 0.6 to 1
- 1 to 2
- 2 to 4
- 4 to 8
- 42

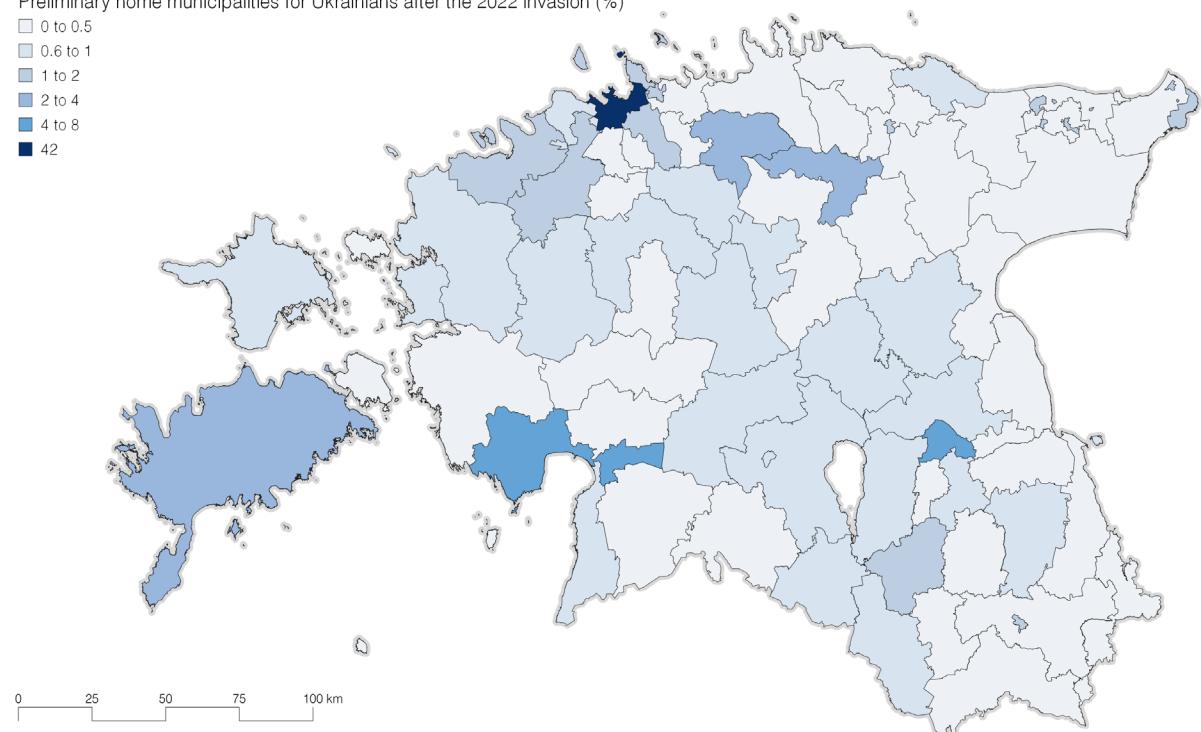


0 25 50 75 100 km

During the period of Russian invasion to Ukraine

Preliminary home municipalities for Ukrainians after the 2022 invasion (%)

- 0 to 0.5
- 0.6 to 1
- 1 to 2
- 2 to 4
- 4 to 8
- 42

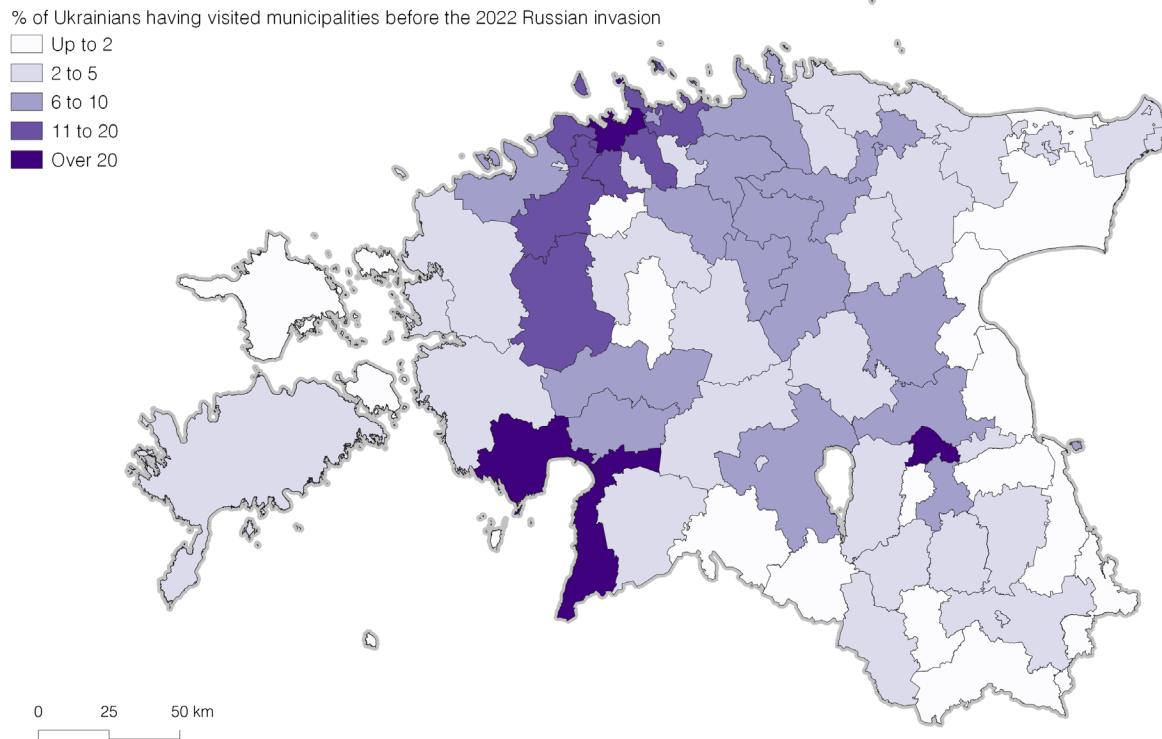


0 25 50 75 100 km

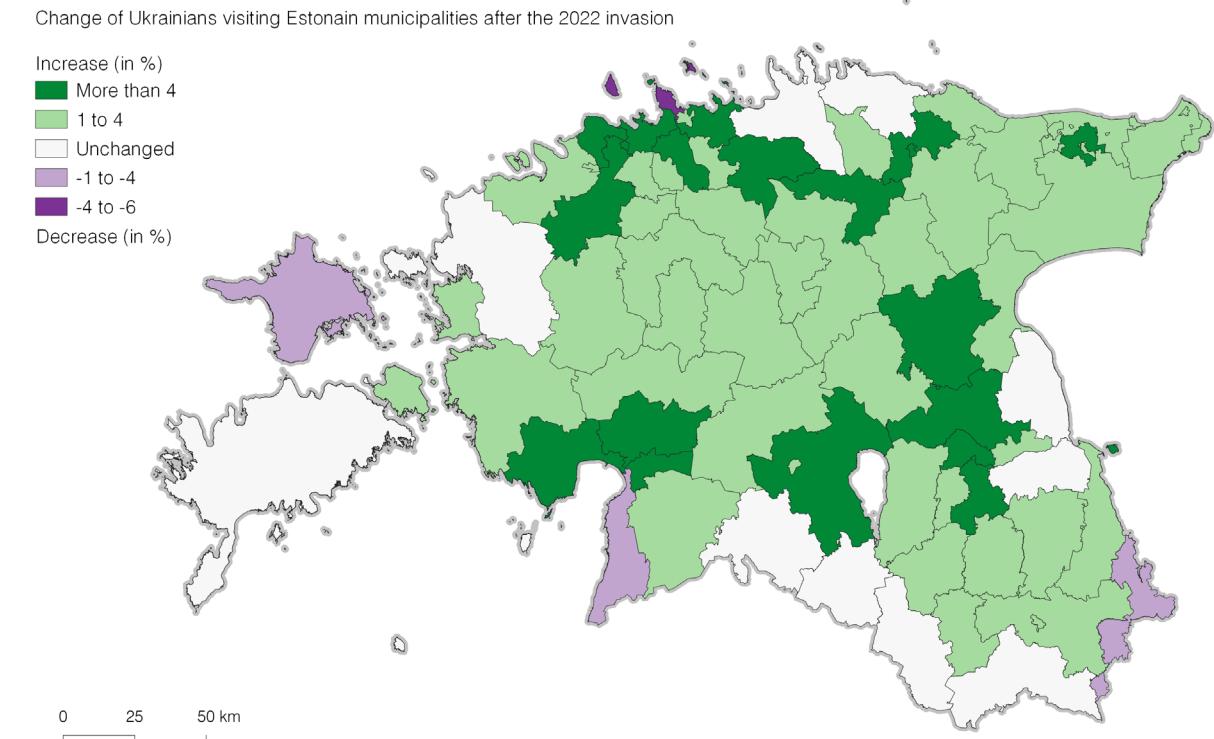


Visited municipalities before and after the invasion

Before period of Russian invasion to Ukraine



Changes on the period of Russian invasion to Ukraine





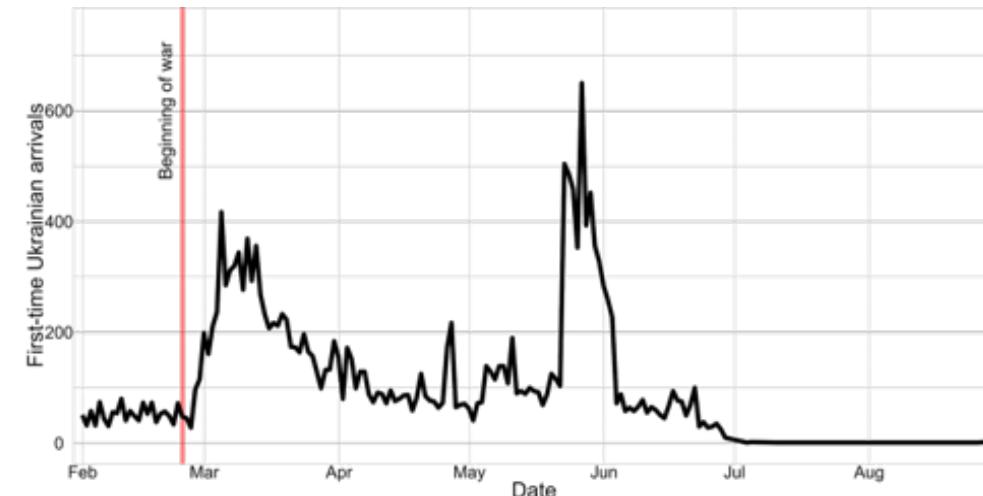
Discussion

Advantages

- Monitoring of spatial locations and its persistence, within destination country.

Challenges

- Unusual behaviour from mobile operators side (free calls for refugees, changes in roaming network selection, ...)
- Using local SIM cards instead of roaming
- Not the usual tourism or migration behavior





Thank you!

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Opositum



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