9^{th} International Conference on Computational Social Science IC^{2}S^2
July 17-20, 2023, Copenhagen, Denmark

War and Migration: Modeling the Russian Exodus with Digital Trace Data

Keywords: migration flows, Russian invasion, digital traces, Yandex, mobility

Extended Abstract

About a year ago, on February 24, 2022, Russia launched a full-scale invasion on neighboring Ukraine. The Russian invasion of Ukraine has triggered a notable outflow of Russian citizens from their home country. Nevertheless, our empirical knowledge about this flow is fragmentary as official data and reliable estimates are missing. This project aims at predicting international border crossings of Russian nationals by utilizing online search queries in combination with data from official sources to obtain a clearer picture of the numbers and migration patterns of Russian expatriates. Whilst newspapers and social media became already aware of this outflow in the early stages of the war, reliable numbers and the destinations of people on the move are still not certain. Estimates of the number of people leaving Russia due to increasing repressions, sanctions, and mobilization efforts amount to some hundred thousands and vary across sources[1]. Amidst these recent developments, we aim to shed light on this large-scale exodus of Russian nationals by employing computational methods and digital trace data.

The potential of online searches to inform migration predictions has already been discovered by researchers and international organizations (UN Global Pulse, 2014; Böhme, Gröger, & Stöhr, 2020). Although online searches can only reflect intentions to migrate, migration aspirations have been found to translate into actual international migration flows (Tjaden, Auer, & Laczko, 2019). While most papers linking search results to migration intentions use Google Trends, we make use of Yandex.Wordstat in this work. Yandex is the most popular search engine in Russia holding a market share of 62.1% followed by Google with 36.7%[2]. Migration- and mobility-related searches on Yandex can be observed to spike around the key dates of our analysis, namely the beginning of the war on February 24, 2022 and of the announcement of mobilization on September 21, 2022 (see figure 1).

Yandex Wordstat provides weekly absolute and relative (share on total queries) search counts on the regional level for Russia and a few other countries. The data are available for all 83 Russian regions and for smaller sub-national levels like municipalities and towns. Other data sources utilized in this project include official border crossings as published by statistical offices of the destination countries as well as socio-economic indicators as provided by the statistical office of Russia. We collected data on absolute and relative numbers of searches performed in the respective municipalities across Russia. The queries of interest include a set of migration-related terms in combination with a destination country name from our set of most popular destinations (see table 1). Thereby, we created a bilateral origin municipality - potential destination data set covering every week over the past two years. We combine our data set with regional level socio-economic indicators to identify the rate at which migration- and mobility-related online searches translate into actual border crossings. This pattern can then be

[1]The Bell: How many Russians have left the country in 2022 and did not return? (retrieved 2023-02-24): https://thebell.io/skolko-rossiyan-v-2022-godu-uekhalo-iz-strany-i-ne-vernulos

[2]Statista: Most popular search engines in Russia 2022 (retrieved 2022-08-14): https://www.statista.com/statistics/1094920/leading-search-engines-by-visits-share-russia/

extrapolated for similar countries where official (monthly or weekly) border crossings statistics are lacking at the moment.

Our preliminary results show a high positive correlation between border crossings by Russian citizens to Turkey and recent migration-related online searches related to Turkey performed in Russia. Since Yandex search results are not an established data source for migration research yet, we compare their correlation with Google search results for some of the destination countries revealing high positive correlations. In order to see whether the online searches are actually translating into flows, we are interested in their correlation with search queries made in the destination countries. This validation supports our approach. So far, we have identified spatial variations regarding the intensity of searches around the start of the war and the start of mobilization (see figures 2, 3, 4).

The implications of our work are manifold. We are connecting two strands of literature, the predictive potential of online searches for international migration intentions and the translation of such intentions into actual flows. Establishing a direct link between search results and migration flows has the potential to improve projections in data-scarce contexts. Thereby, contributing to the anticipation of demographic change and improvement of policy making. Our work is also contributing to the exploration of Yandex.Wordstat as a novel data source for population research on Russian-speaking populations. Monitoring and understanding the exodus of Russians as a response to the war is critical as we can expect many of them to be displaced for long-term. Therefore, increasing their visibility has direct policy implications for the destination countries (migration status, labor demand shocks, and more). Finally, the so-called Russian exodus is far from being over. As war efforts continue in Russia, more and more Russians are crossing the borders to neighboring countries. In this rapidly changing setting, future migration waves following political events are expected and need to be met with the appropriate research tools.

References

Böhme, M. H., Gröger, A., & Stöhr, T. (2020). Searching for a better life: Predicting international migration with online search keywords. *Journal of Development Economics*, *142*, 102347. doi: 10.1016/j.jdeveco.2019.04.002

Tjaden, J., Auer, D., & Laczko, F. (2019). Linking Migration Intentions with Flows: Evidence and Potential Use. *International Migration*, *57*(1), 36–57. doi: 10.1111/imig.12502

UN Global Pulse. (2014). *Estimating Migration Flows Using Online Search Data • UN Global Pulse* (Tech. Rep.).

Figures

Queries	Destinations
move, work, residence permit, permanent residence, bank, rent, accommodation, (to) rent, flat	Armenia, Azerbaijan, Egypt, Georgia, Israel, Kazakhstan, Kyrgyzstan, Montenegro, Serbia, Tajikistan, Thailand, Turkey, UAE, Uzbekistan, and all EU countries

Table 1: List of queries (in Russian language) and destinations

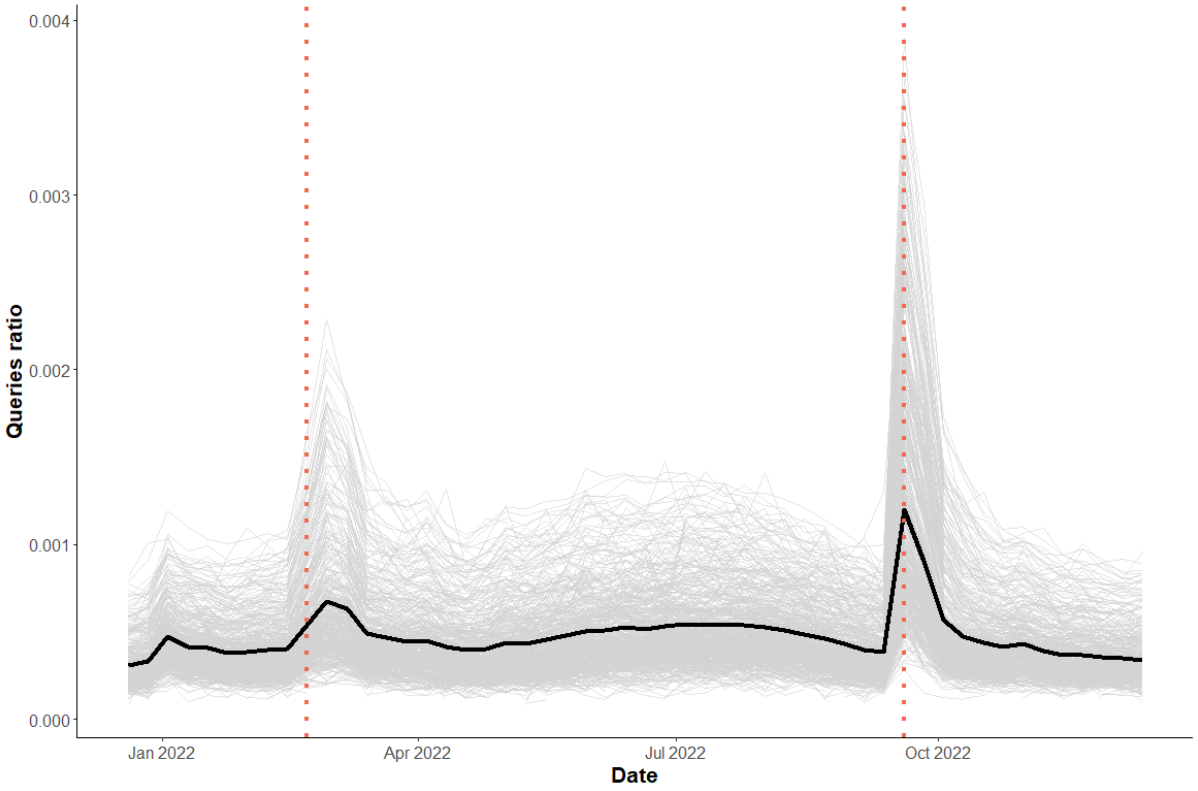

Figure 1: Migration-related searches (share on total weekly searches) performed on the municipality level (grey lines) in Russia and their average (black line). Dashed lines indicating February 24, 2022 (beginning of the war) and September 21 (beginning of mobilization).

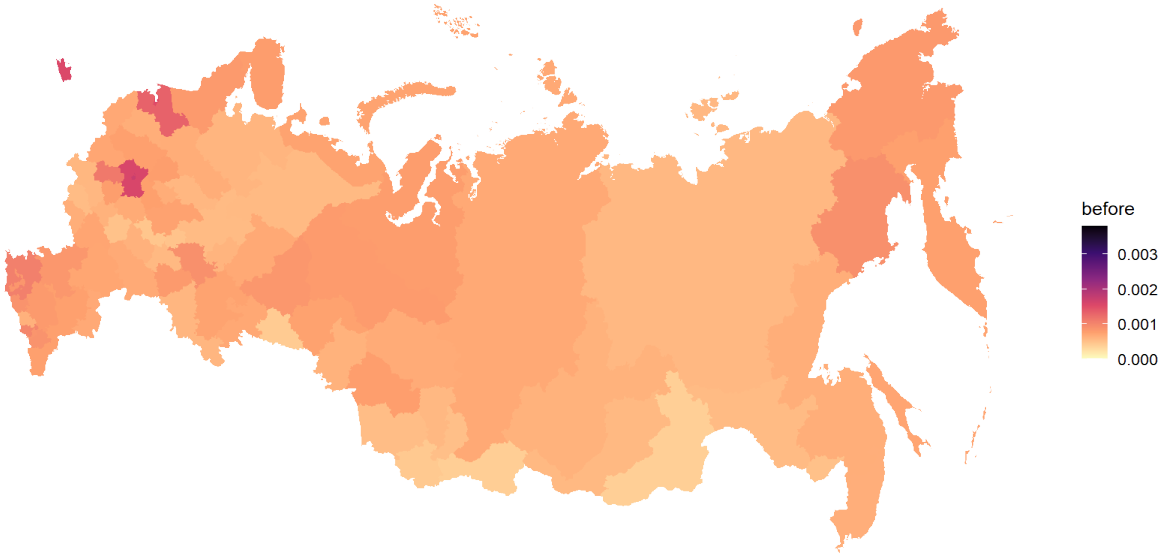

Figure 2: Migration-related searches (share on total weekly searches) performed on the sub-national level in Russia, 2 weeks **before the war** started.

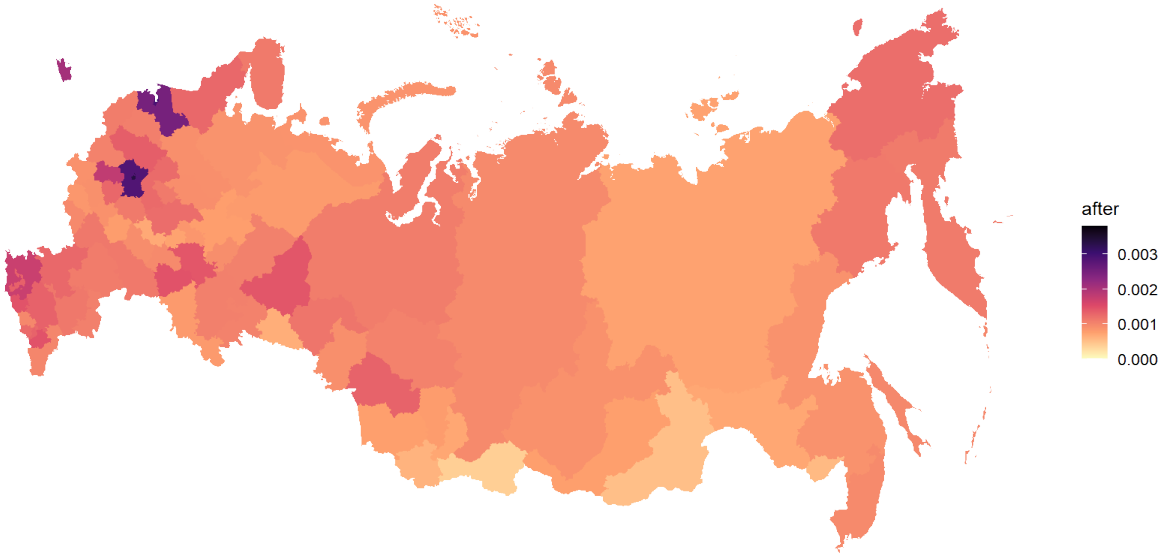

Figure 3: Migration-related searches (share on total weekly searches) performed on the sub-national level in Russia, 2 weeks **after the war** started.

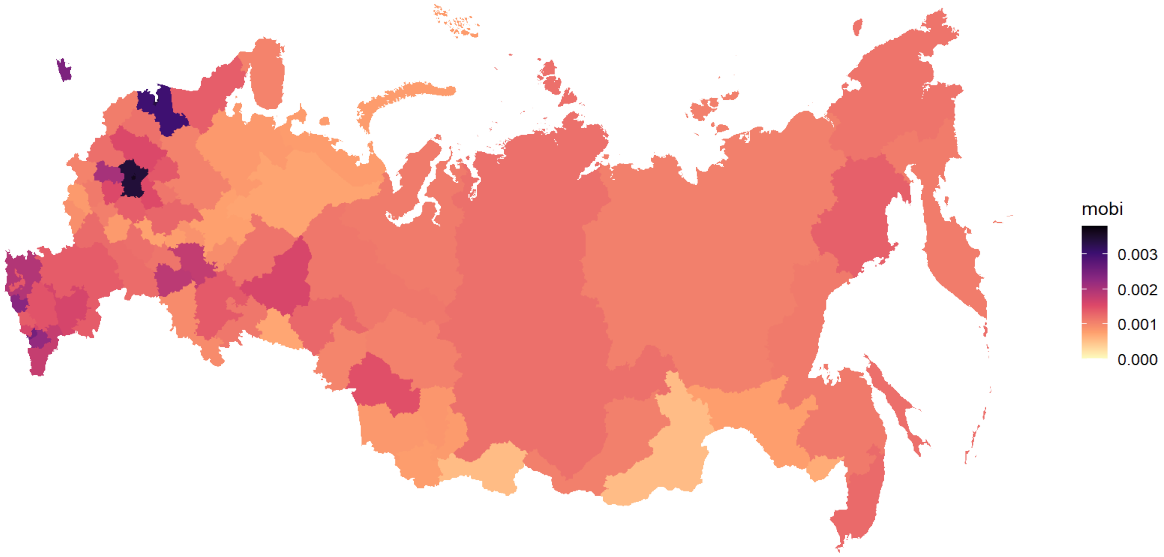

Figure 4: Migration-related searches (share on total weekly searches) performed on the sub-national level in Russia, 2 weeks **after mobilization** was announced.