https://doi.org/10.51408/issi2025_044

The Impact of Russia-Ukraine Conflict on International Migration of Russian-Affiliated Researchers

Andrey Lovakov

lovakov@dzhw.eu
German Centre for Higher Education Research and Science Studies (DZHW), Schützenstraße 6A, 10117 Berlin (Germany)

Abstract

The Russia-Ukraine conflict has had a significant impact on international migration patterns, including a significant exodus of Russian-affiliated researchers. This study examines the scale, disciplinary impact, and geographic shifts of this migration wave by analyzing data from the Scopus database. Using changes in the most frequent country of affiliation as a proxy for migration, the results show a substantial decline in the net migration rate of Russian researchers from 2022 to 2024. Russia has been losing about 0.8% of its active researchers annually over this period. This brain drain wave affects almost all research fields. The most affected disciplines include Physics and Astronomy, Computer Science, and Mathematics, while Dentistry and Health Professions experienced comparatively smaller declines. Geographically, traditional academic destinations such as Germany, the United States, and Switzerland have absorbed the majority of emigrating researchers, while non-traditional destinations, such as Armenia, the United Arab Emirates, and Kazakhstan, are also becoming important. However, large academic systems such as China and India have not seen significant increases. The findings underscore that this unprecedented brain drain will have both short- and long-term consequences for Russian academia and global science.

Introduction

The Russia-Ukraine conflict has dramatically reshaped the geopolitical, economic, and social landscape, with significant implications for international migration patterns. While migration from Ukraine has mainly taken the form of refugee movements in search of immediate safety, migration from Russia has different drivers. Economic sanctions, growing political repression, fear of conscription following Russia's mobilization campaigns, and moral opposition to the conflict have led many Russian citizens to flee abroad. For the academic and research community, these factors are compounded by concerns about academic freedom, the sustainability of international collaborations, and the narrowing space for intellectual dissent.

While data on the exact scale of researcher migration from Russia remains scarce, emerging evidence suggests a broader trend of intellectual flight. Wachs (2023), for example, documented a notable shift among Russian open-source software developers: 11.1% listed a new country on GitHub by November 2022, compared to only 2.8% of developers from neighboring countries not involved in the conflict. Similar trends are likely to exist within other segments of Russia's intellectual community, including academic researchers. Chankseliani and Belkina (2024) provided an overview of various estimates of the outflow of researchers from Russia. For example, an analysis based on the ORCID database estimated that about 2500 scientists left Russia after February 2022, when the armed conflict began. However,

it is important to note that the ORCID database relies on self-reported information and has limited coverage of the Russian research community.

The current study aims to examine the impact of the Russia-Ukraine conflict on the international mobility of Russian-affiliated researchers, focusing on the scale of migration, the disciplines most affected, and the primary destinations of these migrating researchers. Understanding the extent and characteristics of this migration is important for several reasons. First, it sheds light on the broader consequences of the conflict for global scientific networks, particularly in fields where Russian researchers have traditionally been active contributors (such as physics, mathematics, chemistry (Lovakov, 2022)). Second, it provides valuable information to receiving countries, which may consider adopting targeted policies to attract and support displaced researchers. Third, it contributes to a deeper understanding of how geopolitical crises influence the mobility of intellectual communities, with implications for both policy and practice. Chankseliani and Belkina (2024) noted that this wave of migration may be different from the previous one that followed the dissolution of the Soviet Union. While the previous wave of migration was influenced by an evolving political or economic landscape and economic drivers (Ganguli, 2014; Graham & Dezhina, 2008; Yegorov, 2009), the current wave is more immediate and driven not only by economic reasons, but also by personal safety concerns and opposition to government actions. This specificity requires a better understanding of the current wave of migration and its potential impact on the Russian and global academic system.

This study seeks to answer the following research questions: 1) How many researchers have left Russia in response to the armed conflict? 2) Which academic disciplines have been most affected by this migration? 3) What are the main destination countries for Russian researchers?

Method

Data

The in-house version of the Scopus database provided by the German Competence Network for Bibliometrics (snapshot as of 01.2025) was used (Schmidt et al., 2024). All authors who affiliated with Russian institution in at least one publication indexed in Scopus were selected. There are 856,853 author profiles of researchers who have published at least once with a Russian address in the period 1996-2024. For each of these authors all its publications and affiliations were found. There are 3,575,868 publications in Scopus published between 1996 and 2024 associated with these authors. The Scopus author ID was used to identify all publications for each author. All affiliations and publications associated with the same author ID were considered to be affiliations and publications of the one same author. It was shown that Scopus data and Scopus author ID are suitable to identify the international mobility of a scientist and could be a good solution (Aman, 2018; Baas et al., 2020).

Migration event

The data include the year of publication, the address, and the country, that can be used as a proxy for the author's residential addresses. To detect a migration event,

the most frequent (mode) country of affiliation is extracted for each researcher in each year. A migration event is considered to have occurred if the researcher's most frequent country of affiliation changes in two different years. This so-called “mode-based method” is a widely used method for identifying migration events (Akbaritabar et al., 2024; Subbotin & Aref, 2021; Zhao et al., 2022). When there were two the most frequent countries, they were compared to the most frequent country in the previous year. If one of them is the same as the previous year, that country was selected as the country of residence. If none of them matched the most frequent country in the previous year, one of them was chosen at random. When available, the year of “early access”, “online first” or “in press” was used to more precisely identify the time of the migration event.

Research field assignment

Each author has been classified into one of the Subject Area Classifications, which are based on the All Science Journal Classification (ASJC) scheme. Each serial title in Scopus is classified into one or more subcategories of the ASJC. The 334 lower-level subcategories are assigned to one of the 27 top-level fields. Each individual publication can also be assigned to one of these fields. To assign an author to a research field, the most frequent (mode) research field was extracted. If there were two or more most frequent fields, one of them was chosen at random.

Measures

Based on these data, several measures were calculated. In-migration I_y was calculated as the number of published researchers who immigrated to Russia in year y. Out-migration E_y was calculated as the number of published researchers who emigrated from Russia in year y. The estimated population of researchers in Russia in year y (M_y) was calculated as the number of researchers with Russia as the mode country of affiliation. If an author does not publish every year, we assume that he or she is still part of the population of active researchers two years before the nearest publication year. Only authors with a total of more than one Scopus-indexed publication in their entire career were included in these calculations. Authors with only one Scopus-indexed publication were not considered as active members of the academic community. Net migration rate NMR_y was calculated as the difference between in-migration and out-migration rates per 100 researchers:

$$NMR_y = (I_y - E_y)*100/M_y.$$

The main idea of the analysis is to compare the net migration rate in the last three years (2022-2024) with the net migration rate in previous years.

Results

Figure 1 shows the inflow, outflow, and net migration rate per 100 researchers in Russia from 1997 to 2024. Overall, the net migration rate remained negative for most of the study period, indicating a persistent net outflow of researchers. From 1997 to 2014, the net migration rate showed a gradual improvement, starting at -0.36 in 1997 and peaking at -0.05 in 2014. This trend coincides with an increase in the number of

active researchers (from 74,829 in 1997 to 141,035 in 2014). A turning point occurred in 2015, when the net migration rate became positive for the first time (0.12). However, in 2018, the net migration rate returned to negative values, indicating a resurgence of net emigration, which will gradually worsen until 2023. The period from 2022 to 2024 shows a steep decline in the net migration rate, falling from -0.17 in 2021 to -0.83 in 2023, the second lowest value in the dataset. This dramatic drop coincides with the onset of the armed conflict between Russia and Ukraine, which is likely to exacerbate emigration (1,465 and 1,938 researchers emigrated in 2022 and 2023, compared to only 672 and 618 who immigrated). It means that Russia has been losing about 0.8% active researchers per year for the last two years. In addition, the shrinking population of active researchers also points to broader structural problems in the academia. It is possible that researchers have either left academia or are still in the process of looking for an academic position. It is important to note, however, that the coverage of 2024 may is not complete and that all measures may change in the future when all publications are included.

Figure 2 shows the net migration rates in different research fields. The period 2022-2024 shows a significant decrease in the net migration rate in almost all research fields in Russia. The largest net migration rate are observed in Physics and Astronomy (-4.42 per 100 researchers), Computer Science (-3.45), Economics, Econometrics and Finance (-2.89), Business, Management and Accounting (-2.62), Mathematics (-2.38), Neuroscience (-2.35), Social Sciences (-2.06), Biochemistry, Genetics and Molecular Biology (-1.83), Psychology (-1.56), and Arts and Humanities (-1.53). Whereas the lowest net migration rate is observed in Medicine (-0.34). Overall, the data show that high-technology and internationally integrated disciplines, such as Physics, Mathematics, and Computer Science, are the most affected by brain drain.

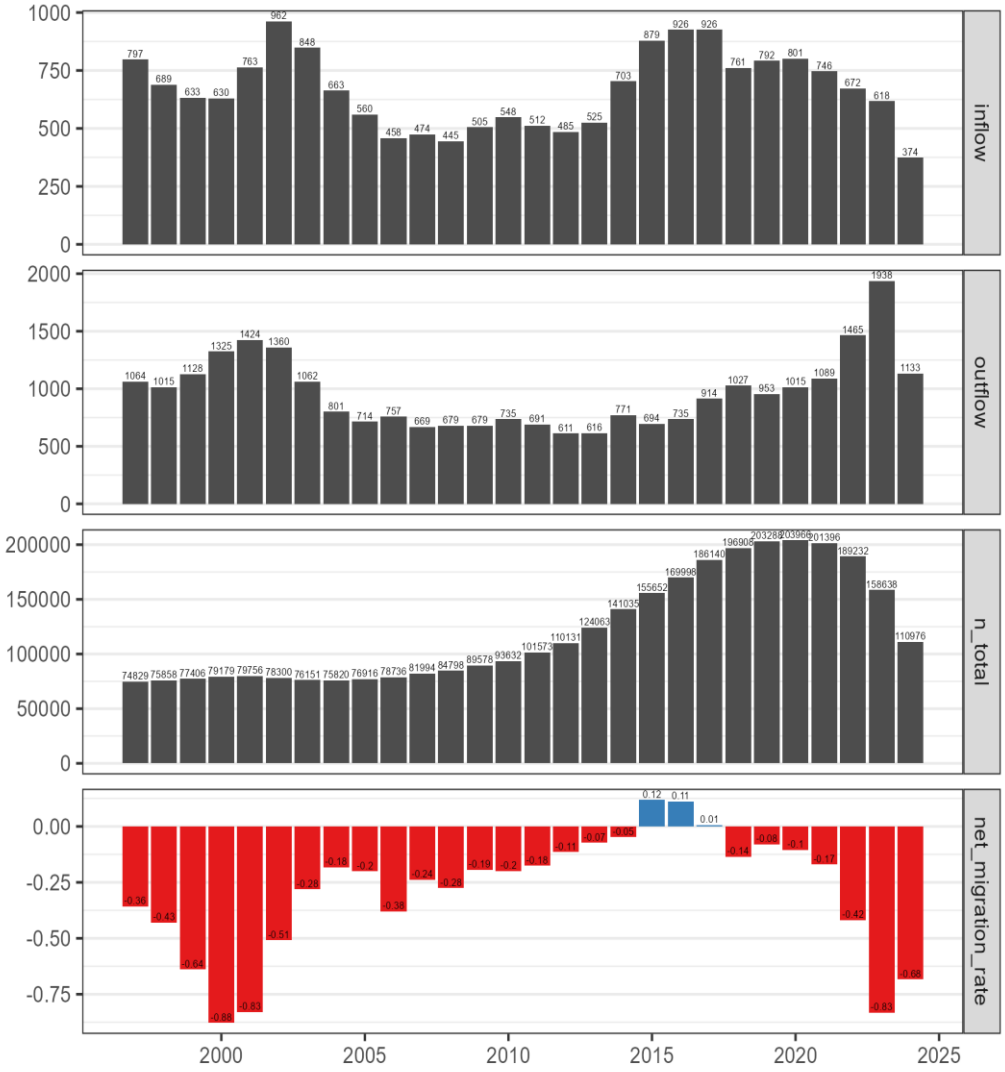

Figure 1. In-migration, out-migration, and net migration rate per 100 researchers in Russia over the 1997–2024 period.

An analysis of the net migration rate by countries reveals some significant changes for some countries (see Figure 3). Compared to earlier periods, the net migration rate shows a marked increase in out-migration from Russia for several destination countries. Traditional destinations for Russian researchers such as Germany, the United States, Switzerland, Finland, Israel, experienced the most notable increase in last three years. Switzerland's net migration rate dropped from -0.018 in 2019–2021 to a dramatic -0.294 in 2022–2024. This drop is most likely due to CERN's policy regarding Russian affiliated researchers. Europe's particle-physics laboratory CERN has decided not to renew agreements with Russia and Belarus when they expire in 2024. All Russian-affiliated scientists should have lost access to the CERN site and must hand in any French or Swiss residency permits they hold after November 2024

(Gibney, 2024). All Russia-affiliated scientists who wanted to continue working on CERN's projects had to find positions in institutions outside of Russia. Our results show that many researchers apparently succeeded in doing so.

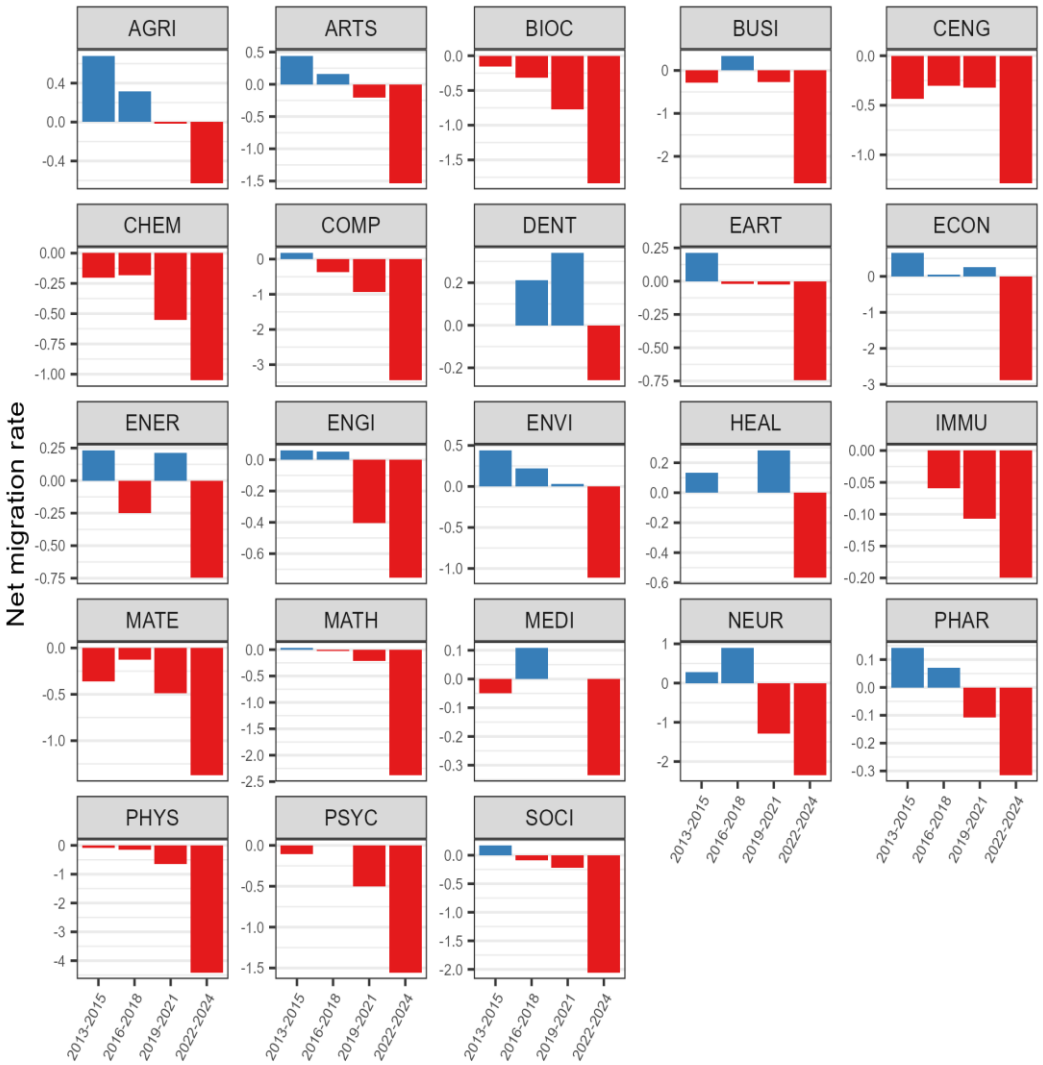

Figure 2. Net migration rate per 100 researchers in Russia in different fields. Nursing, Veterinary, and Decision Sciences are not shown because of small total number of authors (< 100 authors).

Similarly, the United Kingdom, France, and other European countries also increased the number of immigrated Russian researchers. Italy rose from 33rd to 10th place in the ranking of countries with the highest outflow from Russia, and Spain moved from 27th to 12th place, Canada moved from 32nd to 13th place. These changes suggest a diversification of emigration destinations, possibly due to the availability of academic opportunities and a welcoming environment for skilled migrants in these countries.

Other significant risers include countries that were not typical destinations for academic mobility. Armenia rose from 31st to 16th place, Kazakhstan rose from 18th to 6th place, the United Arab Emirates rose from 28th to 17th place. Interestingly, China and India, which are among the largest academic systems in the world, show relatively smaller changes. Russian researchers are not actively moving to these countries. The reasons for this should be investigated in the future. Overall, these results show that Russian researchers are mainly moving to typical destinations in Europe and the US, however there are also some new destinations that were not very attractive in previous periods.

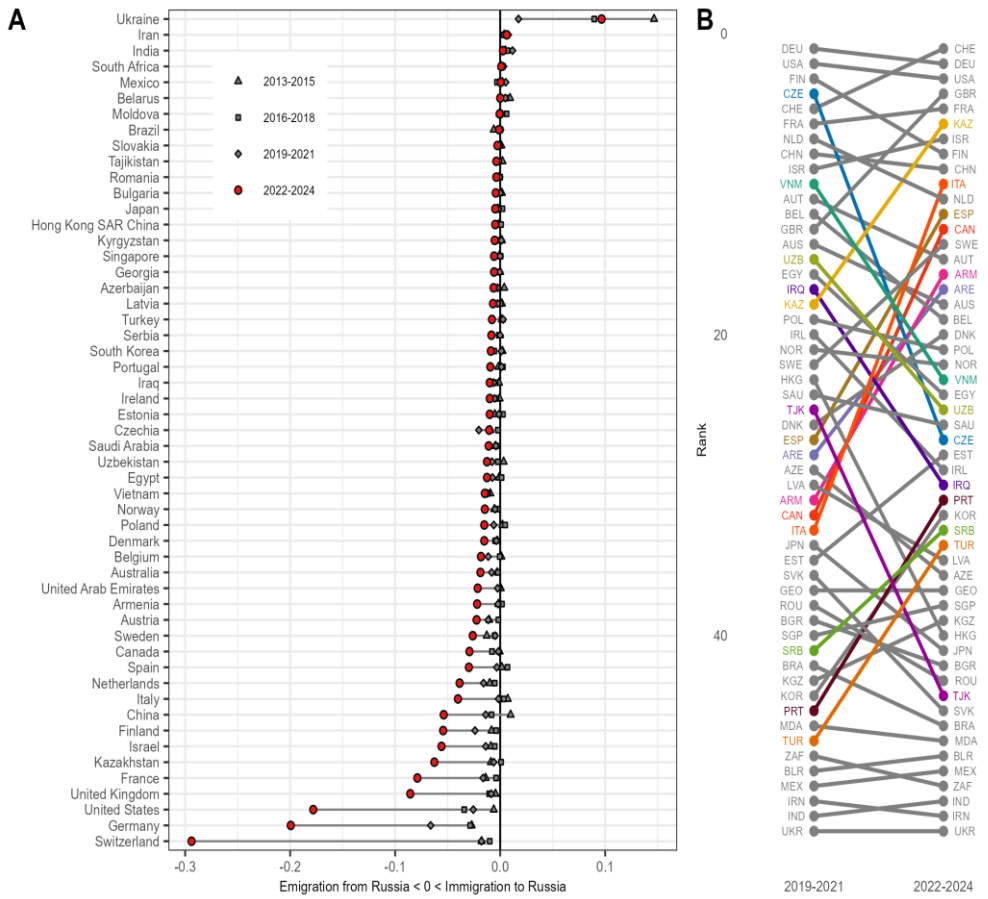

Figure 3. A - Changes in Russia's net migration rate per 100 researchers with different countries (only countries with more than 30 outcome or income researchers in sum between 2013-2024 are shown). B – Ranking of countries based on the net migration rate per 100 researchers with Russia (the higher the rank, the higher the emigration from Russia).

Discussion and Conclusion

The results of this study provide important insights into the impact of the Russia-Ukraine conflict on the international migration patterns of Russian-affiliated researchers. The sharp decline in the net migration rate in 2022-2024 highlights the

magnitude of this phenomenon, with Russia losing about 0.8% of its active researchers per year during this period. There is both an increase in emigration and a decrease in immigration. However, there is also a huge decrease in the total number of active researchers in Russia over the last three years. This huge decrease could also be a sign of future academic emigration. Some researchers may still be in the process of looking for a new position, or they may have moved but haven't published yet because it takes time to start a new project, prepare and publish new papers based on that new project. This unprecedented loss of researchers has far-reaching implications, not only for the Russian academic system, but also for global scientific networks, host countries, and the disciplines most affected by this migration.

The results underline that this brain drain wave affects almost all research fields. However, the most internationally integrated and high-tech disciplines, such as Physics, Mathematics, and Computer Science, are more severely affected. These fields have historically been stronger and more internationally oriented in Russia, with greater opportunities for academic mobility and emigration.

The study also highlights shifts in the geography of academic migration from Russia. Traditional destinations for Russian researchers, such as Germany, the United States, and Switzerland, continue to attract significant numbers of emigrants, confirming their status as hubs of global academic mobility. However, the rise of non-traditional destinations such as Armenia, the United Arab Emirates, and Kazakhstan signals a diversification of migration patterns. This diversification may reflect a combination of factors, including the geopolitical landscape, visa and migration policies, and the availability of academic opportunities in these countries. For host countries, this trend offers opportunities to strengthen their research ecosystems by attracting highly qualified talent. It also highlights the importance of creating a supportive environment for displaced researchers, including funding and integration programs. Interestingly, large academic systems such as China and India have not yet experienced a significant influx of Russian researchers. This could be due to both linguistic and cultural barriers, limited compatibility between academic systems, or political factors. Future research should explore the underlying factors that make certain destinations more attractive or less attractive to migrating researchers, especially in the context of global and regional geopolitical dynamics.

For Russia, the findings reveal a deepening crisis within its academic system. The declining number of active researchers, coupled with a significant brain drain, is weakening the academic system and creating major challenges for higher education. The immediate loss of a huge amount of talent leads to a decline in research capacity, innovation potential, and global academic standing (Chankseliani & Belkina, 2024). Addressing these issues will be a long-term challenge.

The Russia-Ukraine conflict has triggered a significant outflow of Russian-affiliated researchers, reshaping global patterns of academic mobility. This study contributes to a broader understanding of how geopolitical crises shape intellectual mobility in today's highly internationalized and mobile academic system. The current wave of migration, driven largely by political reasons and security concerns, differs from previous patterns. Its impact on global scientific networks, particularly in terms of disrupted collaborations and shifts in research priorities, requires further study.

Acknowledgments

Data for Scopus in this study were obtained from the German Competence Network for Bibliometrics (https://bibliometrie.info/), funded by the German Federal Ministry for Education and Research (BMBF) with grant number 16WIK2101A.

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