

Chapter 10

INTERNATIONAL MIGRATION OF SCIENTISTS AND ENGINEERS IN RUSSIA

by

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Introduction

At the start of the 1990s, the scale of emigration drastically increased in Russia to reach a total annual outflow that exceeded 100 000 persons. Measuring this emigration and analysing the driving forces became the task of the day. Since organisation of data collection at border control posts required much funding and time, the available sources of information were simply adapted to new requirements. This resulted in an imperfect system of statistical observation of emigration from Russia.

With respect to scientists and engineers, the problem was even greater. Neither national statistical authorities nor migration-related agencies were interested in describing this category of migrants. Specific efforts were therefore required from the Centre for Science Research and Statistics (CSRS) to provide a quantitative assessment of the scale of migrating scientists and engineers.

With the warmer international political climate, Russian researchers had the possibility of obtaining contract jobs abroad owing to the stronger interest in Russia at the end of the 1980s, which contributed to the closer integration of Russian science into the world S&T community. The increased openness of the Russian S&T system and new forms of international co-operation played a significant role. Another crucial factor in this regard was the 1991 Law on Employment, which stipulated the right of Russian citizens to take employment abroad. Consequently, the scale of temporary engagement of Russian research scholars in other countries has significantly exceeded the emigration of R&D personnel *per se*.

Given that the departure of researchers abroad was not part of any clear-cut government policies and that no statistical data were collected, CSRS had to undertake special statistical studies to analyse the population of scientists and engineers employed internationally on a temporary basis.

This chapter describes the sources of data for measuring the international mobility of Russian researchers and the collection methods used. An assessment of emigration of scientists and engineers from Russia is provided. Particular attention is devoted to the methodology and results of an *ad hoc* survey of employment of Russian researchers abroad.

Emigration of Russian scientists and engineers: data sources and analysis

Overall data on citizens leaving Russia for permanent residence abroad are provided by the Ministry of Internal Affairs of the Russian Federation (MVD) and the State Committee on Statistics of the Russian Federation (Goskomstat). Though these data sources are not free from certain shortcomings, they may serve as a starting point for estimating the scale of qualified professionals' emigration from Russia.

MVD records contain data on persons who receive permission to leave Russia for permanent residence in other countries. They enable analysts to make a rough evaluation of the professional structure of those going abroad for permanent residence on the basis of the sector in which they were employed in Russia. The data also make it possible to distribute emigrating individuals by region of Russia and recipient country from 1992. Unfortunately, this source of information does not provide information on highly qualified personnel, since it does not include the educational level of emigrants. Gender and age variables are available only with regard to the total emigrating population, but not for particular professional groups. Moreover, it is impossible to single out R&D personnel, because the classification of economic sectors used by MVD merges the R&D and education sectors. This disadvantage seems, however, to be surmountable owing to the method of assessing the scale of emigration of R&D professionals developed by CSRS.

The Goskomstat data on the emigration of Russian citizens were obtained from processing, performed by regional statistical offices, of primary records of arrivals and departures that are filed by local units of the Ministry of Internal Affairs which surveys the population at their places of residence. It is intended to cover not only citizens departing for permanent residence (which is as a rule connected with a change in citizenship), but also those who leave the country for a long period to study or work abroad. It should be stressed, however, that registration is not obligatory so that the data are far from complete.

Nevertheless, on that basis, Goskomstat has produced since 1994 figures on the qualifications of emigrants, their gender and age characteristics, nationality, occupation and region of residence in Russia, as well as country of destination. Unfortunately, data collection on migrants' qualifications and sector of employment was discontinued in 1997. This has decreased the analytical value of this data source and discouraged its use.

For a better understanding of emigration data for Russia, two specific features of Russian statistics should be mentioned, which are different from those of most other countries. First, in the Russian Federation, emigrants are defined as persons going abroad for permanent residence, not as those who leave the country for over one year. Second, nationality is understood as the ethnic group to which an individual belongs, not the country of birth or citizenship. For example, a person can be a Russian citizen but at the same time belong to a specific "nationality": Russian, Jewish, Tatar, German, Ukrainian, etc. Hence, the nationality record reflects an ethnic group, not citizenship.

Table 1 presents the overall scale of emigration from Russia in 1990-2000 by country of destination.

Table 1. Emigration from Russia by recipient country
Number of persons who received permission to go abroad for permanent residence

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Aggregate total for 1990-2000
Total	103 614	88 281	102 910	114 133	106 076	111 012	97 548	85 828	84 658	106 837	78 399	1 079 296
Germany	33 753	33 697	62 690	73 093	69 900	79 912	64 841	52 491	49 558	53 221	45 574	618 730
Israel	61 022	38 742	21 975	20 558	17 107	15 368	14 488	14 613	17 005	33 699	16 480	271 057
United States	2 317	11 016	13 200	14 919	13 813	10 705	12 355	12 507	10 797	11 108	9 552	122 289
Australia	79	304	803	531	690	486	375	210	167	161	127	3 933
Greece	4 177	2 088	1 855	1 798	1 052	1 309	1 334	1 002	832	938	601	16 986
Canada	179	164	292	663	874	763	1 010	1 309	1 463	1 885	971	9 573
Other countries	2 087	2 270	2 095	2 571	2 640	2 469	3 145	3 696	4 836	5 825	5 094	36 728

Source: Calculated by CSRS on the basis of data collected by the Ministry of Internal Affairs.

According to long-term observations, children under 18 years old account for approximately 30% (29.7% in 2000) of emigrants. About three-quarters of all adult emigrants (72% in 2000) are employed. Thus, about half of people leaving the country (50.6% in 2000) are part of the economically active population. Among those over 18 years old, there is a slightly greater share of women (57.2%).

The bulk of the flow of emigrants is directed towards Germany and Israel. The third recipient country for Russian emigrants is the United States (12.2% in 2000); all other countries account for only 8.6% of the total number of emigrants from Russia (Table 2).

Table 2. Distribution of Russian emigrants by recipient country
Percentages

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Germany	32.6	38.2	60.9	64.0	65.9	72.0	66.5	61.2	58.5	49.8	58.1
Israel	58.9	43.9	21.4	18.0	16.1	13.8	14.8	17.0	20.1	31.5	21.0
United States	2.2	12.5	12.8	13.1	13.0	9.6	12.7	14.6	12.8	10.4	12.2
Australia	0.1	0.3	0.8	0.5	0.7	0.4	0.4	0.2	0.2	0.2	0.2
Greece	4.0	2.4	1.8	1.6	1.0	1.2	1.4	1.2	1.0	0.9	0.8
Canada	0.2	0.2	0.3	0.6	0.8	0.7	1.0	1.5	1.7	1.8	1.2
Other countries	2.0	2.6	2.0	2.2	2.5	2.2	3.2	4.3	5.7	5.4	6.5

Source: Calculated by CSRS on the basis of data collected by the Ministry of Internal Affairs.

The occupational structure of emigrants from Russia can be assessed with the help of data from the Ministry of Internal Affairs on the distribution of those who received permission to leave the country, by sector of the national economy (Table 3).

Table 3. Distribution of emigrants from Russia by sector of the national economy¹
Percentages

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total	100	100	100	100	100	100	100	100	100
Industry, electricity, transport, communications, material and technical supply, construction	27.5	29.0	25.8	26.5	25.8	23.7	21.5	19.5	18.3
Agriculture and forestry, purchasing	14.9	14.5	14.6	14.3	12.0	10.9	11.7	10.2	10.5
Trade, public catering, housing and communal services, finance, insurance, administration	7.9	7.0	7.3	8.5	9.0	8.6	7.7	7.7	6.7
Science and education	7.8	8.7	8.9	9.9	9.9	9.0	9.1	8.5	8.7
Health, social security, physical training	7.0	6.2	5.9	5.9	6.7	6.5	6.8	6.6	6.0
Culture and arts	1.8	1.7	1.4	1.4	1.6	1.5	1.6	1.4	1.4
Others	33.1	32.9	36.1	33.5	35.0	39.7	41.6	46.1	48.4

1. Only employed emigrants over 18 years of age were included.

Source: Ministry of Internal Affairs.

During the 1990s, the number of persons employed in the sector “Science and Scientific Services” who emigrated from Russia ranged from 1 000 to 2 000 a year. This included not only research scientists but other categories employed in this sector as well (Table 4).

Table 4. Number of employees of the sector “Science and Scientific Services” who emigrated from Russia
Thousands

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Aggregate 1989-2000
0.9	2.1	1.8	2.1	2.3	2.1	2.2	1.9	1.2	1.1	1.4	1.1	20.2

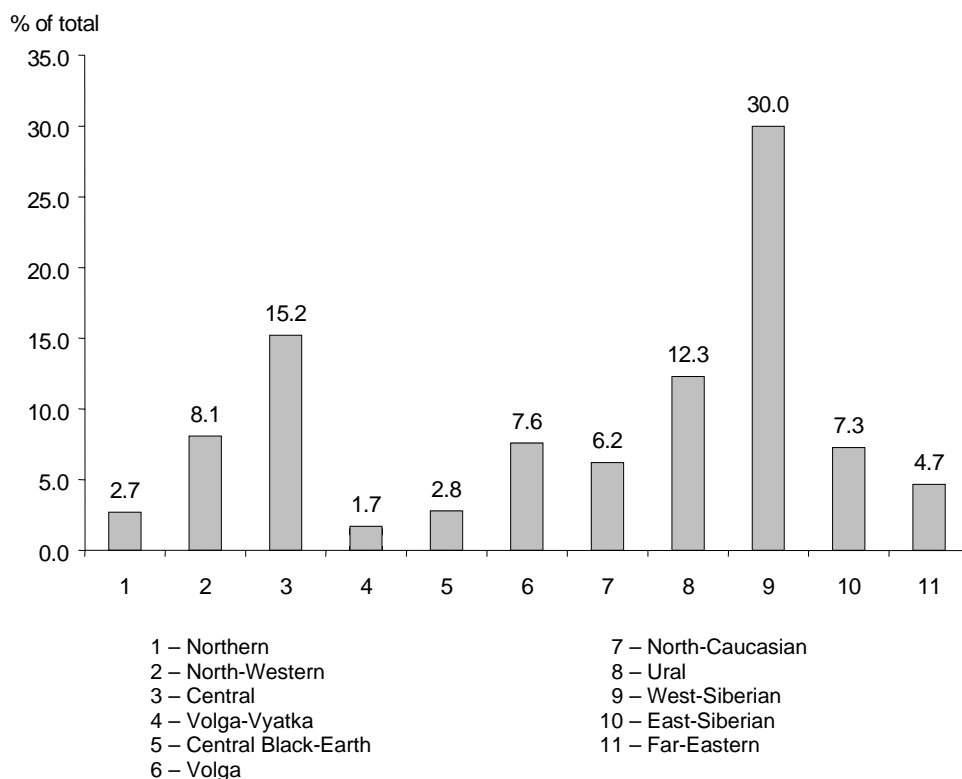
Source: Estimated by CSRS.

The majority of emigrants employed in the S&T and education sectors¹ have gone to Germany and Israel. These two countries accounted for 86% of the emigrants in this category who left Russia in 2000. At the same time, relative indicators reflecting the proportion of S&T and education employees in the total number of emigrants by recipient countries are the highest for Canada (13.8%), the United States (11.9%) and Israel (10.9%).

Analysis of the distribution of emigrants employed in the S&T and education sectors by region of the Russian Federation shows that half originate from West Siberia and the Central Economic Region (Figure 1). The contribution of these two regions to the overall migration flow from Russia is significant as well.

In addition, Goskomstat data make it possible to assess the ethnic and educational patterns of emigrants. In particular, in 1999, ethnic Germans accounted for 32.9% of all emigrants, Russians, 40.4% and Jews, 10.5%. According to 1996 data, one in five emigrants from Russia held a university degree and 27.7% had secondary vocational education degrees. Among those with university education only 0.17% had advanced scientific degrees.

Figure 1. Employees of the science and education sectors who emigrated from Russia, by economic region



Source: Ministry of Internal Affairs of the Russian Federation.

The last few years have seen a reduction in the outflow of manpower from the S&T sector. CSRS studies show that emigrants represent 1–2% of total S&T manpower. Emigration of S&T employees for permanent residence abroad is usually ethnically determined. As a rule, it does not affect the most highly qualified professionals, who are mainly involved in scientifically driven migration.

Employment of Russian researchers abroad

As mentioned, the improved international climate at the beginning of the 1990s greatly contributed to the large-scale outflow of Russian scientists. This outflow was also due in part to the worsening condition of the domestic R&D sector in the transition period, which resulted in a drastic reduction of R&D financing, declining employment and salaries and falling prestige of S&T occupations. All these factors led Russian scientists and engineers, especially those with higher professional qualifications, to seek jobs abroad.

The initial CSRS attempts to measure the employment-driven outflow of researchers from Russia date back to 1992-93. The primary focus was on the Russian Academy of Sciences, as the major centre for state-of-the-art basic research. At that early stage, it became evident that temporary outflows exceeded permanent emigration in both scale and quality.

Then, in 1997-98, CSRS conducted a survey to obtain information on researchers temporarily employed abroad. It drew on the fact that scientists leaving the country for a contract or allied arrangements abroad generally stayed on the payroll of their mother organisations.

Only those who had spent more than three months abroad were considered. The duration of temporary work abroad for persons who had returned home prior to the survey was defined as the actual period of time spent abroad. For those still working abroad, the respective term was identified on the basis of their contracts or declared intentions, as known to personnel officers at responding units.

The survey targeted academy and industry R&D institutes, universities and other equivalent higher education institutions located throughout Russia in order to answer the following questions:

- ◆ Who goes for temporary work abroad and where do they go?
- ◆ For how long are Russian researchers employed abroad?
- ◆ What are the objectives and channels for Russian researchers to obtain jobs abroad?
- ◆ What is the nature of their work there?
- ◆ What fields of S&T are most affected by such arrangements?

Through the survey, detailed information was obtained on the population of researchers temporarily engaged abroad and their distribution by age, position, qualification, field of S&T, etc.

The survey showed that 169 Academy research institutes (21.5% of the total), 58 branch R&D institutes (5.3%) and 53 universities (13%) had researchers temporarily employed abroad. The total number of such researchers was 4 084, or 2.6% of the total number of the researchers of these institutions.

Table 5 shows that Academy institutes accounted for 2 727 researchers in this category (7.6% of all researchers employed by these institutes). The respective number for industry R&D institutes was 501 (2.7%), and for universities, 856 (9.9%). Therefore, while Academy institutes led in terms of the absolute number of researchers employed abroad, they are somewhat behind higher education institutions in terms of intensity of international mobility of researchers.

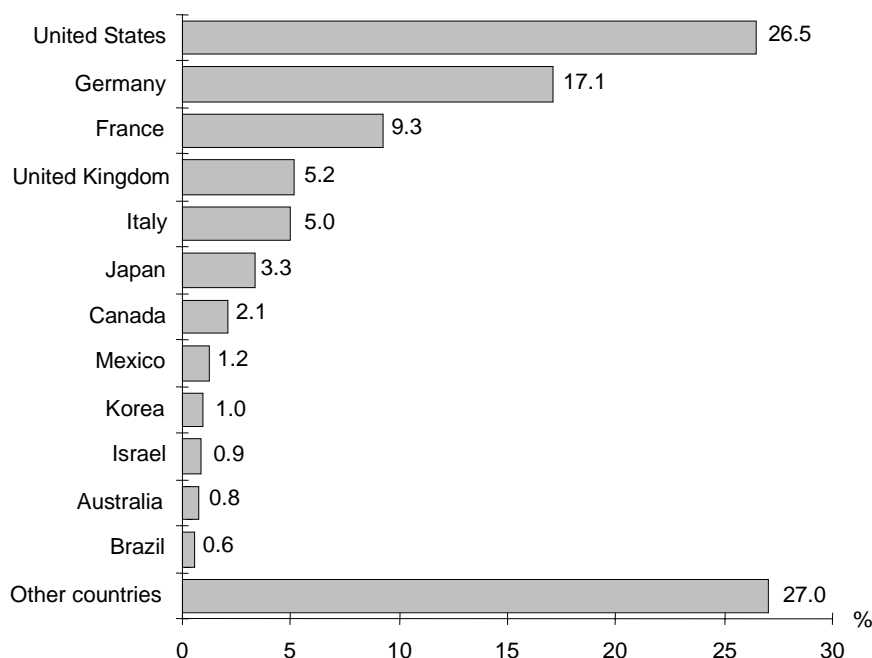
Table 5. Researchers employed abroad by type of institution

	Researchers employed abroad	Percentage of the total number of researchers
Total	4 084	6.5
Academy research institutes	2 727	7.6
Branch R&D institutes	501	2.7
Higher education institutions	856	9.9

Source: Centre for Science Research and Statistics.

The majority of Russian researchers working abroad were employed in the major OECD economies (Figure 2). Slightly over half (62.9%) were employed in the United States, Germany, and France, followed by the United Kingdom, Italy and Japan (with a total of 13.5%). In all, these countries accounted for two-thirds of the Russian researchers employed abroad.

Figure 2. Researchers employed abroad by recipient country



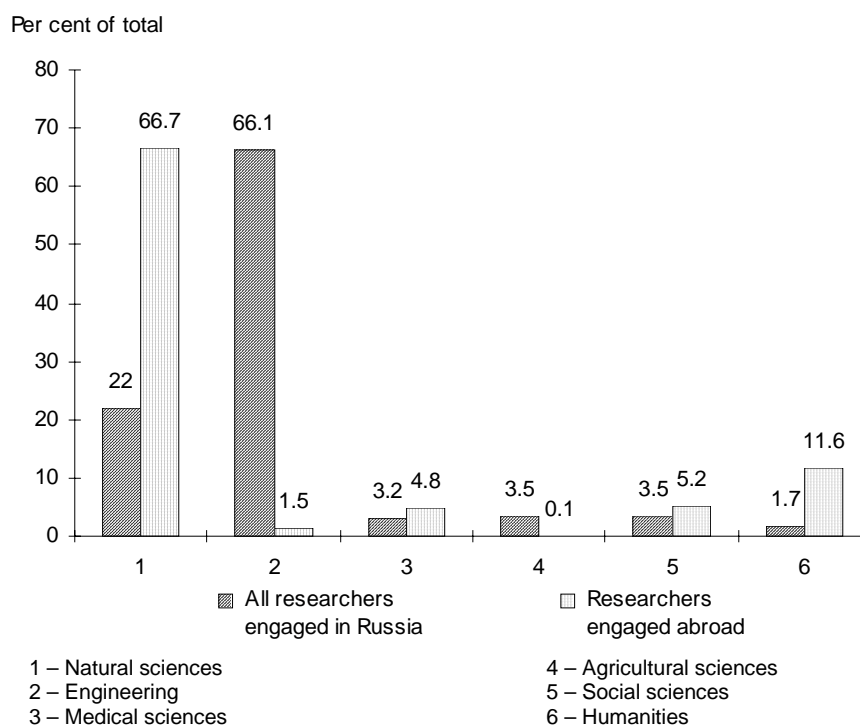
Source: Centre for Science Research and Statistics.

The researchers who obtained temporary positions in foreign countries are largely natural scientists, especially physicists and biologists (Figure 3). Their proportion among migrants is three times their proportion in the overall stock of researchers. Engineers, who represent the bulk of the domestic stock of researchers, played a minor role in terms of international migration. The shares of social and medical scientists among those employed outside Russia were 5.2% and 4.8%, respectively, slightly above their shares in the total stock of researchers in Russia. In terms of the intensity of research scholars' migration, expressed as the ratio of such employees to the total stock of researchers in a given S&T field, the humanities occupy the first place, with almost 6% temporarily employed abroad. For researchers in the natural sciences, this indicator did not exceed 2.5%. In other S&T fields, the levels were even lower: 1% for social sciences and medicine, 0.2% for engineering and 0.04% for agriculture.

Russian scientists obtained positions abroad on the basis of invitations from foreign partners (38.8%), through contracts negotiated independently (18%) or via official Russian institutions (15.2%). S&T exchange was the basis of temporary employment for 10.5% of researchers (Table 6).

Half of Russian scientists sought employment abroad in order to conduct joint research projects and one in four sought to perform non-collaborative research at a foreign institution (Table 7). Approximately equal shares (slightly above 10%) concerned those going to lecture or for training.

Figure 3. Researchers by field of science and technology



Source: Centre for Science Research and Statistics.

Table 6. Researchers employed abroad by cause of departure

	Researchers employed abroad	By invitation	Under contract signed through Russian organisations	Under independent contract	By exchange	Other
Total	4 084	1 584	621	736	427	716
Academy research institutes	2 727	1 213	384	502	112	516
Branch R&D institutes	501	145	131	80	29	116
Higher education institutions	856	226	106	154	286	84

Source: Centre for Science Research and Statistics.

Table 7. Researchers employed abroad by aim
Percentages

	Researchers employed abroad	Lecturing, consulting	Joint research projects	Scientific work in foreign organisations	Education, training	Other
Total	100.0	12.4	41.7	24.6	11.1	10.2
Academy research institutes	100.0	12.5	42.5	27.3	6.1	11.7
Branch R&D institutes	100.0	2.0	62.5	17.2	10.6	6.8
Higher education institutions	100.0	18.2	26.1	20.6	27.5	7.7

Source: Centre for Science Research and Statistics.

Somewhat over half of the scientists (57.4%) stayed abroad for less than a year, 20.2% from one to two years and 22.4% for more than two years (Table 8).

Table 8. Researchers employed abroad by duration of work

	Researchers employed abroad	From 3 months to one year	1-2 years	More than 2 years
Total	4 084	2 345	824	915
Academy research institutes	2 727	1 380	616	731
Branch R&D institutes	501	295	112	94
Higher education institutions	856	670	96	90

Source: Centre for Science Research and Statistics.

Most researchers employed abroad (63.9%) were 30-49 years old (Table 9). Although the share of younger scholars (under 29 years) was somewhat higher among those employed outside Russia than in the structure of domestic R&D personnel, other indicators show that foreign partners prefer to collaborate with scientists who have already achieved a certain level of expertise. The coefficient of mobility (the proportion of those going abroad in a certain age group to total R&D personnel belonging to that age group) is highest among those aged 30-39. Despite the high share of women in Russia's R&D personnel (57%), they represent less than a quarter of the scientists employed abroad.

Table 9. Researchers employed abroad by age and gender
Percentages

	Researchers employed abroad	Under 29 years	30-39 years	40-49 years	50-59 years	60-69 years	70 years and over
Total	100.0	11.8	32.5	31.4	17.0	6.3	1.0
Women	100.0	17.7	38.0	27.6	12.6	3.4	0.7

Source: Centre for Science Research and Statistics.

The qualifications of researchers going to other countries for temporary work exceeds by all parameters the respective indicators for the Russian R&D personnel in general. Candidates of science represent 19.7% of researchers employed in Russia but 50.3% of those engaged abroad. For doctors of science, these percentages are 4.4% and 19.9%, respectively. Within the latter category, 10% had the status of a professor, whereas corresponding and full members of the Russian Academy of Sciences represented 1% each (Table 10).

Table 10. Researchers employed abroad by qualification
Percentages

	Scientific degree			Academic status	
	Candidate	Doctorate	Professor	Corresponding member	Academician
Researchers employed abroad	50.3	19.9	9.6	1.2	1.0
Of whom women	51.8	10.3	4.1	0.7	0.2

Source: Centre for Science Research and Statistics.

These are, in brief, the major findings of the survey described above. However, to understand fully the phenomenon of temporary international migration of scientists and engineers, national

surveys in the countries of origin should be complemented by analysis of the situation in recipient countries. For instance, there is no information about Russian researchers who went abroad for temporary work and never returned. Their professional and social status in host countries as well as how they have adapted to their new environment remains unclear.

Given Russia's role in the global process of international mobility of scientists and engineers, as well as the deterioration of the national S&T potential during the transition to a market economy, there has been in Russia a certain bias towards restraining the migratory outflow highly skilled professionals. This involves not only government policies but also public perception of scientific migration. Thus, CSRS public opinion studies have highlighted that 51% of the population believe that by leaving the country in the current difficult times, researchers inflict losses on Russia in general and its science base in particular. Only 29% think that going abroad allows researchers to improve their skills, with a promise of returning enriched by their new experiences.

Although both the outflow of researchers from the domestic R&D sector and permanent emigration from Russia have been declining in recent years, many questions concerning temporary professional mobility of highly skilled scientists and engineers remain. Long-term trends and the impact on national R&D capacities need to be considered. Is the international mobility of Russian scientists to be treated as a necessary element of their scientific work or simply as the result of seeking better living conditions? What role does it play as an implicit form of technology transfer beyond the borders of the Russian Federation? Or, vice versa, is temporary work abroad an alternative to "brain drain"? All these issues are subjects of future investigations.

NOTE

1. Since the records of the Ministry of Internal Affairs do not distinguish between S&T and education occupations, separate estimates for emigrants earlier employed in the S&T sector are not available.

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