PART 2
The Surveys

FIGURES

TABLES

NUCLEAR CITIES

1. CHANGES IN SPECIALIST RECRUITMENT

Over the past decade, two factors have considerably changed personnel recruitment in the nuclear complex cities: A sharp increase in the number of local residents and a reduction in the demand for incoming specialists. Let us examine these factors.

1.1. The Growth of Local Labor Resources in Closed Cities

Unfortunately, data on the age structure of the population of nuclear complex cities remain classified. In order to estimate the demographic potential of closed cities, therefore, we had to determine indirectly how the number of natives at local enterprises has been changing. In short, it was necessary to assess the change in the number of children born in closed cities over a prolonged period of time.

To develop our estimate, we relied on data from our surveys of the number of children of different ages born into the families of specialists working at the covered enterprises. Our results show that the number of children born varied greatly at different times (table 1-1).

Table 1-1. Distribution of specialists' children by age and year of birth, %

CHILDREN'S YEARS OF BIRTH	YEARS WHEN THEY CAN/ COULD START WORKING	CHILDREN'S AGE GROUPS	PERCENTAGE SHARE
1990-99	2010-19	under 10	18
1980-89	2000-09	10-19	45
1970-79	1990-99	20-29	30
1960-69	1980-89	30-39	7

Children born in the 1970s—now twenty to twenty-nine years old—account for 30 percent of the total number of the specialists' children. This means that most of them (70 percent to 80 percent) would have graduated from institutions of higher education and taken jobs at enterprises in closed cities during the 1990s. Accordingly, the children born in the 1960s, now thirty to thirty-nine years old and, having graduated from institutions of higher education, might potentially have taken jobs at the enterprises in the 1980s. This latter group is 4.5 times smaller than that of children born in the 1970s.

It follows that the closed cities' demographic potential grew sharply (4.5 times) in the 1990s as compared with the 1980s. This dramatic explosion in local population may explain to a certain extent the change in the ratio between local residents and migrants among those taking jobs at the enterprises. Based on birthrates alone, one could assume that this employment trend will continue. There will be a 50 percent increase in the number of residents who will reach working age during the current decade as compared with the 1990s. The years 2000–2009 will be the most difficult period in terms of ensuring the employment of local labor resources, as there is a dramatic drop in the number of children born in the 1990s; this in turn will result in a dramatic drop in the number entering the labor pool in 2010–2019. The nuclear cities are therefore facing major challenges in adapting to future swings in the growth of their labor resources.

In the 1980s, 36 percent of those beginning to work in closed cities were local residents and 64 percent were newcomers. In the 1990s, 87 percent of those beginning to work in closed cities were local residents and 15 percent were newcomers. We believe that the substantial increase in the closed cities' internal labor resources was at least partially responsible for the sharp drop in recruitment of outside personnel that these cities witnessed during the 1990s, as compared with the previous decade

1.2. Demand for Specialists in Closed Cities in the 1990s

The demographic factor in itself means little if the demand for specialists is not considered. For the demographic factor—sharp growth in the number of local residents—to play its part, the demand for specialists in the 1990s would have had to be considerably lower than the growth in the number of local residents. This presupposes, at a minimum, that the number of those employed at the enterprises would not increase. Let us look at the distribution of specialists by length of employment at an enterprise (table 1-2).

Table 1-2. Distribution of specialists by length of employment at enterprises, %

YEAR EMPLOYED	LENGTH OF EMPLOYMENT	PERCENTAGE SHARE OF SPECIALISTS
1990-99	Fewer than 10 years	31
1980-89	10-20 years	31
1970-79	20-30 years	27
1960-69	30-40 years	10
Before 1960	More than 40 years	1
Total sampling		100

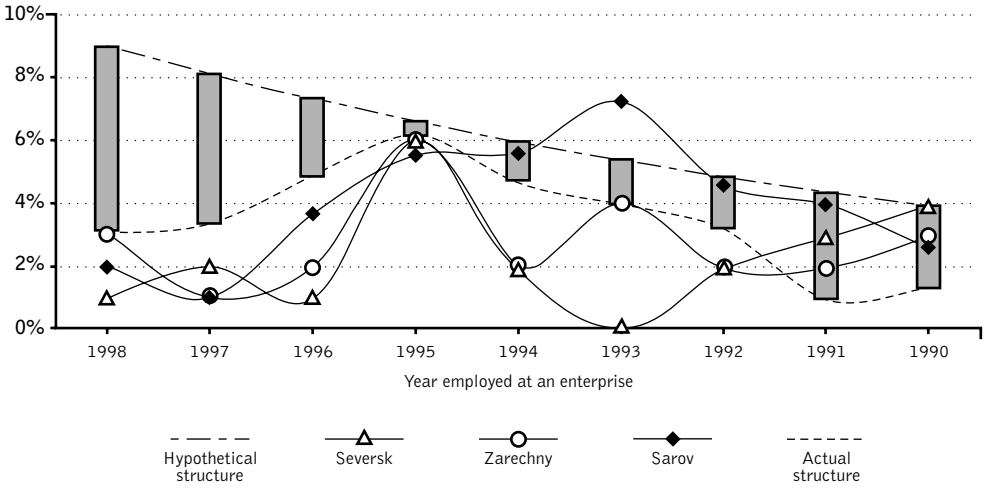
As can be seen, 31 percent of those working at enterprises began their jobs during the 1990s. This does not mean, however, that those who took jobs at enterprises constituted precisely 31 percent of the total number of employees because there is a considerable attrition rate of new employees at these enterprises.

A total of 45 percent of the respondents have colleagues who quit in the 1990s to take jobs with private businesses. Owing to this factor alone, then, the annual percentage share of those who quit their jobs at the surveyed enterprises was at least 4.5 percent (this number does not include those who left to settle abroad, took jobs at other state enterprises, or retired on a pension).

According to the findings of a survey of those who left their jobs at the enterprises, approximately half took positions with private businesses, the other half taking jobs at other state enterprises or retiring. Thus for each year in the 1990s, at least 9 percent of those working at the enterprises quit their jobs for various reasons. One-third, or 33 percent, of those who left their jobs had been working at the enterprises for fewer than 10 years, that is, they were among those who joined the enterprises in the 1990s.

From this one can calculate the rate at which employees started work at the enterprises in the 1990s and then quit within ten years. This number is equal to the ratio of those who worked for however many years among the total number of those who quit their jobs to the percentage of those who are still working and who have been working for a similar number of years. This ratio is 1.06 (33 percent : 31 percent). The average annual probability that an employee who has worked fewer than ten years will quit an enterprise equals the product of the average annual level of quitting (9 percent) and the average rate of quitting by members of a given length-of-employment group (1.06), which amounts to 9.6 percent. In other words, 90.4 percent of employees hired in the 1990s did not quit. Given that the average level of quitting was not less than 9 percent in the 1990s, a hiring rate of 9 percent would have had to be maintained to ensure constant personnel levels. If the number of enterprise personnel in the 1990s had been stable, the hiring of 9 percent of new personnel annually would have resulted in the hypothetical length-of-employment structure shown in figure 1-1. As can be seen, the actual length-of-employment structure relating to those who took jobs at the enterprises in the 1990s differs substantially from the hypothetical length-of-employment structure. The values of the corresponding length-of-employment groups of the actual structure are, without exception, lower than the values of the hypothetical structure, leading one to conclude that in the 1990s the number of specialists working at the enterprises decreased rapidly.

Figure 1-1. Actual and hypothetical length-of-employment structure, %



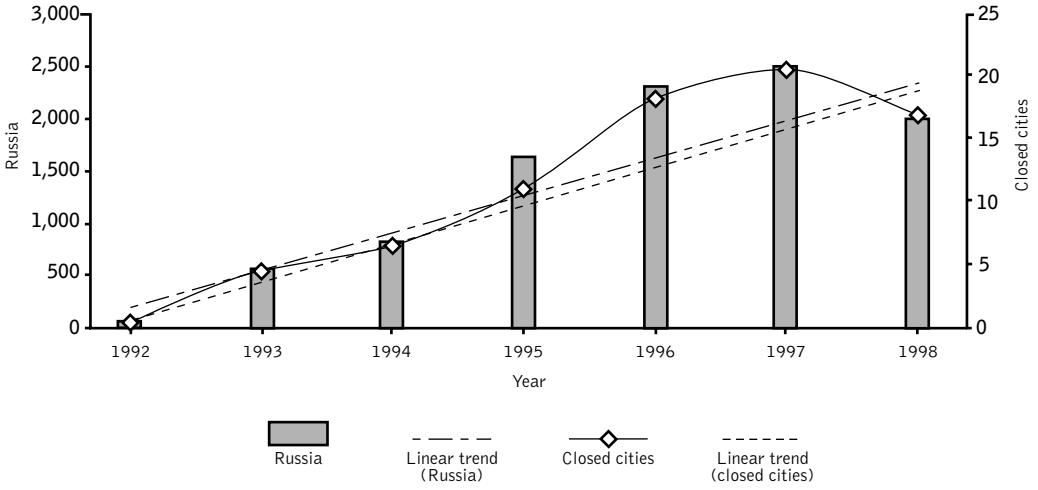
The decrease in the number of specialists working at the enterprises, combined with a demographic explosion, has led to a substantial reduction in the inflow of migrants to closed cities. As a result, the makeup of the work force at the enterprises in the 1990s changed in favor of local residents.

Our hypothesis—that the number of those working at major state enterprises in closed cities were employed under conditions of a sharp increase in the cities' own labor resources—can be corroborated by data on the level of unemployment in closed cities in the 1990s.

1.3. Demand, Supply, and Stringency in the Labor Markets of Russia and Closed Cities

Figure 1-2 shows that unemployment figures in Russia and in closed cities are closely aligned. In this respect, one can say that closed cities, far from contrasting with Russia as a whole, are in fact microcosms of it. Increased unemployment was largely caused by an explosive growth in local labor resources in the 1990s as compared with the 1980s. The impact of the "demographic wave" on unemployment, however, would have been less had there been substantial growth in labor demand in closed cities.

Figure 1-2. Total number of officially registered unemployed (in thousands)

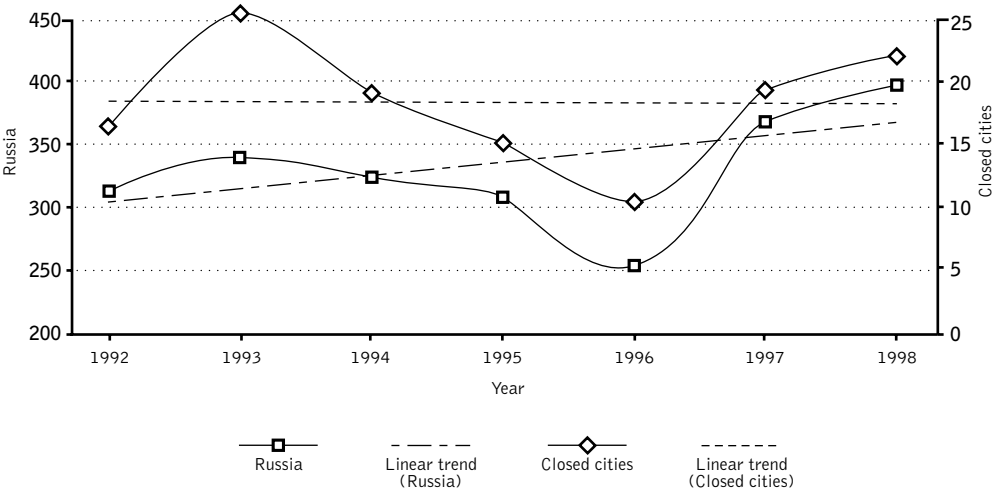


In 1998, total unemployment in the nuclear cities surveyed amounted to 17,000 people. Considering that the ratio between the officially registered and actual number of unemployed is 1 : 3, there are actually about 51,000 unemployed in closed cities. In other words, of the 510,000 residents of working age in the surveyed closed cities, one in ten is unemployed.

Labor demand trends in Russia and in closed cities are different in absolute terms, albeit synchronous (fig. 1-3). The demand for labor dropped sharply in 1992 (by approximately two-thirds) and stabilized in 1993–1998 at a level of 300,000 in Russia and 2,000 in closed cities. Judging by the trend lines, one sees in Russia a weak trend toward growth in demand, and in closed cities an even weaker trend toward a reduction in demand.

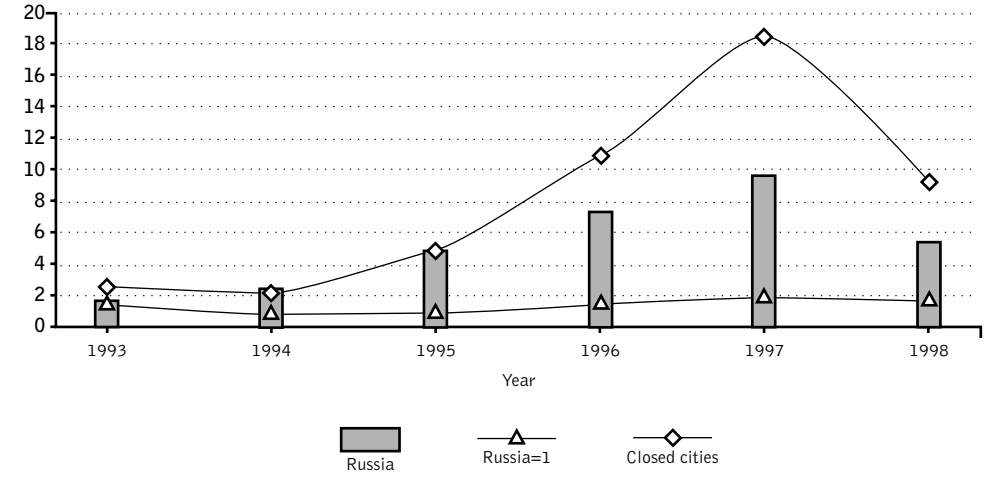
As a result of this labor supply and demand dynamic, labor market stringency in Russia and in closed cities is growing rapidly (fig. 1-4). Between 1992 and 1995, labor market stringency in Russia and in closed cities was practically the same, but subsequently the situation

Figure 1-3. Demand for labor in Russia and in closed cities (in thousands)



began to change rapidly, adversely affecting the nuclear cities. This leads us to believe that, because labor market stringency in these cities is much greater than in Russia as a whole, the migration attractiveness of closed cities in terms of their employment potential is quite low.

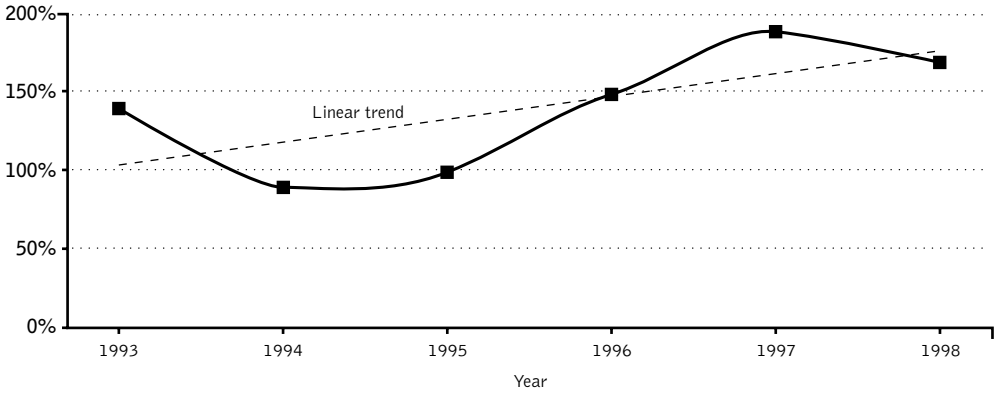
Figure 1-4. Labor market stringency (number of registered unemployed per job vacancy) in Russia and in closed cities



Considering that the first decade of the new century will witness even greater local resident growth than the 1990s did (a 1.5-fold growth), the level of unemployment may double if low labor demand persists. It is quite probable, therefore, that the growth in migration to closed cities seen early in their evolution may well be replaced by an outflow of migrants. Otherwise social tension is likely to develop because of the extremely high unemployment levels.

As can be seen from figure 1-5, the level of labor market stringency in closed cities is higher than in Russia as a whole, and this gap is clearly trending toward widening even more.

Figure 1-5. Ratio between labor market stringency in Russia as a whole and in closed cities (Russia=100%)



2. CHANGES IN THE QUALITATIVE COMPOSITION OF SPECIALISTS WORKING IN CLOSED CITIES

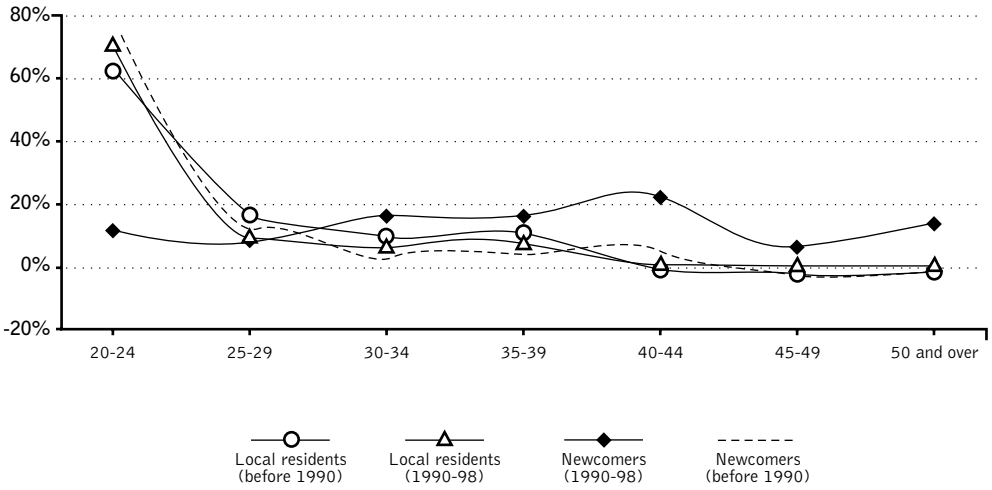
In closed cities, the inflow of migrants is relatively easy to regulate. The fact is that not everyone who wishes to move to a closed city can do so; one must have reasonable grounds. For most migrants who used to reside permanently outside closed cities, it is precisely the need of the cities' enterprises' for a sufficient number of specialists of an appropriate class that offers such grounds. That is why the bulk of the migrants who came to closed cities did so on assignment.[1] From the early 1990s, however, the assignment system has been inoperative, as specialists of the appropriate class are invited to and offered jobs in closed cities. Because the number of people employed at enterprises in these cities steadily decreased in the 1990s, ever fewer specialists came to work there. At the same time, fundamental changes have taken place in the qualitative composition of specialists coming to work in closed cities.

1. In Soviet times, the term "assignment" meant, as a rule, sending graduates of higher education establishments to work at predesignated places. On the one hand, this guaranteed them jobs but, on the other hand, such jobs were not always concordant with the wishes of those who were given assignments. At the same time, the graduates' assignment to jobs did not mean that they were given these jobs for life. More often than not they had to work at the jobs they were assigned for two or three years, after which they could look for another job on their own.

2.1. Age Structure of Those Taking Jobs at Enterprises in Closed Cities

As can be seen from figure 2-1, incoming specialists taking jobs at closed city enterprises in the 1990s were much older than local residents taking jobs there. This is a radical departure from the preceding period, when those moving to the cities to take jobs were somewhat younger than locals taking such jobs.

Figure 2-1. Distribution by age of the local residents and newcomers at the time of their taking a job at the enterprises, %



2.2. Changes in Key Personnel

The 1990s saw very serious negative changes in key personnel. In particular, there was not only a reduction in the percentage of staff members possessing advanced academic degrees, but also a change in where they defended their dissertations.

Table 2-1 shows that among those who began working in closed cities in the 1960s and 1970s, a total of 16 percent to 18 percent of the respondents had academic degrees. In most cases, respondents had received their degrees while working at the enterprises. In other words, their work at an enterprise provided them with material for their dissertation. In the 1980s there was a radical change in this situation. Only 2 percent of those who began working in closed cities during that period possessed academic degrees. And among those who began working in the 1990s only 1 percent had received an academic degree before coming to a closed city.

Table 2-1. Distribution of persons taking jobs at enterprises based on possession of an academic degree and where it was earned, %

WHERE EARNED	YEAR EMPLOYED IN A CLOSED CITY					
	Before 1960	1960-69	1970-79	1980-89	1991-99	Total sampling
While working at an enterprise	0	18	13	2	0	7
Before taking a job at an enterprise	0	0	3	0	1	1
Had no academic degree	100	82	84	98	99	92
Total sampling	100	100	100	100	100	100

2.3. Changes in Location of Specialist Training

More than half of the specialists working in closed cities (table 2-2) obtained an education either in the closed city itself (31 percent) or close to it (the same region in which the enterprise is located [23 percent]). Almost one of seven studied in Moscow or the Moscow Region. The share of those who graduated from institutions of higher education located in other non-Russian Republics of the former USSR is quite small (1 percent). The disintegration of the USSR thus did not adversely affect the personnel training system for closed cities.

Table 2-2. Location of the educational institutions from which specialists graduated, %

YEAR EMPLOYED IN A CLOSED CITY	LOCATION OF THE INSTITUTION OF HIGHER EDUCATION FROM WHICH SPECIALISTS GRADUATED				
	Closed city	Region in which closed city is located	Moscow and the Moscow Region	Other regions of Russia	Republics of the former USSR
1990-99	65	23	4	7	1
1980-89	22	29	6	40	2
1970-79	22	22	17	38	1
1960-69	15	16	41	28	0
before 1960	0	0	100	0	0
Total sampling	31	23	14	30	1

The following trends can be observed in employment dynamics:

First, there has been a dramatic rise in the percentage of people receiving their advanced degrees in or near the closed city where they are employed. In the 1990s, nearly 90 percent of specialists who began working in closed cities had obtained an education there, while in the 1980s that share was 51 percent, and in the 1970s, 44 percent.

Second, there has been a rapid decrease in the share of specialists taking jobs in closed cities who have graduated from the best colleges and universities offering instruction in the atomic field (that is, those located in Moscow and the Moscow Region).

The localization of education in these cities can be explained by the economic crisis of the 1990s, whose consequences are of a dual character. First, the cities have seen a sharp drop in labor demand and substantial unemployment as well as a reduction in labor remuneration. These factors make the closed cities relatively unattractive for graduates of educational institutions

situated far from closed cities. Second, families with students who are living in closed cities have grown much poorer. They do not have the means to send their children to a college or university located far from their hometowns, above all, to those in Moscow and the Moscow Region. Transportation, tuition, and room and board are prohibitively expensive. Such families are forced to send their children to college in the vicinity of their place of residence.

What educational institutions did migrants to closed cities graduate from? (See table 2-3.)

Table 2-3. Location of migrants' training, %

YEAR EMPLOYED IN A CLOSED CITY	LOCATION OF THE INSTITUTIONS OF HIGHER EDUCATION MIGRANTS GRADUATED FROM				
	Region in which closed city is located	Moscow and the Moscow Region	Other regions of Russia	Republics of the former USSR	Total sampling
1990-99	66	12	19	3	100
1980-89	37	8	51	3	100
1970-79	28	22	49	1	100
1960-69	19	49	32	0	100
before 1960	0	100	0	0	100
Total sampling	34	20	44	2	100

Nearly one-third of the migrants received an education in the regions where closed cities are located (table 2-3). This percentage has increased decade after decade and continues to rise. In the 1990s, two-thirds of the migrants taking jobs in closed cities were trained in the cities themselves. Every fifth migrant out of the total number received an education in Moscow or the Moscow Region, but in the 1990s only one of every eight received a degree in and around Moscow. A similar situation is observed with regard to those who graduated from institutions of higher education in other regions of the country. In all, 44 percent of the migrants received an education in other regions, and in the 1990s only 19 percent.

This trend is hardly surprising, considering that nearly two-thirds of incoming migrants during the 1990s were, in fact, former residents of the cities who had left in order to go to school. And, as noted earlier, the economic situation in closed cities often forces students from these cities to study as close to home as possible. In addition, a growing number of new migrants not originally from closed cities are also graduating from higher academic institutions located in the vicinity of the cities in which they come to work.

Table 2-4. Territorial distribution of places where newcomers acquired an education, %

TEN-YEAR GROUPS BY YEAR EMPLOYED IN A CLOSED CITY	LOCATION OF THE INSTITUTIONS OF HIGHER EDUCATION FROM WHICH NEWCOMERS GRADUATED				
	Region in which closed city is located	Moscow and the Moscow Region	Other regions of Russia	Republics of the former USSR	Total sampling
1990-99	44	28	21	7	100
1980-89	29	10	57	4	100
1970-79	24	25	50	1	100
1960-69	17	50	33	0	100
before 1960	0	100	0	0	100
Total sampling	26	24	48	2	100

Thus, the structure of personnel training in the 1990s was strongly affected by the economic crisis. This manifested itself in the fact that a growing number of closed cities' residents, because their families are being compelled to save on education costs, chose to acquire their education close to home rather than in places with the highest standards of training.

On the other hand, the same need to minimize costs forces the management of enterprises to offer jobs to incoming specialists who have graduated from nearby educational establishments and who are living in the vicinity of the closed cities. As a result, closed cities, which were once closely connected with the country's center—above all, Moscow—and were supplied with top-class specialists who were graduates of the most prestigious educational institutions, are becoming self-sufficient in terms of labor supply. Undoubtedly, this reversal adversely affects specialists' professional standards.

2.4. The Need for Migrating to Closed Cities

The importance of training personnel outside closed cities will be more evident if we look at the relation between the institutions of higher education a specialist attended and his or her possession of an academic degree (table 2-5).

Table 2-5. Possession of an academic degree by a specialist and the location of the institution of higher education he or she attended, %

POSSESSION OF DEGREE	LOCATION OF THE INSTITUTION OF HIGHER EDUCATION SPECIALISTS ATTENDED				
	Closed city	Region in which the closed city is located	Moscow and the Moscow Region	Other regions of Russia	Total sampling
Yes	4	6	21	11	9

Migrants attending institutions of higher education outside closed cities are more likely to earn an academic degree than are students of such institutions located in closed cities. Thus, among those attending institutions of higher education located in the vicinity of closed cities, the share holding an academic degree is greater by half than among those who studied at institutions located in closed cities. The share of persons holding academic degrees among students of higher education institutes located in Moscow and the Moscow Region is five times

greater than those graduating in the closed cities. Even among those attending other institutions of higher education, the share of those who hold an academic degree is two and a half times greater than among the specialists who obtained a higher education in closed cities.

Because the training of personnel in the 1990s was concentrated in the regions where closed cities are situated and in the cities themselves, there has been a decline in the professional standards of specialists and in particular of those holding higher academic degrees, namely, Candidate and Doctor of Sciences.

2.5. Age/Sex Pattern

Two-thirds of the surveyed specialists are men. The modal interval of age is forty to forty-nine years for both men and women. It includes about 40 percent of the specialists. The number of men and women under forty is approximately the same, while those above forty-nine years of age make up only 13 percent of the women and 26 percent of the men.

Figure 2-2. Specialists' age/sex pattern: Percentage share of total number of respondents

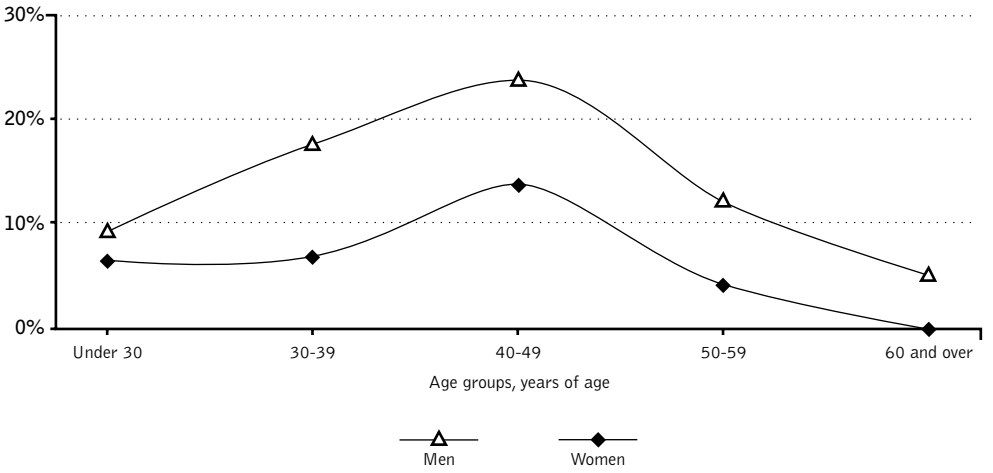
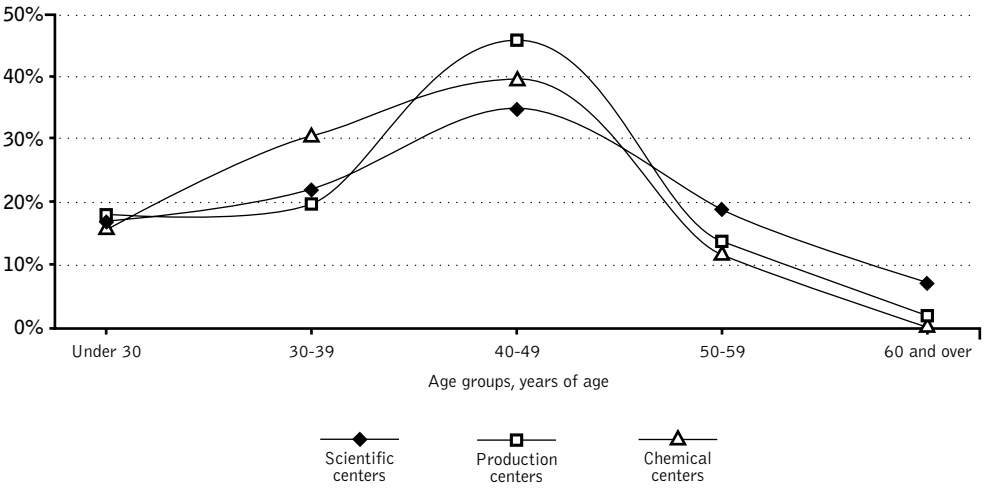


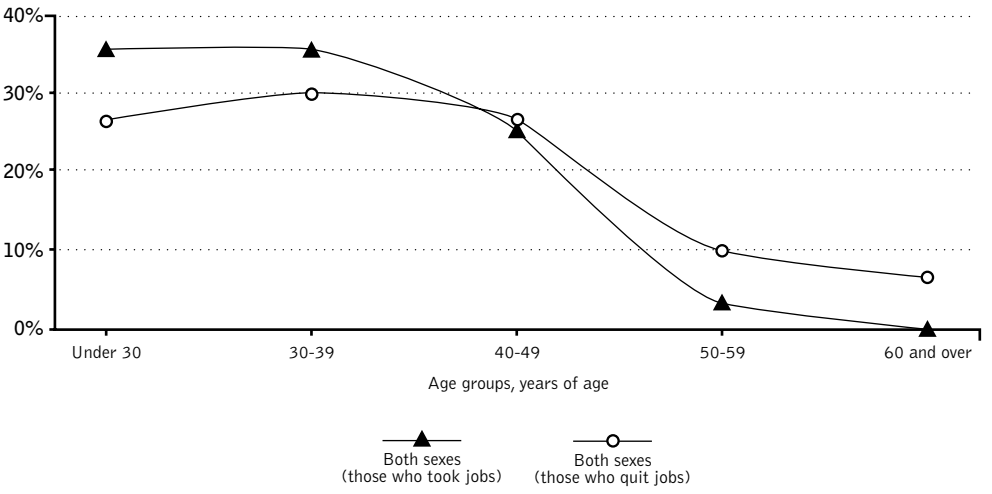
Figure 2-3 shows data about the age pattern of surveyed specialists by individual types of cities. Research centers have the oldest age pattern, every third specialist who works in them being fifty years old and older. The youngest age pattern is in the chemical centers. Production centers are in between.

Figure 2-3. Age pattern of working specialists by individual types of cities, %



The age patterns develop under the influence of two processes: the outflow and inflow of personnel.

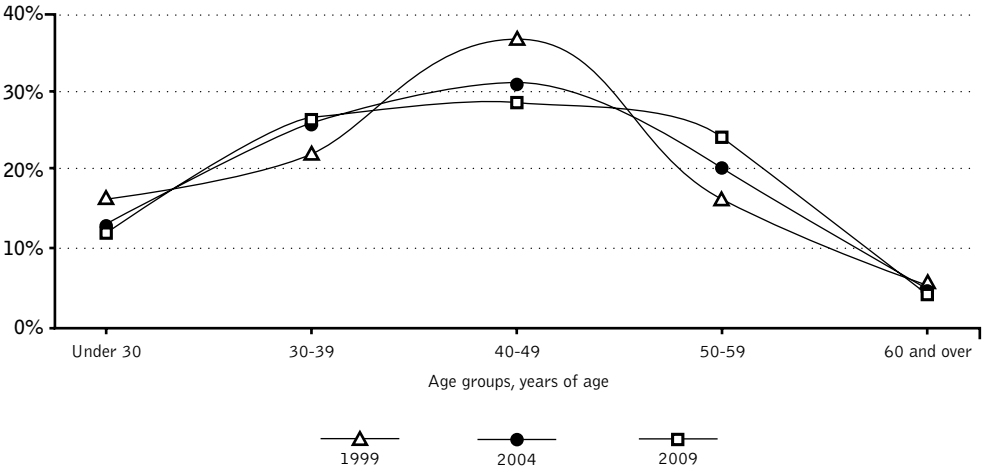
Figure 2-4. Age distribution of specialists who took and who quit jobs in 1999, %



As follows from figure 2-4, the age pattern of those taking jobs is characterized by a large share of specialists under forty years of age (70 percent) and a small (3 percent) share of persons in the age group of fifty to fifty-nine years. The age pattern of those who quit their jobs is rather similar to that of those who took jobs: about 60 percent of those who quit jobs are under forty years of age and 16 percent of them are fifty years old and up. In the forty- to forty-nine-year age group, the share of those who quit and those who took jobs is the same.

Proceeding from the age pattern of the specialists who are working and who took jobs and quit jobs, we tried to forecast changes in the age pattern in five years and ten years (fig. 2-5).

Figure 2-5. Specialists' current (1999) and forecast age pattern, %



As can be seen, if current trends in personnel movement persist in the future, the ages of those working in the collectives will become even more advanced. This will happen, in the first place, through an increase in the share of persons of near-retirement age and an equal reduction in the share of people between the ages of forty and forty-nine.

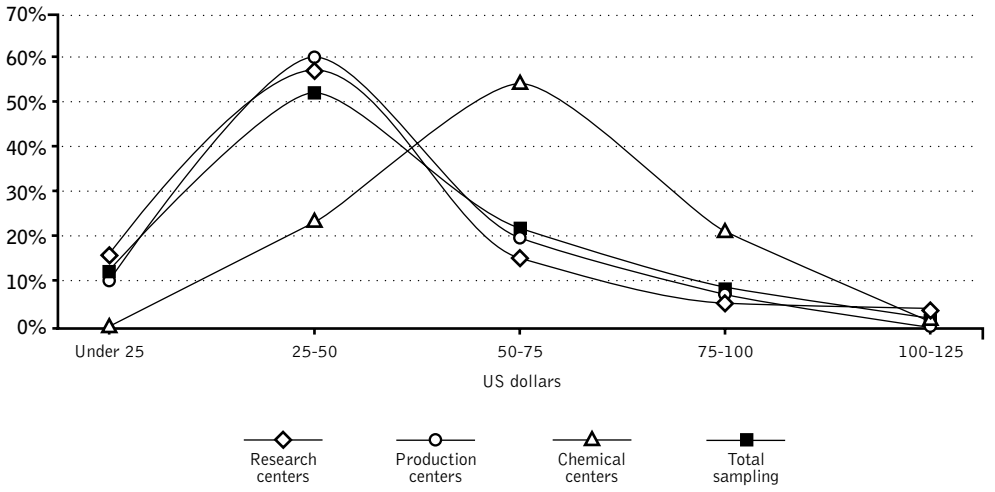
Thus, current patterns of specialists' taking and quitting jobs not only inhibit the rejuvenation of the work force, but do not even maintain the stability of the present age pattern. If a rejuvenation of the work force is to occur, therefore, the pattern of personnel flow rates has to be modified. Such modification can be accomplished by making the enterprises more economically attractive to young people. This is precisely the problem that has to be solved, for demographically the number of young people living in closed cities looks quite favorable in 2000–2009: the growth in their number is expected to be the highest in the entire period in which closed cities have existed. Otherwise, closed cities will be faced with a situation in which the aging of the enterprises' personnel will be accompanied by the presence of large numbers of jobless young people.

3. LIVING STANDARDS IN CLOSED CITIES

3.1. Salary Structure

Salaries are a major determinant of the mobility of the labor force. Although information about the salaries received by specialists in closed cities in the past is not available, according to academician Andrei Sakharov, who used to work in the city of Sarov (also known as Arzamas-16), salaries were enormous compared with the average rate of pay in the country at large. As early as 1994, however, the average rate of pay in closed cities was only 20 percent greater than the national average pay in Russia. The once enormous differences in pay between closed cities and the country as a whole no longer exist. In terms of salary, therefore, the attractiveness of closed cities as immigration destinations has dropped sharply.

Figure 3-1. Distribution of specialists in the surveyed cities by the level of pay received (June, 1999), %



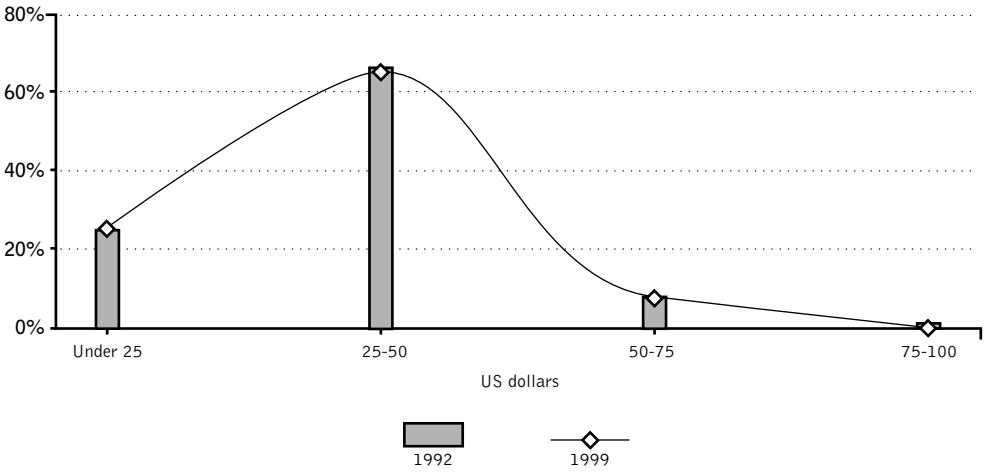
As can be seen from figure 3-1, some 50 percent of the surveyed specialists receive monthly pay equivalent to US$25 to US$50, about 12 percent get less than US$25 a month, 22 percent $50 to $75, and the rest $100 to $125. The distribution of salary rates in research and production centers is similar. The primary activities of these two types of cities, however, differ greatly. Research centers are the brains of the closed cities, while production centers are engaged in the comparatively less demanding work of assembly and disassembly of nuclear munitions. Yet the average level of pay in the cities is practically identical (table 3-1). In chemical centers, where uranium is enriched, salary rates are nearly twice as high as in research and production centers, yet even here it is extremely small, amounting to US$64 per month (1,600 rubles at the exchange rate prevailing at the time of the survey).

Table 3-1. Average salary received at surveyed enterprises in June 1999 (US dollars)

TYPE OF CITY	$U.S./MONTH
Research center	37
Production center	39
Chemical center	64
Total sampling	43

Data on the rate of pay received by specialists in Sarov in 1992 are shown in figure 3-2. As can be seen, the distribution by rate of pay received in 1992 and 1999 coincides exactly. In other words, between 1992 and 1999 the level and structure of pay remained unchanged even though the cost of living increased considerably over that period.

Figure 3-2. Distribution by rate of pay of specialists working in Sarov in 1992 and 1999, %



3.2. Delays in Pay

Yet even this pay, low as it is, is not paid in timely fashion (table 3-2). In all, a total of 74 percent of specialists at the surveyed enterprises noted delays in receiving their pay. The greatest number of specialists indicating delays work in production centers (83 percent). The corresponding figure for production centers is 70 percent, while the fewest delays in pay, experienced by 47 percent of the specialists, occur in chemical centers. Overall, the average length of delay in pay is about 2 months.

Table 3-2. Delays in pay, %

	TYPE OF CITY			
Delays	Research center	Production center	Chemical center	Total sampling
Yes	83	70	47	74
No	10	30	52	21
Sometimes	5	0	0	3
Not now, but in the past	2	0	1	1
Total sampling	100	100	100	100

3.3. Differentiation of Pay by Position Held

It might seem that level of pay should vary substantially depending on the position a specialist occupies at an enterprise, but such is not the case. At present, differentiation of pay by position is minimal (fig. 3-3). The modal interval for all positions is US$25 to US$50, a level of pay received by some 60 percent of specialists in all positions. The distribution of pay for engineers and research workers practically coincides. This is corroborated by data on the average monthly rate of pay (table 3-3). The average pay received by heads of sections is 25 percent higher than that received by engineers and research workers.

Figure 3-3. Distribution by level of pay and position held, %

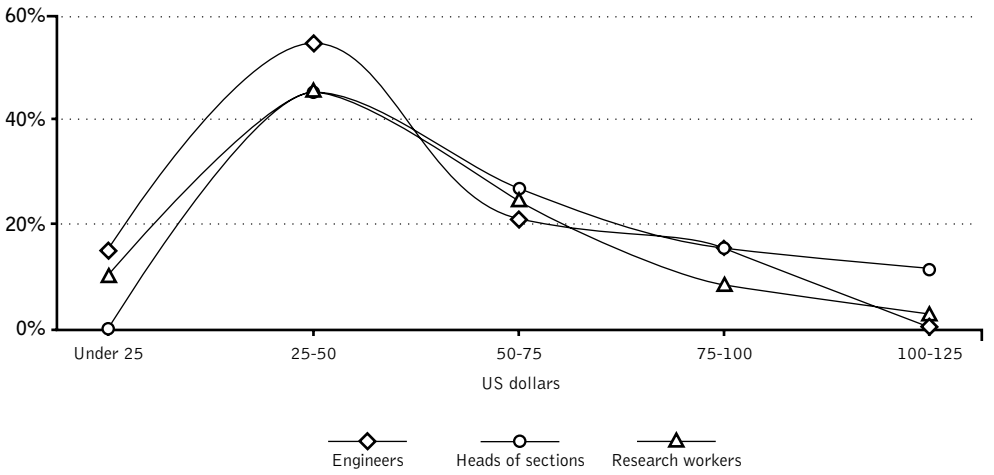


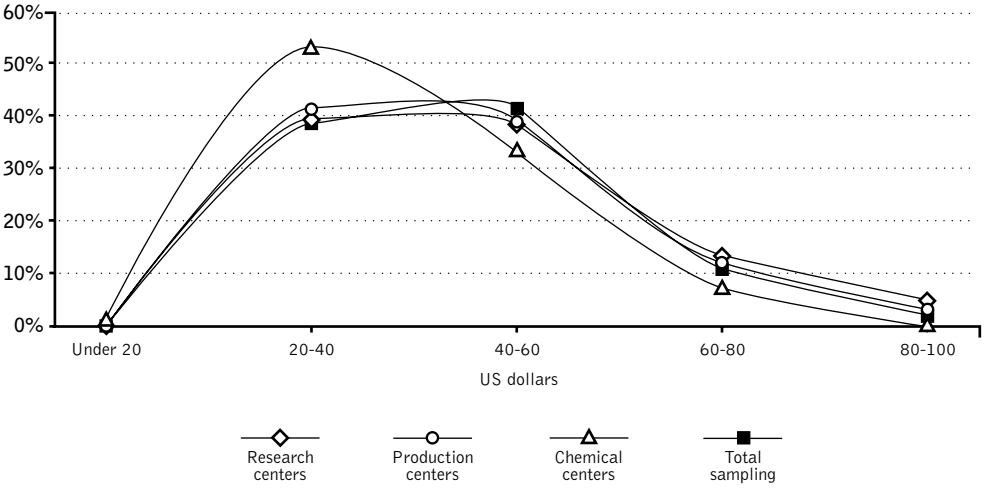
Table 3-3. Average monthly pay by position held (US dollars)

POSITION	AVERAGE PAY
Engineer	41
Head of section	53
Research worker	41

3.4. Level of Monthly Family Income

The level of monthly income of the specialists' families is an even more important indicator of their standard of living than salaries of individual employees. Figure 3-4 shows the distribution of the respondents by size of aggregate income per family member. As can be seen, it is practically identical in research and production centers, while in chemical centers the distribution shifts toward groups with smaller incomes. This is corroborated by data on the average income per family member, which amounts to about US$48 in research and production centers, about US$40 in chemical centers, and US$46 in the sample as a whole.

Figure 3-4. Distribution of specialists by actual average monthly per capita income in their families, %



The average size of a specialist's family is three persons (table 3-4). Thus an average family composed of parents and children has only one child. This is explained by the fact that among specialists living and working in closed cities nearly every fifth one has no children, and about half of them have one child (table 3-5). Only 28 percent of the respondents have two children, and as few as 5 percent have three children.

Table 3-4. Distribution of specialists by family size, %

	TYPE OF CITY			
Number of family members	Research center	Production center	Chemical center	Total sampling
1	17	17	9	16
2	16	20	9	16
3	34	34	57	38
4	28	24	23	26
5	6	4	3	5
Average number of family members	2.93	2.75	3.05	2.91

Table 3-5. Distribution of specialists by number of children, %

	TYPE OF CITY			
Number of children	Research center	Production center	Chemical center	Total sampling
0	22	25	11	21
1	42	44	59	46
2	29	27	27	28
3	6	4	3	5
Total sampling	100	100	100	100

It should be noted that salaries received in chemical centers are highest, amounting to US$64 as compared to US$37 in research centers and US$39 in production centers. At the same time, chemical centers show the lowest per capita income. This cannot be explained by differences in the sizes of families. It may be assumed, however, that the share of those who supplement their salaries by outside work (moonlighting) is lowest in chemical centers—50 percent as compared with 60 percent in research and production centers. Considering that in most cases incomes earned through outside work are either comparable to or higher than regular pay, it can be said that higher family incomes in cities with lower pay are exclusively the result of moonlighting. Regular pay is becoming less significant as a source of income.

It is not by accident that specialists taking jobs in closed cities prefer to work at state enterprises, thereby ensuring themselves of certain social guarantees albeit with a small (yet stable) salary, and then supplement their salaries with outside work, done mostly for private enterprises. Respondents commonly stated that "it is better to make money on the side by doing some work at commercial companies, while having a regular job at a state enterprise" and "a state enterprise is more reliable; I don't trust commercial companies because they exist today but may vanish tomorrow."

3.5. Housing Conditions

Housing is one of the most acute problems affecting migration in Russia. A high percentage of residents in the closed cities have been provided with housing. Nearly 90 percent of the surveyed specialists live in what are officially known as separate apartments (table 3-6). The number who live in shared apartments and hostels is quite small. On the other hand, some of the specialists note that, although formally they are living in separate apartments, these are in fact shared because they live together with their parents.

Table 3-6. Housing conditions of specialists working at the enterprises, %

PRESENT HOUSING	TYPE OF CITY			
	Research center	Production center	Chemical center	Total sampling
Separate apartment	75	75	87	77
House	1	0	1	1
Separate apartment (living with parents)	13	16	4	12
Shared apartment	6	6	4	5
Hostel	3	1	3	2
Rented dwelling	2	2	1	2
Total sampling	100	100	100	100

Specialists who have families live, as a rule, in separate apartments. Those who are divorced live mostly in shared apartments, which were separate apartments prior to their divorce, or in rented dwellings. Nearly 75 percent of those who indicated that they were living in separate apartments with their parents are single (table 3-7).

Table 3-7. Distribution of specialists by marital status and housing conditions, %

PRESENT HOUSING	MARITAL STATUS				
	Married	Single	Divorced	Widower (widow)	Total sampling
Separate apartment	83	4	8	4	100
House	100	0	0	0	100
Separate apartment (living with parents)	21	77	3	0	100
Shared apartment	10	14	69	0	100
Hostel	42	7	42	9	100
Rented dwelling	13	45	37	0	100
Total sampling	69	14	12	4	100

Leaving a closed city in effect means the loss of one's housing because the opportunities to sell housing are limited by low demand. In most cases, housing belongs to local enterprises and is provided free of charge. This acts as a major restraint on the outflow from closed cities in that those leaving will not be given free housing anywhere else. Once having left a closed city, people must purchase their housing, an extremely difficult proposition given the low salaries and difficulty of saving the large amount of money required to purchase good housing outside of the enterprises. On the other hand, the availability of housing owned by enterprises and the possibility of acquiring it for relatively little money is one incentive for migrating to closed cities.

4. MOONLIGHTING

4.1. Extent of and Reasons for Moonlighting

In order to supplement their low salaries, specialists are forced to moonlight. In all, nearly 60 percent of specialists in the surveyed cities are making money on the side. The lowest level of income earned on the side is earned by those who work in chemical centers, where salaries are highest. In research and production centers, where pay is comparable—but much lower than in chemical centers—the level of income earned by moonlighting is higher, although the share of specialists doing so is equal. Clearly the level of income earned on the side is closely related to primary salaries—the higher the salary, the lower the level of income earned on the side. Given present economic conditions, moonlighting may be regarded not as a hobby but a condition of survival.

Table 4-1. Reasons for moonlighting, %

REASONS	TYPE OF CITY			
	Research center	Production center	Chemical center	Total sampling
Economic difficulties only	70	78	46	68
Interesting work only	26	9	19	20
Both economic difficulties and interesting work	5	13	35	11
Total sampling	100	100	100	100

From table 4-1, it can be seen that between 46 percent and 78 percent of those moonlighting are doing so only because of difficult economic circumstances resulting from low pay. In research and production centers, where pay is lowest, the greatest number of those doing outside work indicate difficult economic circumstances as the main reason for moonlighting. By contrast, just 9 percent to 26 percent perform outside work only because the work is of interest to them. The greatest share of people moonlighting for this reason is found in research and chemical centers. These are mostly specialists teaching at branches of the Moscow Physical Engineering Institute and the Tomsk Polytechnic Institute. Between 5 percent and 35 percent of those earning money on the side do so because of economic circumstances, but also engage in work that is of interest to them. The share of this category is greatest in chemical centers, where the share of specialists doing outside work is lowest among the surveyed cities.

Table 4-2 shows that because of lack of demand for their professional skills specialists working in closed cities overcome their difficult economic circumstances mainly by working outside their regular profession. Thus, those who are making money on the side solely because of difficult circumstances are in most cases (43 percent) doing outside work that is outside their regular profession. Only 25 percent of them are moonlighting in their profession.

Table 4-2. Distribution of moonlighting specialists based on reason for doing so and on nature of work, %

IF YOU ARE DOING OUTSIDE WORK, ARE YOU DOING SO IN YOUR REGULAR PROFESSION OR NOT?	REASONS FOR MOONLIGHTING			
	Difficult circumstances only	Interesting work only	Both difficult circumstances and interesting work	Total sampling
Only in my profession	25	79	73	41
Mostly in my profession	17	7	27	16
Mostly outside my profession	9	7	0	8
Entirely outside my profession	43	4	0	31
Hard to say	3	0	0	2
Not exactly in my profession, but close to it	2	3	0	2
Total sampling	100	100	100	100

Radically different from moonlighters who work in their profession are those who do outside work only because it is of interest to them. Not surprisingly, a total of 79 percent of them are moonlighting only within their profession, and only 4 percent of them are doing so in an area that is entirely outside their profession.

Earning extra money by working outside one's profession is related to the fact that in closed cities it is very difficult to find any opportunities for moonlighting, let alone opportunities for doing so in one's regular profession. Responses to our survey included such comments as, "How can I do outside work that's in my profession? Maybe sell the equipment I operate?" The point is that respondents are mainly specialists in technical fields, whereas the outside work they do is mostly basic trade. What relation can selling bear to nuclear physics?

Knowledge in a technical field is absolutely unnecessary for engaging in commercial activities (individual small trade or work at a private business enterprise), the main type of outside work being done in closed cities.

Nearly two-thirds of the specialists believe that finding outside work is difficult, and only 3 percent believe it is easy (table 4-3). Of special interest are the statements that finding outside work is easy "if the boss lends a hand" and "things will be the way the boss wants them to be." Such views are related to the fact that in some cases outside work is done at the very enterprises where the specialists work. In such cases, undoubtedly, it is the bosses who have the final say as to who should be given an opportunity to do outside work and who should not.

Table 4-3. Difficulty of finding moonlighting opportunity, % of respondents

IS IT DIFFICULT FOR A PERSON OF YOUR PROFESSION AND QUALIFICATIONS TO FIND AN OPPORTUNITY TO DO OUTSIDE WORK?	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Difficult	63	74	66	66
Easy	3	0	3	2
Hard to say	26	25	26	26
Easy: just wish for it strong enough	1	0	0	1
Things will be the way the boss wants them to be	0	1	0	0
Easy if the boss lends a hand	4	1	2	3
Not so easy	1	0	0	0
It can be found, but not easily	1	0	0	0
Very difficult	0	0	1	0
Difficult, yet I try because I need it to survive	0	0	1	0
Difficult, so one has to fight hard to get it	0	0	1	0
Total sampling	100	100	100	100

4.2. Potential for Making Money on the Side

The share of specialists making money on the side is constantly growing. For example, in 1992 in Sarov only 11 percent were doing outside work, whereas in 1995 the figure had risen to 40 percent, and today it is 70 percent. And the limit has not been reached. Table 4-4 gives data about the moonlighting intentions of those who have not yet taken on outside work.

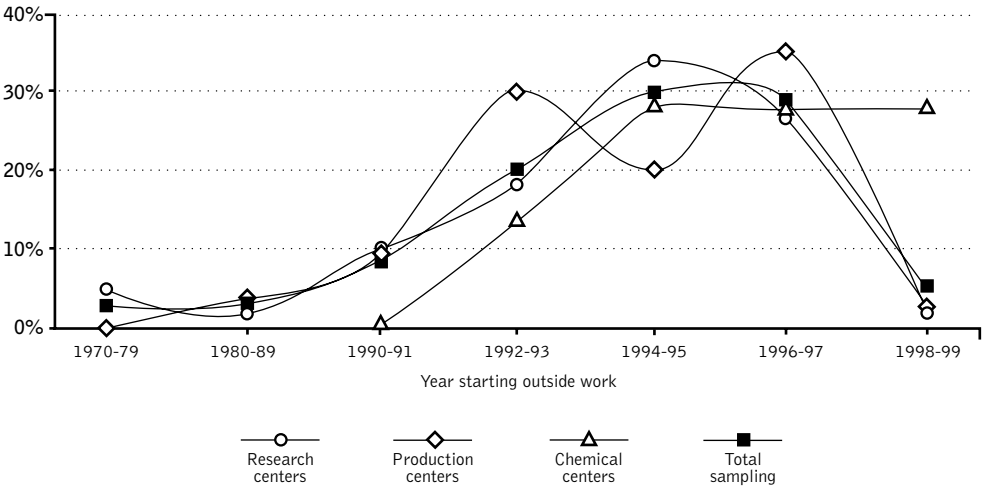
Table 4-4. Moonlighting intentions of specialists who are not doing outside work, %

IF YOU ARE NOT DOING OUTSIDE WORK, WOULD YOU LIKE TO?	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Yes	9	12	12	10
No	40	40	52	42
Hard to say	45	39	26	40
No, I'm occupied with my family	5	7	4	5
Hard to say, and where could I do it?	1	0	0	1
No, because who will take care of my family?	1	0	0	1
Hard to say; my husband is doing outside work because we have a large family	0	1	0	0
Yes, I would, only there is nowhere to do so	0	0	4	1
No, I wouldn't because a man has to have some private life and some rest from his work	0	0	2	0
Total sampling	100	100	100	100

4.3. Duration of Outside Work

Figure 4-1 shows the distribution of persons moonlighting by duration of outside work. A small number of people did outside work before the reforms were launched. An upsurge in the number of moonlighters began in 1989–1992, but it was in 1993 that the greatest number of specialists began taking on outside work. This was the result of both the increasingly deteriorating economic situation at the state enterprises and of the development in closed cities of the economic base for undertaking outside work, that is, the private sector.

Figure 4-1. Duration of moonlighting, % of total moonlighters



4.4. Nature of Outside Work in the Various Types of Cities

Table 4-5 shows the main types of outside work being done by specialists in the various types of cities. In all, commercial activities rank first at the surveyed enterprises, followed by work under foreign research grants and contracts, then by work under domestic research grants and contracts.

Table 4-5. Main types of outside work performed by specialists, %

NATURE OF OUTSIDE WORK	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Commercial companies and private enterprises (trade, repair, order fulfillment)	55	40	33	49
Foreign research grants and contracts with foreign customers	17	6	65	23
Domestic contracts and domestic research grants	13	52	2	22
Teaching and tutoring	24	7	0	16
Odd jobs	2	9	0	4
Total sampling	100	100	100	100

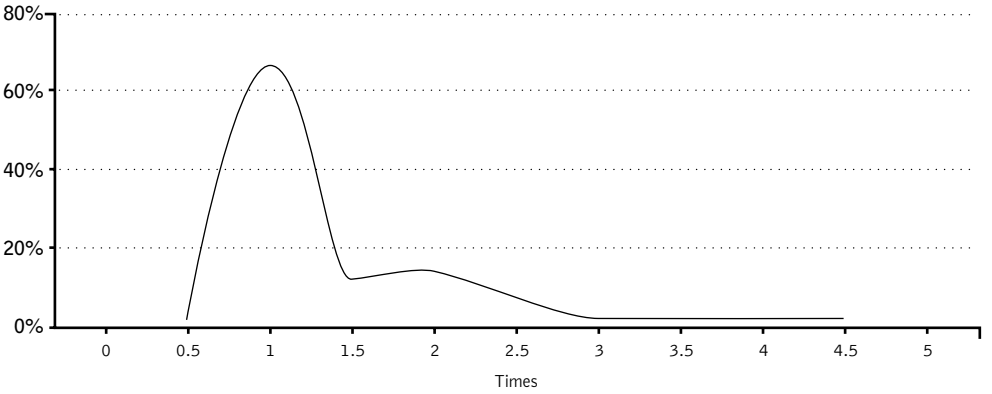
In research centers, the main type of outside work being done by specialists is commercial activity. Nearly 60 percent named commerce as among the main types of outside work. One-fourth are moonlighting by teaching at branches of institutions of higher education in closed

cities and by tutoring college and school students. One-sixth are working under foreign contracts and grants. Only 13 percent have work under domestic contracts and grants as a source of extra income. Clearly, extra income is earned mainly through work outside the domestic sphere.

In chemical centers, the pattern of outside work done by specialists is radically different from that done in research centers, in that nearly two-thirds of specialists making money on the side are earning foreign income under nondomestic contracts. As can be seen, the specialists' outside work is related to their regular work. This close connection of outside work with foreign funds shows that a substantial share of the income received by specialists for their regular work is also of foreign origin.

In production centers, domestic contracts and grants account for nearly half of the specialists' outside work, and 40 percent of specialists make extra money by engaging in commercial activity. As can be seen, secondary income in production centers comes mainly from domestic funds. Among the surveyed cities, the share of remuneration for outside work stemming from foreign funds is lowest here (6 percent).

Figure 4-2. Proportion of income from outside work to regular pay, %



4.5. Income Earned from Outside Work

Figure 4-2 shows that about 70 percent of specialists doing outside work are earning extra income comparable to their regular pay. The remainder of moonlighting specialists earn income greater than their regular pay, resulting in a substantial increase in their earnings.

Figure 4-3 shows the proportion between the regular pay received by the specialists at the enterprises and their actual earnings including money made on the side. As can be seen, the modal interval is shifted from the US$25–$50 group to the US$50–$75 group. As a result, the average monthly income of specialists doing outside work is US$74 dollars, compared to the US$43 earned by those who do not make any money on the side. Yet even this amount is obviously too small. This is corroborated by data on the amount of pay specialists regard as sufficient to ensure themselves a reasonable subsistence (fig. 4-4).

Figure 4-3. Distribution of specialists by regular pay and by actual earnings including money earned on the side, %

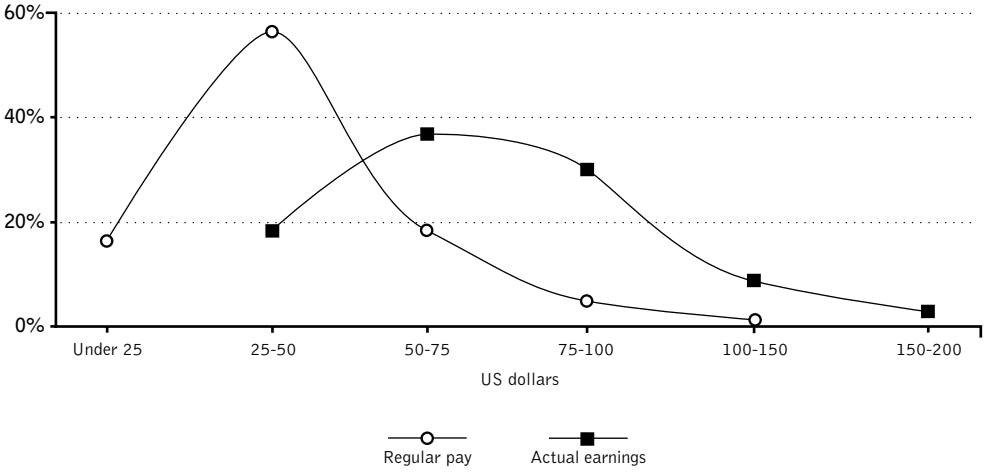
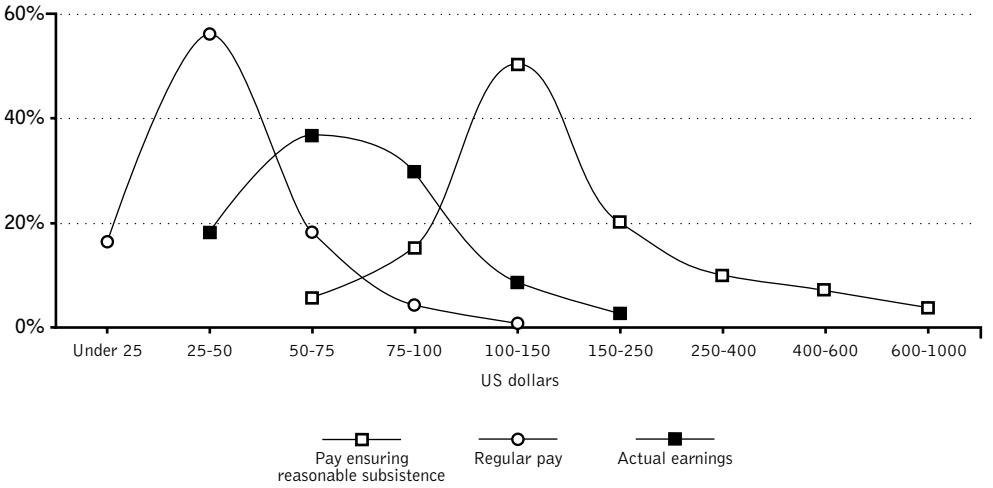


Figure 4-4. Distribution of specialists by regular pay, by actual earnings including money earned on the side, and by pay ensuring reasonable subsistence, %



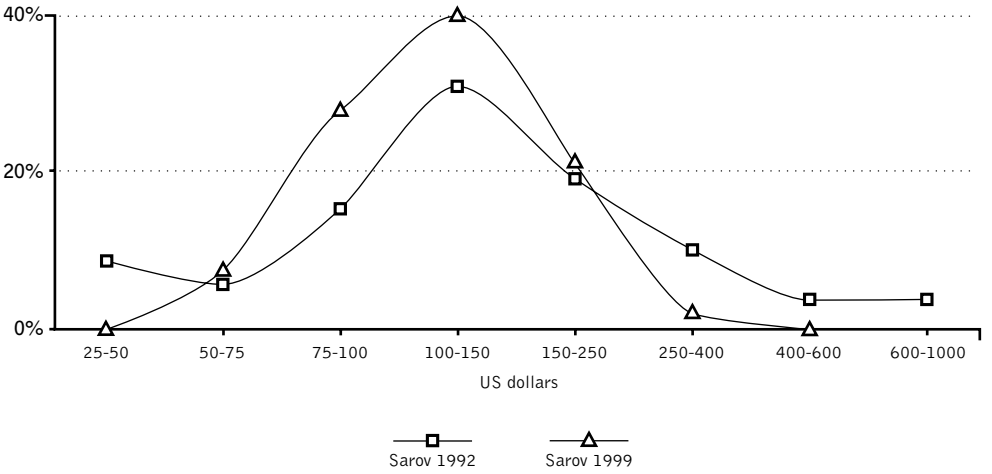
4.6. Pay Ensuring Reasonable Subsistence and Money Made on the Side

The average amount of pay that specialists working in closed cities regard as sufficient to ensure themselves of a reasonable subsistence is US$160 a month. This is four times greater than their regular pay and a little more than twice as much as actual earnings including money made on the side.

It is interesting to note that, although the distribution by pay regarded by specialists as ensuring themselves a reasonable subsistence and its average size both changed in the period between 1992 and 1999, the change was not as substantial as one might have expected considering the rise in the cost of living during the same period.

Figure 4-5 shows the distribution of specialists working in Sarov by the pay they consider necessary to ensure themselves of a reasonable subsistence. The distribution did not change substantially in the two surveys, although the level of pay regarded by specialists as sufficient in 1992 was greater than that in 1999. Indeed, the average monthly pay ensuring a reasonable subsistence in Sarov was US$140 in 1999, as against US$185 in 1992. Does this mean that after a period of seven years, less pay became sufficient to ensure a reasonable existence?That would be possible if the cost of living had decreased, but in fact it has risen.

Figure 4-5. Distribution of specialists in Sarov by pay ensuring reasonable subsistence, 1992 and 1999, %



We assume that the reduction in level of pay deemed sufficient to ensure a reasonable existence is related to a change in the specialists' sense of themselves. The year 1992 was a euphoric period. It seemed that the reforms mapped out at the time would soon help Russia overcome the economic crisis, and one had only to be patient for a while. Conversion from military production was expected to be carried out so that enterprises would start turning out civilian products instead of military ones. Indeed, it made no difference to the specialists whether they would be producing guns or butter.

In 1992, a total of 54 percent of specialists believed that Russia's reduction in defense expenditures was the right policy. In 1999, only 7 percent expressed this opinion. Over a period of seven years, the share of those approving of the reduction in defense expenditures fell to less than one-seventh of what it had been. The decrease is not surprising, for the conversion that was expected—specialists' switchover from military to civilian production—did not materialize. What actually happened was that the enterprises, receiving no orders for either military or civilian products, disintegrated. In 1992 there was no unemployment in closed cities. Today, the level of unemployment in these cities is higher than the average level of unemployment throughout Russia. Over the period 1992–1999, the cities underwent changes their residents could not ever have imagined, and in response people now are demanding not conversion but increased defense expenditures. The Russian-style conversion in closed cities has become fully discredited, turning specialists from doves advocating reduction in defense expenditures in 1992 into hawks demanding an increase in 1999.

5. SPECIALISTS' FINANCIAL SITUATION

5.1. Changes in Specialists' Financial Situation during the Reform Period

Nearly 90 percent of those who gave a definitive answer to the question about the change in their financial situation said that it had deteriorated, and nearly every other person noted that it had deteriorated sharply (table 5-1). Judging by the share of those who believe that their financial situation has sharply deteriorated over the reform period, chemical centers are in the most difficult position (61 percent), followed by production centers (55 percent) and research centers (41 percent).

Table 5-1. Change in specialists' financial situation during the reform period (1992–1999), % of definitive answers

CHANGE	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Dramatic improvement	2	0	1	2
Slight improvement	2	0	4	2
Unchanged	11	4	2	8
Slight decline	44	41	32	41
Dramatic decline	41	55	61	48
Total sampling	100	100	100	100

Specialists in all employment positions experienced deterioration in their financial situation (table 5-2). Heads of sections suffered less than engineers and research workers over the reform period.

Table 5-2. Change in specialists' financial situation according to employment position over the reform period (1992–1999), % of definitive answers

CHANGE	POSITION			TOTAL SAMPLING
	Engineer	Head of section	Research worker	
Dramatic improvement	1	4	3	2
Slight improvement	2	0	3	2
Unchanged	5	20	9	8
Slight decline	40	48	39	41
Dramatic decline	52	28	46	48
Total sampling	100	100	100	100

5.2. Specialists' Current Financial Situation

Table 5-3 shows respondents' evaluation of their present financial situation. None evaluated their current financial situation as very good, and practically no one evaluated it as good. Only every sixth respondent described it as normal. The others described their situation as difficult or very difficult. The lowest evaluation of current financial situation was given by specialists in chemical centers: 94 percent regarded it as difficult and very difficult. In production centers, the comparable figure was 86 percent, and in research centers, 79 percent.

Table 5-3. Evaluation of financial situation by specialists in various types of cities, %

CURRENT FINANCIAL SITUATION	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Very good	0	0	0	0
Good	1	0	0	1
Normal	20	14	6	16
Difficult	55	62	50	56
Very difficult	24	24	44	28
Total sampling	100	100	100	100

Table 5-4 shows that engineers and research workers, accounting for four-fifths of the total number of specialists, gave the most negative evaluation of their financial situation. Between 83 percent and 88 percent of this group regard their current economic situation as difficult or very difficult, and only 1 percent to 2 percent as good. Heads of section are more optimistic. Compared with engineers and research workers, nearly three times as many section heads regard their situation as normal, and four to five times fewer regard it as very difficult.

Table 5-4. Evaluation of financial situation by specialists holding different positions, %

CURRENT FINANCIAL SITUATION	POSITION			TOTAL SAMPLING
	Engineer	Head of section	Research worker	
Very good	0	0	0	0
Good	1	0	2	1
Normal	12	35	14	16
Difficult	57	58	49	56
Very difficult	31	7	34	28
Total sampling	100	100	100	100

The following examples of responses given by those surveyed convey an idea of what the specialists mean by difficult and very difficult financial situation: "It is hard to tell and even to imagine what s— we are living in"; "Very difficult situation, even people in Zambia do not live in this way"; "Very difficult situation, it can't be worse."

Here are examples of responses given by those who evaluated their situation as normal: "Normal, better than what many others are in, although money is a bit tight"; "Normal, but my wife says it's difficult"; "Normal with no frills." Thus, evaluating one's financial situation as normal does not necessarily mean that it is so in reality. Indeed, if others are in even more desperate straits, one's own situation begins to seem normal in comparison.

6. POTENTIAL AND ACTUAL EMIGRATION

6.1. Emigration Intentions

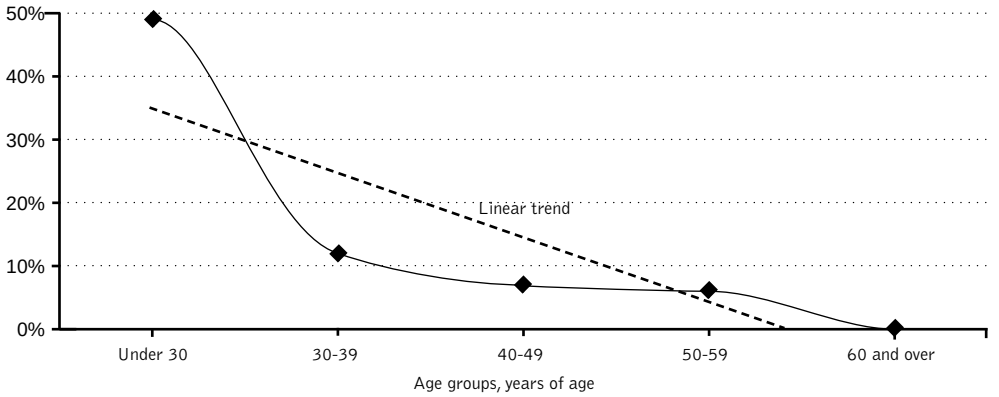
Figure 6-1 shows data about the share by age group of those who wish to work abroad. We note that in general the level of intention to work abroad is rather low, amounting to 14 percent (table 6-1). The greatest share of those who wish to work abroad is observed in chemical centers (18 percent), and the smallest in production centers (10 percent).

Table 6-1. Desire to work abroad, % of definitive answers

DESIRE TO WORK ABROAD	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Yes	15	10	18	14

The trend in intention to emigrate is, in principle, a standard one: the share of those who wish to emigrate decreases rapidly with increase in age (fig. 6-1). Yet the way in which specialists' intentions to emigrate change over time is interesting.

Figure 6-1. Share of those who wish to work abroad, by age group, %

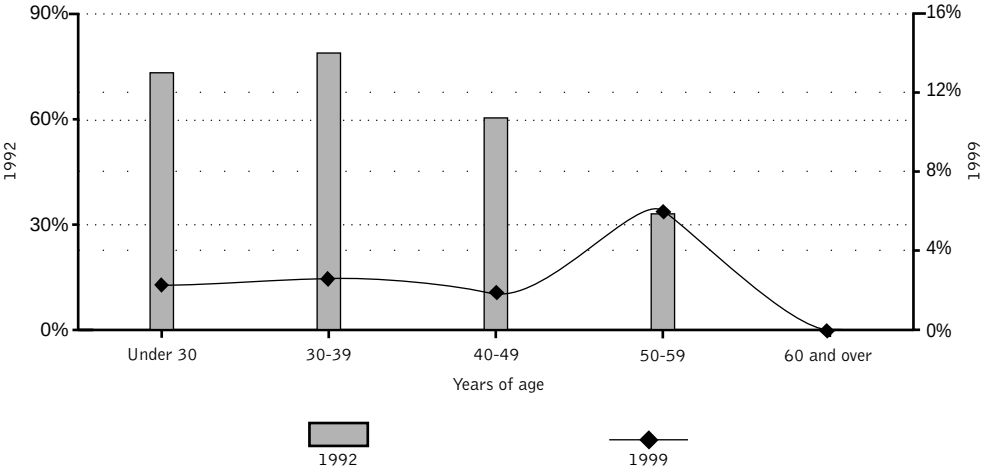


One explanation for this trend is the more realistic view of emigration that has formed since 1992. In 1992, Russia established itself as an independent state and launched reforms. Freedom and openness were the catchwords of the day, and the sudden euphoria of the time undoubtedly had an impact on the residents of closed cities, enticing them with alluring prospects for going abroad to work. People's heightened desire to leave the country was not substantiated either by knowledge of the sober reality of emigration or existing administrative restrictions or by adequate financial resources. It was during this time that the specter of nuclear specialists going abroad en masse to work in countries with "aggressive" regimes took shape.

The passage of seven years reduced the intentions of specialists to emigrate. The residents of closed cities were confronted by reality—above all, by financial problems, which were only beginning to be felt in the early 1990s.

Data from Sarov, where a survey was conducted in 1992 (fig. 6-2), show in the first place a great difference from 1992 to 1999 in the share of those wanting to work abroad. In 1992, 57 percent of those who gave a definitive answer expressed a desire to work abroad, and in 1999 only 9 percent did—a reduction to less than one-sixth over a period of seven years! On the other hand, one can see that the distribution by age groups is identical for both years. Those wanting to go abroad in 1999 are distributed among age groups in exactly the same way as those in 1992; only the desire to go abroad has become six times less intense.

Figure 6-2. Sarov: Intention to work abroad in 1992 and 1999, %



Before 1992, about 15 percent of specialists working in closed cities traveled abroad, mainly on short-term business trips. Nearly 90 percent of all trips made abroad were to countries of the socialist camp. Thus, in the past trips made abroad were not independent and self-arranged but rather working trips arranged by the state. One did not need either to be able to speak a foreign language or adapt to a different social environment. The way in which the trips were arranged obviated such requirements.

In the years since 1992, specialists have become aware that they can live and work abroad only by cutting through a lot of red tape and negotiating a mass of official procedures related primarily to security matters. Even if one managed to do this, one had to be sufficiently well off to be able to bear the expense of migrating, and one had to find a country interested in one's services and capabilities.

6.2. Obstacles to Working Abroad

Cited in table 6-2 are the most typical responses given by those surveyed about the obstacles preventing them from working abroad.

Table 6-2. Typical responses about obstacles to going abroad

IF YOU WISH TO WORK ABROAD, WHAT IS PREVENTING YOU FROM DOING SO?
Both the system and people and the authorities and empty pockets.
I have neither money nor good connections, so I am living like on a volcano. Everything prevents me from achieving my dream of going abroad, and I do not know how it can be realized.
No money, a gloomy present, and a misty future.
Everything and everybody pose obstacles, no money either in the purse or in view, and no one has any use for us anywhere. In a word, this is a dog's life.
Not everything is so simple as is described in the stories told by the free "dermo-cratic" press. [Trans. note: The respondent made a pun combining "democratic" with a Russian scatological term.]
Everything—red tape, lack of money (I don't even have enough to get to Chelyabinsk), and the whole of this Russian bedlam—prevents me from going abroad.
Everything, just everything prevents me from going abroad—things like where can I get the money and how can I get through the bureaucratic red tape?
Lack of money and every kind of hindrance.
One has to have money and good connections, and I have so little of both that my dream will hardly come true. The Muscovites have got hold of all the money and left nothing to us.
The most terrible thing is that no one is waiting for us anywhere, either abroad or in this godforsaken country.
I have neither the money nor the willpower to go abroad.
Empty pockets and various conditions.
Everything prevents me from going abroad—above all the fact that we've been clipped so short that if you really decide to leave here all the conditions will be turned against you and your family. The local authorities and the management of our enterprise, however, are glad of this regime of unlimited abuse, to which they take like a duck to water.
Bad workers often blame their tools.
To be able to leave here, one has to have everything: money, a footing in society, weight, etc.
What prevents me from going abroad is lack of money and various thinkable and unthinkable obstacles. So far everything has been preventing me from going abroad, but one should strictly follow one's own program, which I have.
No money.
Everything seems to prevent me from doing this, and so far I don't know how I can overcome all this, yet something must be done.
Lack of money and terrible obstacles in the way of everyone who would like to go abroad.
No money, no connections, no nothing that could help me run away to where people live like human beings.

IF YOU WISH TO WORK ABROAD, WHAT IS PREVENTING YOU FROM DOING SO? (CONTINUED)
Lack of money, absolute gloom, hopelessness, lack of prospects for going abroad, lack of sense.
I would go abroad with great pleasure, but sometimes I don't have enough money even to buy cigarettes, so I am in the depths of despair.
The authorities do everything to prevent a person from going abroad, like depriving him of money, imposing conditions on him, and putting obstacles in his way.
Where will I get the money and where will I find an open corridor so that I could fly away from here forever?
It is difficult to achieve this and make this dream come true.
One has first to earn enough money and then start thinking about how to go about emigrating.
Not enough money, and I haven't decided yet how I am to go about this; I think that no one has any use for us anywhere.

These responses confirm that there are two main obstacles to going abroad: lack of money and administrative restrictions. One has to have money and good connections to be able to go abroad, and most of the respondents have neither. Moreover, respondents suspect that all of the obstructions, including administrative restrictions and low, irregularly paid salaries, have been deliberately imposed by the authorities to prevent specialists from going abroad.

Specialists working in the atomic cities actually suffered losses during the period of reforms. Just as in the days of the ex-USSR, they are not free to go abroad, as the restrictions preventing them from leaving the country still exist. Formerly the lack of freedom to leave the country was compensated for by high living standards, but today the standard of living has sharply deteriorated.

The small share of those wishing to live and work abroad in 1999 as compared with 1992 should not serve to ease the anxiety of those who are aware of the potential danger of specialists going to "near-nuclear" countries to work. The past few years have shown that for the time being one can go abroad to work only on one's own, but specialists have no money to do so. The situation in closed cities is no different in that low incomes and administrative restrictions make it impossible for residents to leave the country on their own. That is why the share of those who would like to work abroad is so small. The situation may change radically, however, if, in order to ensure the departure of necessary specialists from the country, sponsors appear with enough money at their disposal to get around administrative restrictions.

6.3. Steps Taken to Realize Desire of Going Abroad

Yet those who would like to live and work abroad are on the whole passive in the extreme when it comes to trying to realize their desire (table 6-3). As can be seen, only every third person of those wanting to leave the country is taking steps to do so, while two-thirds are doing nothing.

Table 6-3. Steps taken to realize desire of going abroad, % of total number wishing to emigrate

IF YOU ARE INTERESTED IN WORKING ABROAD, ARE YOU TAKING ANY PARTICULAR STEPS TO FIND EMPLOYMENT THERE?	%
Yes	33
Yes, but it is a very difficult proposition here	2
No	41
Hard to say	24
Total sampling	100

What steps are being taken by those who would like to go abroad (table 6-4)?

Table 6-4. Steps taken to realize desire of going abroad, % of the total number taking such steps

IF TAKING PARTICULAR STEPS TO FIND EMPLOYMENT ABROAD, WHAT ARE YOU DOING?	%
Establishing useful contacts	56
Making use of the potential of relatives	46
Applying to foreign companies	9
For the time being, gathering information about how this can be done	4
Keep going on business trips	3
So far doing nothing	3
Applying to people everywhere I can, but few can really help	3
I have no connections and it is highly difficult to achieve anything without them	3
I am leaving no stone unturned, but it is not that simple, for who will encourage the young?	3
I am doing something, but this process is extremely difficult	3
I would like to go, but I don't know how I should go about it	3
Using everything I can	3
You have to make some money first, because you can't go anywhere if you're broke	2

These are mostly rather hypothetical steps, for example, using the positions of one's relatives and friends to establish useful contacts. Only 9 percent of those who are taking any steps at all (and this amounts to a mere 2 percent of the total number of those who would like to work abroad) are taking practical steps to this end, for example, by applying to foreign companies. Apparently those wishing to go abroad are regarding such a change at the level of wishful thinking, not at the level of taking practical steps.

This reading is supported by the fact that among those who wish to work outside the country no one has a clear notion of the conditions under which they would accept a job abroad. Just over 50 percent of those wishing to work abroad have only a vague notion of what they would like, and the rest have no notion at all. In a situation in which those who would like to work outside the country do not have a clear notion of the conditions of getting a job abroad the prospects for their going abroad on their own are ruled out. Intermediaries are needed to make arrangements (table 6-5).

Table 6-5. Intermediaries in going abroad to work, % of the total number of those wishing to emigrate to work abroad

IF INTERESTED IN WORKING ABROAD, WHAT INTERMEDIARY ORGANIZATIONAL FORM WOULD YOU PREFER?	%
Any form	64
Special state-run agency only	24
Friends and acquaintances only	7
I would say thanks a million to anyone who will help!	2
Private agency only	1
If only someone could help me get out of this hole	1
I would prefer to make my own arrangements	0
Hard to say	8
Total sampling	100

As is clear from table 6-5, among those wishing to work abroad no one would like to do so on one's own. Preference is given to a special state-run agency and to one's friends and acquaintances. It should be noted, however, that 60 percent would agree to any form of intermediacy.

Thus, under present conditions, it can practically be ruled out that a person from a closed city will go abroad on his own. People are not ready to act independently. Their departure has to be organized. That is why emigration from closed cities can in principle occur only if it is organized by someone, not on an independent basis. This is not surprising. Specialists working in closed cities have been living in a special world all their lives, a world that has been and continues to be different from that inhabited by their fellow citizens, to say nothing of that known to people in other countries.

6.4. Destinations

As a general rule, the respondents expressed a preference to go to industrialized countries in Europe and America (table 6-6). Another aspect, however, is of more interest: countries the respondents would not go to under any circumstances. From the industrialized countries' point of view, specialists who develop and produce nuclear weapons and their components should not go to countries with aggressive, totalitarian regimes, to "near-nuclear" countries, or to countries that have only just begun producing nuclear weapons.

Table 6-6. Countries and regions to which persons wishing to work abroad would like to go, % of the number of countries named by respondents

REGIONS	%
Europe	45
North America	28
Middle East	10
Asia	6
Any place at all	6
Any "civilized country"	5
Total sampling	100

Respondents were asked to name three countries to which they would not go under any circumstances, in decreasing order in terms of their negative attitude toward each. The countries most often named are given in table 6-7. It may be assumed that if respondents took an "equally negative" attitude toward all of these countries, the distribution of specialists in table 6-7 would be random and uniform: 26.8 percent of the respondents would not wish to go to any of these countries. Such, however, is not the case. As can be seen, specialists are most averse to going to Iraq, Pakistan, and Libya. On the other hand, the share of specialists who are ill-disposed toward going to Iran, with which Russia is cooperating in the nuclear sphere, just as it is with India and China, is smaller than would follow from the uniform distribution. Neither is there any strong antagonism toward Israel and North Korea. In sum, a ready source of experts is apparently willing to at least entertain the idea of going to countries interested in or engaged in developing nuclear weapons.

Table 6-7. Countries flatly rejected by persons wishing to work abroad, % of the number of countries named by respondents

COUNTRIES	% OF RESPONDENTS WHO NAMED THE COUNTRY	UNIFORM DISTRIBUTION, %	DEVIATION FROM UNIFORM DISTRIBUTION
Iraq	59	26.8	32.3
Pakistan	42	26.8	15.3
Libya	33	26.8	6.3
Iran	24	26.8	-2.8
North Korea	16	26.8	-10.8
Israel	16	26.8	-10.8
India	13	26.8	-13.8
China	11	26.8	-15.8

Thus, specialists in the Russian nuclear complex have their own view of the problem of nonproliferation of nuclear weapons, and it is radically different from that of the industrialized countries. This nonconcurrence of views is easy to explain. Specialists are faced with the problem of survival under conditions in Russia today—a problem that did not exist in the past. Undoubtedly, if the financial situation of the specialists were the same as it was before or if it were the same as that of the majority of residents of the industrialized countries, opinions about which countries people would work in would be much closer to what is generally accepted.

6.5. Reasons for Specialists' Interest in Working Abroad

The main reasons for specialists' interest in working abroad (table 6-8) are those related to the economic situation, whereas purely professional motives were given only by every seventh person of those wishing to work abroad. About 25 percent of those wishing to work abroad named a combination of economic and professional interests.

Table 6-8. Main reasons for specialists' interest in working abroad, % of those wishing to live and work abroad

REASON	%
Economic	61
Professional and economic	24
Professional	15
Total sampling	100

6.6. Work Abroad

The fact that intentions to work abroad are economically determined is corroborated by the following statements made by respondents:

- "I am simply fed up with this kind of life."
- "Even if I couldn't go abroad forever, I would like to work there for some time, since here I'll soon kick the bucket."
- "We live like paupers, so I would go anywhere someone would pay for my work."

Not only would specialists go anywhere on condition that they were paid for their work, but they would agree to work in a foreign country's military industry (table 6-9).

Table 6-9. Willingness to work in foreign defense industries, % of respondents

IF INTERESTED IN WORKING ABROAD, WOULD YOU WORK IN THE MILITARY INDUSTRY OF A FOREIGN COUNTRY?	%
Yes	46
No	18
It's all the same to me where I will be working so long as I receive good pay for my work.	6
What does it matter where I would be working?	4
I would agree if it caused no harm to Russia.	3
The military industry of the West has no use for such specialists.	2
I would agree to work in any industry, including the military industry.	2
I would, but why ask this question? What does it matter, the main thing is that I should be paid money; after all, I will be working, not robbing or killing.	2
I would because things are so bad here that you would agree to anything at all.	1
Hard to say.	24

Only every fifth person answered no concerning their willingness to work in the military industry of a foreign country. Quite remarkable are such answers as "It's all the same to me," "What does it matter where I would be working?" "Things are so bad here that you would agree to anything at all," "What does it matter, the main thing is that I should be paid money; after all, I will be working, not robbing or killing." It appears that producing nuclear weapons

for those who are capable of killing is gainful employment, not direct complicity in murder. It follows that any hope that some "moral factor" will under certain conditions prevent specialists from going abroad to help produce nuclear weapons is a delusion.

Clearly, either measures must be taken to improve the financial situation of nuclear industry specialists or the readiness of members of this extremely dangerous profession to work abroad will persist. Indeed, efforts are being made to prevent such an outflow. But they are purely administrative measures (bans on going abroad in view of the classified character of the work) and economic measures (extremely low pay—one of the respondents noted, "One cannot afford to go even to Moscow, let alone abroad"). This feeling of hopelessness paralyzes people's will to look independently for means of going abroad. The situation, however, will change radically if those who recruit specialists employ different tactics, namely, if they emphasize organized, not independent, departure, the latter being practically impossible.

We believe that the conditions encouraging stasis may change if the government agencies of the countries concerned, having sufficient funds at their disposal, show an interest in nuclear specialists. In this case, the obstacle hindering specialists' independent departure—lack of money—will be obviated. Given their current desperate straits, specialists will work even for relatively small sums of money. Nearly two of every three respondents who would like to work abroad would work for less than US$1,500 per month.

6.7. Attitude toward Others' Emigration

In our view, specialists' attitudes toward those who are going to emigrate may be a more accurate indicator of their potential readiness to emigrate. The fact is that only those who have a negative attitude toward emigration will not work abroad under any circumstances. By contrast, people whose attitude toward those who are planning to emigrate is positive or neutral (that is, who believe it to be a personal matter) may under certain circumstances leave to work abroad. Table 6-10 gives data about respondents' attitudes toward those who are going to emigrate.

Table 6-10. Specialists' attitudes toward emigrants, %

ATTITUDE TOWARD EMIGRANTS	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Negative	14	19	16	16
Neutral (haven't given it much thought because it is a personal matter)	66	54	67	63
Positive (approval, envy)	21	27	17	21
Total sampling	100	100	100	100

As can be seen, only 16 percent of respondents have a negative attitude toward those who are going to emigrate from Russia and therefore cannot in principle be regarded as potential emigrants. Nearly 60 percent are neutral (haven't given much thought to emigration or view it as a personal matter), and 21 percent approve of or even envy them. Therefore, emigration potential is much greater than appears from the answer to the question about specialists' intentions to work abroad.

The assessment that specialists holding a negative attitude toward those who are going to emigrate cannot be regarded as potential emigrants is corroborated by the fact that there is a direct correlation between a person's view of others emigrating and expressing a negative view regarding their own emigration (table 6-11).

From table 6-11 it follows that groups with neutral or positive attitudes may, under certain circumstances, be willing to work abroad. True, the share of those wishing to work abroad among those who take a neutral attitude toward emigrants is radically different (nearly fourteen times smaller) from the corresponding share of those who approve of emigrants or envy them (4 percent as against 54 percent, respectively). The point, however, is not the size of the share of those who would like to emigrate at present. What really matters is the emigration potential, which is significant.

Table 6-11. Desire to work abroad among specialists holding different attitudes toward emigration, %

ATTITUDE TOWARD THOSE WHO ARE GOING ABROAD	DESIRE TO WORK ABROAD		TOTAL SAMPLING
	Yes	No	
Negative	0	100	100
Neutral (haven't given it much thought because it is a personal matter)	4	96	100
Positive (approval, envy)	54	46	100
Total sampling	14	86	100

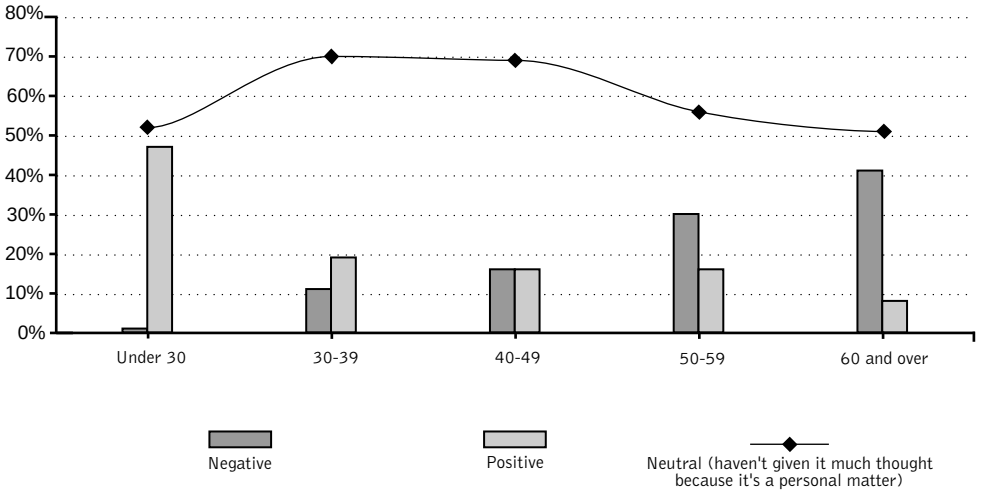
Let us take a closer look at those who are potentially capable of emigrating from Russia (table 6-12).

Table 6-12. Attitude of specialists in different positions toward emigrants, %

POSITION	ATTITUDE TOWARD EMIGRANTS			TOTAL SAMPLING
	Negative	Neutral (haven't given it much thought because it is a personal matter)	Positive (approval, envy)	
Engineer	13	62	25	100
Head of section	33	50	17	100
Research worker	18	58	23	100
Total sampling	18	59	24	100

The most negative attitude toward potential emigration is held by heads of section. One-third of this group is immobile in terms of emigration. Engineers and research workers equally have the most positive attitude toward emigrants, one quarter approving or envying steps taken by emigrants. A neutral attitude prevails in all positions (about 50 percent to 60 percent).

Figure 6-3. Attitude toward emigrants, by age, %



Specialists' negative attitudes toward emigrants are closely related to their age (fig. 6-3). As can be seen, the older the age, the greater the share of specialists with negative attitudes toward emigrants.

Among people less than thirty years old who took jobs at the enterprises in the 1990s, almost none has a negative attitude toward emigration. This group makes up the lion's share of those holding positive and neutral views of emigration. By contrast, among older people there are fewer whose attitude toward emigrants is neutral, and the number of those offering a definite, mostly negative opinion is greater.

Specialists' attitudes toward emigrants are closely related to whether they have had contact with people who have gone abroad. As can be seen from table 6-13, those who have former colleagues who have gone abroad have a more positive attitude toward emigrants. In fact, they are three times more likely to have a positive attitude (and four times more likely to have a neutral attitude) toward migration than those with no colleagues who have left Russia.

Thus, the better a person knows people who have gone abroad and why and how they have settled there, the more positive his attitude toward their actions. However, so long as the number of specialists from closed cities who have gone abroad and, accordingly, the number of colleagues who had contact with them are not large, the share of those who have a negative attitude toward migration will remain quite substantial.

Table 6-13. Specialists' attitudes toward emigrants depending on whether ex-colleagues have gone abroad, %

HAVE ANY OF YOUR EX-COLLEAGUES GONE ABROAD?	ATTITUDE TOWARD THOSE WHO ARE EMIGRATING			TOTAL SAMPLING
	Negative	Neutral (haven't given it much thought because it is a personal matter)	Positive (approval, envy)	
Yes	4	40	56	100
No	17	66	18	100
Total sampling	16	63	21	100

6.8. Actual Emigration: Scope and Pattern

There is a certain amount of actual emigration from closed cities. One can get a rough idea of its scope from respondents' answers to the question of whether any of their former colleagues have gone abroad (table 6-14). The findings seem, on the whole, to reflect the emigration processes going on in closed cities.

Table 6-14. Emigrants from closed cities, %

HAVE ANY OF YOUR EX-COLLEAGUES GONE ABROAD?	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Yes	11	4	9	9

A total of 9 percent of respondents at the surveyed enterprises said that they had former colleagues who had gone abroad. This figure is highest in research centers (11 percent) and lowest in the production centers where warheads are manufactured.

Figure 6-4 shows changes in emigration flow over time. As can be seen, emigration began approximately in 1991 and reached its peak in 1996, following which it began to decrease. In all, during the eight-year period between 1991 and 1998, about 1 percent of the total number of specialists working at the surveyed enterprises on average went abroad each year.

Figure 6-4. Dynamics of emigration flow from closed cities, % of the sample total

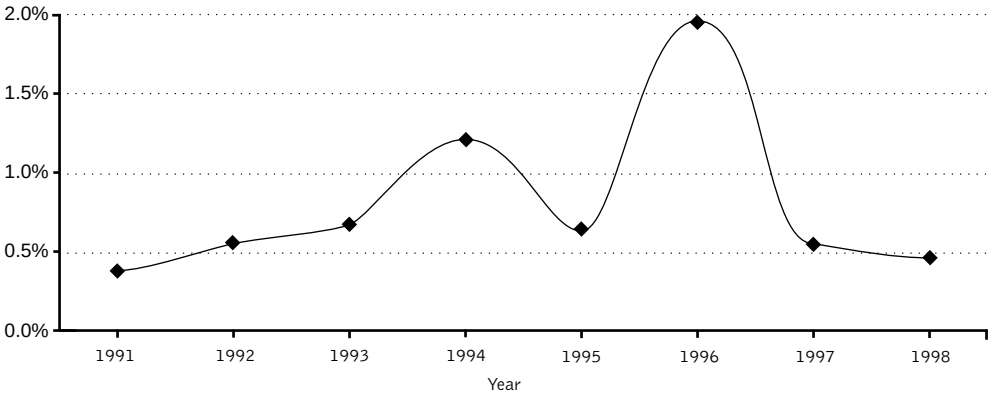


Table 6-15. Specialists' countries of destination, % of total number who have emigrated

COUNTRY OF DESTINATION	%
Germany	33
Israel	32
Sweden	12
United States	11
Finland	5
France	3
India	3
Unknown	1
Total sampling	100

About two-thirds of the emigrants went to two countries, Germany and Israel; approximately one-tenth went to Sweden and one-tenth to the United States. As can be seen, among those who have gone abroad none, as far as we were informed, went to countries with aggressive regimes. Men represent 60 percent of emigrants. More than 50 percent of emigrants are Russians, and the rest are mostly Jews and persons whose nationality was unknown to respondents (table 6-16). At the same time, if one looks at the distribution by destination of persons whose nationality is unknown, one may conclude that they are most likely not Germans, for every third one went to Israel. It may be assumed that they are Russians and Jews.

Table 6-16. Ethnic composition of emigrants by sex, % of total

	SEX		
Ethnicity	Male	Female	Total sampling
Russian	34	100	54
Jew	33	0	23
Do not know	28	0	20
Volga Area German	4	0	3
Total sampling	100	100	100

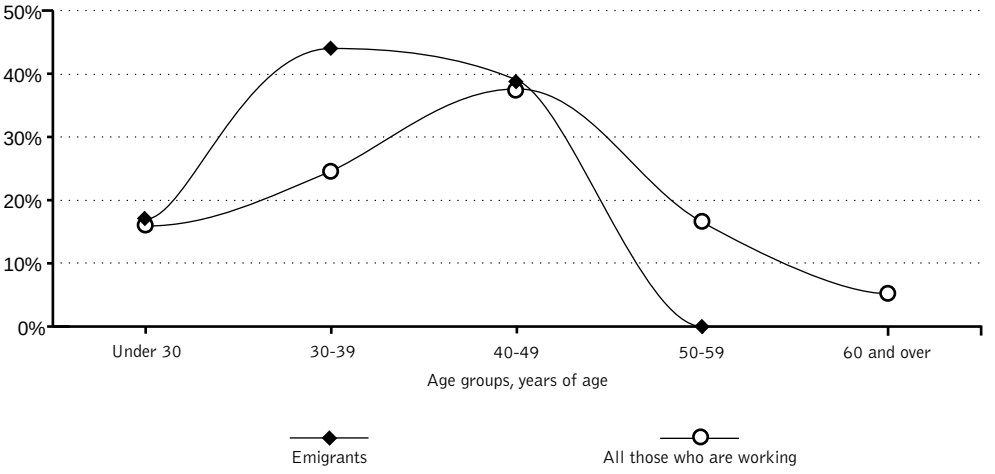
One-third of those who have gone abroad are research workers, and the other two-thirds are engineers and technicians.

The share of persons holding an academic degree among those who have gone abroad is the same as among those working at the surveyed enterprises in general (table 6-17).

Table 6-17. Possession of an academic degree by those who have gone abroad, %

POSSESSION OF AN ACADEMIC DEGREE	ETHNICITY				TOTAL SAMPLING
	Russian	Jew	Do not know	Volga Area German	
Yes	3	32	0	0	9

Figure 6-5. Emigrants vs. total current employees: Age profile, %



Emigrants tend to be younger than average compared with all specialists working at the enterprises: 61 percent of them are under forty years of age (fig. 6-5).

6.9. Reasons for Emigrating

In the respondents' opinion, emigrants go abroad mainly for family reasons. Every sixth emigrant has gone abroad for economic reasons, and every third one for professional reasons. A total of 9 percent of emigrants have gone abroad for political reasons (table 6-18).

Table 6-18. Reasons for emigrating, %

REASON	%
Family	40
Professional	30
Economic	17
Unknown	10
Political reason	9
Total sampling	100

About 60 percent of emigrants have gone abroad permanently, the rest for a temporary job or to undergo practical training (table 6-19). As can be seen, the reasons for going abroad vary depending on the respondent's country of destination. Those who emigrate to Israel and Germany tend to go there to reside permanently, and emigrants to other countries as a rule emigrate in order to take a temporary job.

Table 6-19. Distribution of emigrants by country of destination and by reason for emigrating, %

COUNTRY	REASON FOR EMIGRATING				TOTAL SAMPLING
	Permanent residence	Temporary job	Practical training	Hard to say	
Israel	96	4	0	0	100
Germany	58	16	9	16	100
United States	50	50	0	0	100
France	0	100	0	0	100
Sweden	0	100	0	0	100
Finland	0	100	0	0	100
India	0	100	0	0	100
Total sampling	56	35	3	5	100

This situation is closely related to the emigrants' ethnic composition (table 6-20).

Table 6-20. Distribution of emigrants by reason for emigrating and by ethnic origin, %

REASON FOR EMIGRATING	ETHNICITY				TOTAL SAMPLING
	Russian	Jew	Do not know	Volga Area German	
Permanent residence	38	100	69	100	60
Temporary job	50	0	31	0	33
Practical training	7	0	0	0	4
Hard to say	5	0	0	0	3
Total sampling	100	100	100	100	100

Whereas 100 percent of Jews and Germans go abroad in order to take up permanent residence there, Russians, constituting an absolute majority of specialists at the surveyed enterprises, emigrate for the purpose of establishing permanent residence abroad in only four cases out of ten. The majority of Russians go abroad to take a temporary job or to get practical training. Because the persons of unknown nationality, as we have assumed, are either Russians or Jews, it follows from this table that Jews do not go abroad to take a temporary job: this means that two-thirds of the total number of persons of "unknown" nationality are Jews and one-third are Russians. Thus, the emigration of Jews and Germans is, in effect, repatriation, a return to their historical homeland. People of other ethnic origins mostly go abroad to permanently settle there.

Table 6-21. Distribution of emigrants by ethnic origin and by country of destination, %

COUNTRY OF DESTINATION	ETHNICITY				TOTAL SAMPLING
	Russian	Jew	Do not know	Volga Area German	
Germany	55	0	0	100	33
Israel	0	100	35	0	30
United States	13	0	35	0	14
Sweden	20	0	0	0	11
Finland	6	0	15	0	6
France	7	0	0	0	4
India	0	0	15	0	3
Total sampling	100	100	100	100	100

To summarize, emigration from closed cities has been relatively limited in scope during the 1990s. Over that period, about 9 percent of specialists working at enterprises in closed cities have gone abroad: of these, 60 percent have emigrated in order to settle permanently abroad, and the rest to take temporary jobs. Therefore, the enterprises' unrecoverable losses amounted to about 5 percent of their specialists over an eight-year period. It is mostly young people (under forty-five years of age) who emigrate. One in five of those who emigrated to Israel and one in twenty-five of those who emigrated to Germany held an academic degree. For Jews and Germans, emigration has the character of repatriation in that they are going to their historical homeland. Russians mostly go to Germany and the United States both in order to settle in those countries for good and to take a temporary job.

7. PERSONNEL SHIFT TOWARD PRIVATE BUSINESS

7.1. Extent, Composition, Dynamics

The number of specialists taking jobs with private businesses and starting their own businesses is large enough to seriously damage the enterprises by depleting them of personnel. A total of 45 percent of respondents have former colleagues who have taken jobs with private businesses or started their own businesses. The largest share of these is in production centers, where it amounts to 60 percent. This is half again as much as that in research and chemical centers, which have identical figures in this category.

Let us examine the data on the types of cities in which specialists who have taken jobs with private businesses are working (table 7-1). As can be seen, people tend to take private enterprise jobs in the same city in which they were formerly employed. Open cities offer, in principle, more opportunities for private enterprise, although closed cities enjoy certain tax privileges.[2]

2. Closed cities enjoy tax privileges in that they do not pay taxes to the federal budget. This should attract business people to these cities. It actually does, but this does not result in the development of production in closed cities: they are used only for registering commercial companies. In other words, actual production facilities are located in open cities and their legal addresses are in closed cities. This poses certain problems for the centers of the regions in which these closed cities are located. Taxes are thus being diverted from regional centers to closed cities. As a rule, such problems are solved by allowing only newly formed commercial companies to be registered in closed cities.

Table 7-1. Cities where specialists have private enterprise jobs, %

WHERE IS SPECIALIST WORKING WITH A PRIVATE BUSINESS OR RUNNING HIS OWN BUSINESS?	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
In the same city	77	55	88	71
In an open city	20	44	9	27
In a rural area	3	1	3	2
Total sampling	100	100	100	100

From table 7-2 it follows that specialists who have quit their jobs at state enterprises are playing a major part in the development of new economic entities. Forty percent of former enterprise employees are running their own businesses, and 60 percent are continuing to work for hire, only now in the private instead of the public sector.

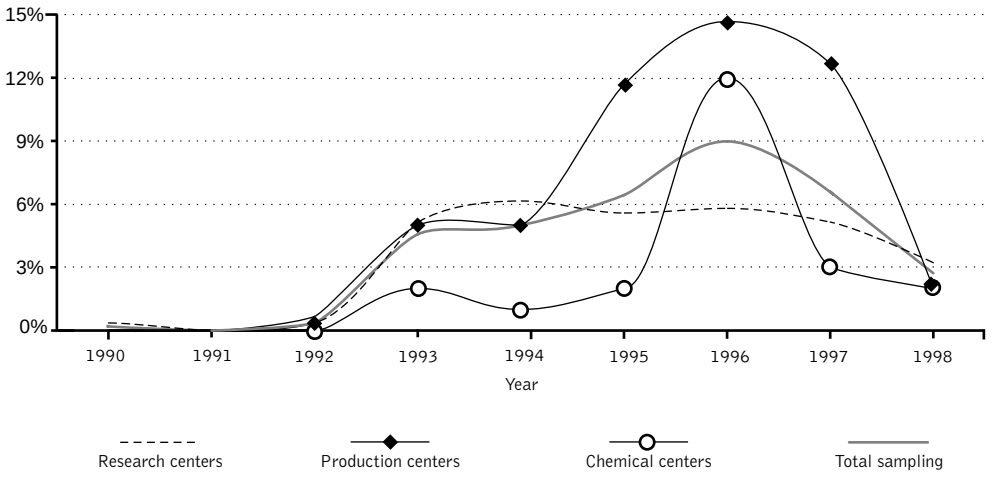
Table 7-2. What ex-specialists of state enterprises do for a living, %

	TYPE OF CITY			TOTAL SAMPLING
	Research center	Production center	Chemical center	
Working for hire at private businesses	62	60	56	60
Running own businesses	38	40	44	40
Total sampling	100	100	100	100

As can be seen from figure 7-1, the movement of specialists out of state enterprises and into jobs with private businesses and their own businesses did not occur simultaneously in all types of cities. However, an overall tendency toward growth in the period between 1991 and 1996, followed by a downtrend, can be clearly observed. The percentage of specialists quitting their jobs at state enterprises to take jobs with private businesses can be estimated. Over the eight-year period from 1991 to 1998, 45 percent of the total number of specialists left the surveyed enterprises and took jobs with private businesses. This means that not less than 5 percent to 6 percent of the specialists quit their jobs at the enterprises each year, with the respective figures for production centers being approximately 7 percent to 8 percent and for research and chemical centers about 5 percent.

Comparing these data with data on emigration outflow, which in that period amounted to about 1 percent a year, one can say that in 1991–1998 the intensity of outflow from enterprises to private businesses was five to six times greater than that owing to emigration.

Figure 7-1. Distribution of specialists who took jobs with private businesses by year of their taking such jobs, %



Three-fourths of the specialists taking jobs with private businesses are men. As a rule, specialists who quit their jobs at enterprises tend to be young: 77 percent of the men and 87 percent of the women leaving the enterprises are under forty years of age (table 7-3).

Table 7-3. Distribution of those who have taken jobs at commercial companies by sex and age, %

AGE GROUPS OF THOSE WHO HAVE TAKEN JOBS WITH PRIVATE BUSINESSES, YEARS OF AGE	SEX		TOTAL SAMPLING
	Male	Female	
Under 30	24	24	24
30-39	53	63	56
40-49	21	13	19
50-59	2	0	1
Total sampling	100	100	100

Eighty percent of specialists taking jobs with private enterprises are engineers and technicians, 17 percent are research workers, and the rest are heads of section. As a rule, few of those taking jobs with private enterprises hold an academic degree.

7.2. Reasons for Moving to Business Entities

Table 7-4 shows that men and women have very different reasons for taking jobs with private businesses. Although both sexes cite economics as their primary reason for changing jobs, women are four times more likely than men to do so for personal or family reasons and seven times less likely to do so for professional reasons. Professional reasons appear to have little significance to women. The most important factors for them are economic and personal.

Table 7-4. Reasons for moving to business entities, by sex, %

REASON	SEX		TOTAL SAMPLING
	Male	Female	
Economic (low pay)	75	61	71
Other (personal or family reasons)	9	38	17
Professional (uninteresting work, absence of prospects for career development)	14	2	10
Hard to say	3	0	2
Total sampling	100	100	100

7.3. Becoming Employed in Private Business vs. Specialists' Profession

As a rule, becoming employed in private business requires specialists to change the focus of their profession (table 7-5). Only 25 percent of both men and women who have moved to private business work in the same profession as before. The rest have been forced to change.

Table 7-5. Distribution by profession and sex, %

	SEX		TOTAL SAMPLING
	Male	Female	
Different profession	60	66	62
Same profession	23	24	23
No information	15	9	13
Not quite same profession	2	2	2
Total sampling	100	100	100

Not surprisingly, a greater number of those who start their own businesses are forced to change profession than those who continue to work for hire (table 7-6).

Table 7-6. Distribution of those who have taken jobs with private businesses, by profession and occupation, %

WHAT SPECIALIST IS DOING	WORKING FOR HIRE AT A PRIVATE BUSINESS	RUNNING OWN BUSINESS	TOTAL SAMPLING
Different profession	58	70	63
Same profession	27	20	24
No information	14	8	11
Not quite same profession	1	2	2
Total sampling	100	100	100

It turns out, however, that there are no fundamental differences in level of satisfaction felt by those running their own businesses and those working for hire. A full 90 percent of those who have left state enterprises to work in private business are satisfied with the change. It is not accidental that more than 70 percent of those who would like to quit their jobs at the surveyed enterprises wish to take jobs precisely with private businesses.

7.4. Returning from Private Business to State Enterprises

Also of interest are where people who have quit their jobs at state enterprises have gone to work afterwards. Our results show that more than 60 percent of both men and women leave state enterprises to work at commercial companies, while the remainder work at other state enterprises, further adding to the drain away from state enterprises.

The characteristics of those who take jobs at state enterprises show a different trend. Approximately half of them come from other state enterprises, and the other half from private business. Women return from private business to state enterprises more often than men.

Table 7-7. Specialists leaving private business and state enterprises to take a job at a state enterprise, %

WHERE SPECIALISTS COME FROM WHEN THEY TAKE JOBS AT STATE ENTERPRISES	SEX		TOTAL SAMPLING
	Male	Female	
Private business	43	63	49
Another state enterprise	57	37	51
Total sampling	100	100	100

These findings may be interpreted as follows. Approximately one-third of specialists taking jobs at state enterprises are graduates of institutions of higher education, and two-thirds of them previously worked either in private business or at state enterprises. Therefore, about one-third (two-thirds x 49 percent) of the total number of those taking jobs at state enterprises come from private businesses. Of the total number of those quitting their jobs at state enterprises, only 10 percent retire on a pension, and the remaining 90 percent take jobs in private business or at other state enterprises. Considering that 61 percent of them leave to take jobs in private business, it can be stated that a little more than half (90 percent x 61 percent) of those who quit their jobs at state enterprises do so in order to take jobs in private businesses. Assuming that the inflow and outflow of personnel are equal in magnitude, it follows that for every fifty specialists who quit their jobs at state enterprises to take jobs in private businesses, thirty-three eventually return to enterprises in the public sector. The share of returnees thus amounts to two-thirds. Actually this number is slightly lower because state enterprises are reducing the number of employed, and the outflow from the enterprises is thus greater than the inflow. The trend in the movement of specialists in closed cities is definitely toward private businesses.

8. PERSONNEL TRAINING FOR THE NUCLEAR INDUSTRY

8.1. Selection of Students

People currently taking jobs at state enterprises are graduates who began their studies at least five to six years ago. The early to mid-1990s was a rather difficult period for technical schools, as the majority of students entering advanced education programs were interested in studying economics or law. Competition among entrants to technical schools was not very strong (table 8-1).

Table 8-1. Competition for admittance to an institution of higher education, %

COMPETITION	YEAR ADMITTED			TOTAL SAMPLING
	1993	1994	1995	
Less than 1 person per vacancy	0	4	0	2
1-2 persons per vacancy	27	9	33	17
2-3 persons per vacancy	31	45	33	39
3-5 persons per vacancy	5	15	22	12
Hard to say	36	28	11	31
Total sampling	100	100	100	100

Even in the areas of strongest competition among the surveyed students there was, in fact, very limited competition for positions, averaging three to five persons per vacancy. Only in the last few years has there been a trend toward increased competition. In 1993, only 5 percent of respondents entered an advanced school in which competition for places averaged three to five persons per vacancy. In 1995, that percentage was 22 percent. It follows that low competition for positions means reduced entrance requirements, which in turn results in lower professional standards of graduates.

8.2. Economic Situation and Professional Standards of Young Specialists

In the present economic situation, 75 percent of students are forced to work while they are in school. This adversely affects their grades (table 8-2).

Table 8-2. Making money on the side and average grades, %

DID THE STUDENT MAKE MONEY WHILE STUDYING?	GENERAL ACADEMIC RECORD			TOTAL SAMPLING
	Mostly satisfactory	Mostly good	Mostly excellent	
Yes	82	75	63	76
No	18	25	38	24
Total sampling	100	100	100	100

There is a clear and direct correlation to working and grades: students are less likely to have excellent or good grades if they work at outside jobs. The adverse effect of outside work on students' average grades is corroborated by the data in table 8-3.

Table 8-3. Proportion of time spent on outside work and on studying and average grades, %

PROPORTION OF TIME SPENT ON STUDYING AND ON OUTSIDE WORK	GENERAL ACADEMIC RECORD			TOTAL SAMPLING
	Mostly satisfactory	Mostly good	Mostly excellent	
Studying took more time than outside work	56	83	100	76
Studying took approximately as much time as outside work	38	17	0	22
Studying took less time than outside work	6	0	0	2
Total sampling	100	100	100	100

As can be seen, students who received mostly excellent grades spent more time studying than making money on the side. By contrast, nearly half of those who received mostly satisfactory grades spent as much or more time on outside work as on studying.

8.3. Graduates' Plans

Because the surveyed institutions of higher education specialize in training personnel for the nuclear industry, it is important to have an idea of graduates' attitudes toward working in closed cities (table 8-4). Let us look particularly at the response, "No, under no circumstances." In all, 43 percent of the respondents do not plan, under any circumstances, to work in closed cities, and there is a trend upward in that number. Approximately one-third of respondents would plan on doing so, but only under certain conditions, one of which, naturally, is that current levels of remuneration in closed cities change for the better.

Table 8-4. Students' attitudes toward working at nuclear industry enterprises in closed cities, %

WOULD YOU WORK AT A NUCLEAR INDUSTRY ENTERPRISE IN A CLOSED CITY?	YEAR ADMITTED TO COLLEGE OR UNIVERSITY			TOTAL SAMPLING
	1993	1994	1995	
Yes, under certain conditions	30	41	33	33
Yes, but only in Moscow	6	0	0	3
No, under no circumstances	41	44	67	43
Hard to say	24	16	0	20

About 90 percent of the students intend to work in Russia upon graduation, and the rest are going to continue studying (table 8-5). Significantly, not one of the respondents expressed a desire to work or study abroad. Apparently, the belief that a majority of students in Russia are eager to emigrate to the West is unfounded.

Students' academic achievements have an evident influence on their plans. The share of those who would like to continue their education among the students who received mostly excellent grades is nearly four times as large as the respective share among those who received mostly good grades, and eight times as large as it is among those who received mostly satisfactory grades.

Table 8-5. Students' plans and average grades, %

PLANS	GENERAL ACADEMIC RECORD			TOTAL SAMPLING
	Mostly satisfactory	Mostly good	Mostly excellent	
Continue studying	5	11	38	13
Work in Russia	90	89	54	87
Hard to say	5	0	8	2
Total sampling	100	100	100	100

Our surveys indicate that the better a student did, the greater the probability that he or she will take a job at a state enterprise (table 8-6). This phenomenon can be explained by the fact that students receiving mostly satisfactory and good grades have much closer connections with private business as a result of doing outside work during their years in school. For the time being, work in private business does not call for the same high professional standards required at state enterprises. This circumstance holds out hope that state enterprises stand a good chance of getting better specialists than private businesses can get, but they are letting the opportunity slip by.

Table 8-6. Students' intended place of work and average grades, %

WHERE WOULD THE STUDENT LIKE TO WORK UPON GRADUATION?	GENERAL ACADEMIC RECORD			TOTAL SAMPLING
	Mostly satisfactory	Mostly good	Mostly excellent	
Preferably at a state enterprise	5	22	62	22
Preferably at a private business	41	33	15	32
Makes no difference	55	44	23	43
Hard to say	0	2	0	1
Total sampling	100	100	100	100

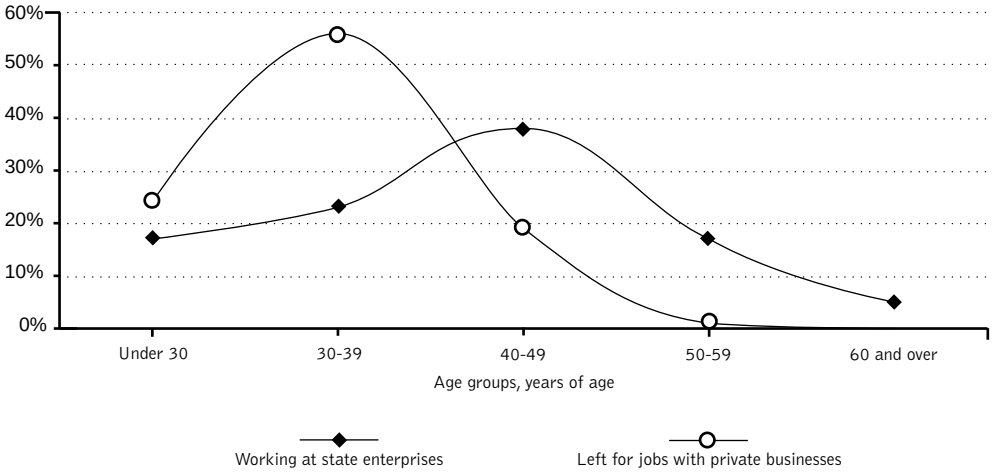
9. NUCLEAR SECURITY AND PERSONNEL

9.1. Aging of the Work Force

The survey has shown that the makeup of the state enterprise work force is changing. In particular, employees are getting older, and there is a reduced inflow of younger employees. About 45 percent of respondents noted these two factors.

The aging of the work force stems from a lack of natural rollover of generations. The number of elderly people who retire on pension is greater than the number of young people who are available to take their jobs. The most productive people in terms of developing science and production thus are leaving the enterprises. These specialists (between the ages of thirty and forty) are quitting their jobs at defense enterprises to take jobs in private business. In figure 9-1 one can clearly see that the share of specialists under forty years of age among those who take jobs at private business entities is several times greater than the share of specialists of the same age who continue to work at state enterprises. This indicates an increased intensity in outflow of this group from state enterprises.

Figure 9-1. Distribution by age of those who are working at state enterprises and those who have left to take jobs with private businesses, %



More than one-third of respondents cited specialists' taking jobs with private business as a cause of the deterioration of personnel composition at state enterprises. At the same time, only 1 percent of respondents named emigration to other countries as a factor adversely affecting personnel composition. Thus, in the opinion of the specialists themselves, it is people leaving jobs at state enterprises to take jobs in private business that constitutes the principal threat to the personnel composition of state enterprises.

Table 9-1 shows how moonlighting done for domestic income (trade, work in private business, fulfilling domestic orders, work under research grants, etc.) and for foreign income (foreign orders, foreign research grants, etc.) affects specialists' main work.

Table 9-1. Effect of moonlighting for domestic and foreign income on specialists' main work, %

IF YOU ARE MOONLIGHTING, WHAT EFFECT DOES IT HAVE ON YOUR MAIN WORK?	MOONLIGHTING FOR FOREIGN AND DOMESTIC INCOME		
	Foreign	Domestic	Foreign and domestic
Beneficial	92	16	52
Mutually beneficial	5	0	0
None	2	58	37
Hard to say	0	19	11
Adverse	0	5	0
Total sampling	100	100	100

As can be seen from table 9-1, nearly 90 percent of those doing outside work for foreign income believe that it has a beneficial effect on their main work. By contrast, only one-sixth of specialists note that the work they do outside for domestic income has a beneficial effect on their main work. This can be explained by the fact that the majority of domestic extra

work is outside a specialist's profession and educational background. Thus, foreign money, in fact, has a beneficial, stabilizing effect on the work of enterprises in closed cities, making it possible for a substantial share of specialists to continue working within their profession.

9.3. Foreboding of a Catastrophe

Forty percent of respondents believe that negative changes in the personnel makeup of their enterprises have already adversely affected the country's nuclear security (table 9-2). Over 53 percent think that such an effect will be felt in the near future, and one-third of them are of the opinion that it will happen in the distant future. Only 5 percent of respondents believe that the changes now under way will not affect Russia's nuclear security.

Table 9-2. Can negative changes in specialist personnel makeup of an enterprise adversely affect the nation's nuclear security?, %

	PERCENT
Yes, they can in the very near future	53
They have already affected it	40
Yes, they can in the distant future	34
Hard to say	11
No, they cannot affect it	5