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**THE IMPACT OF COAL MINING LIQUIDATION
ON POPULATION STRUCTURE IN THE SELECTED
REGIONS OF RUSSIA AND UKRAINE**

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Key words: economy, reforms, population structure, migration.

A b s t r a c t

The goal of this paper is to present the changes of population structure in coal mining region. Such changes were born by the economic reforms. The study was based on the two typical coal mining regions in Russia and Ukraine. The correlation indicator was used in order to present the study results. The close attention was paid to the factors which reduce the migration. The most important changes were noted among workers in productivity age. They were the most willing to change the place of living and look for a job in other places and different sectors of the economy.

**WPLYW LIKWIDACJI KOPALŃ WĘGLA KAMIENNEGO NA POZIOM I STRUKTURĘ
ZASOBÓW PRACY NA PRZYKŁADZIE WYBRANYCH REJONÓW ROSJI I UKRAINY**

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Słowa kluczowe: gospodarka, reformy, struktura demograficzna, migracje.

A b s t r a c t

Celem artykułu jest przedstawienie zmian w strukturze demograficznej zagłębia górniczego wywołanych reformami gospodarczymi. Badano zmiany w typowych górniczych regionach Rosji i Ukrainy. W badaniach posłużono się wskaźnikiem korelacji rang. Zwrócono uwagę na czynniki ograniczające migrację ludności. Największe zmiany w populacji dotyczą grupy osób w wieku produkcyjnym. Ta grupa społeczna najchętniej jest gotowa do zmiany miejsca zamieszkania i poszukiwania zatrudnienia w innych sektorach gospodarki.

Transformation in the Central and Eastern Europe

The 1990s were the period of fundamental transformations in the countries of Central and Eastern Europe. The operational environment of enterprises was subject to transformations and entirely new market institutions were established. Implemented reforms were characterized by wide scope and covered all sectors of the economy. In the countries of Central Europe the process of transformations can be presented using a general diagram.

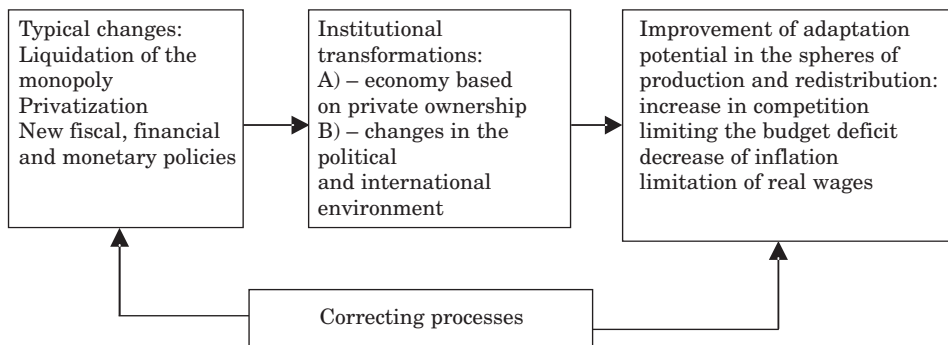


Fig. 1. Process of transformation in the countries of Central and Eastern Europe during the 1990s
Source: Own work based on KORNAI (1998).

The diagram presented presents the processes taking place in general terms only as the individual countries differ in the pace, rate and time of reforms implemented. Additionally, each of the analyzed cases (despite numerous similarities) is characterized by a different baseline. The adjusting reforms are also different. On the other hand, nevertheless, there are many similarities. One of them is the process of limiting the role of the state in the economy and reforms in those sectors where a significant share of budget subsidies was recorded. Those sectors were also characterized by excess employment and disregard for (or at least limited regard) for economic account. Mining was a typical example of such a sector during the period of centrally planned economy. Individual mines were assessed on the basis of the production accounting. The targets met were the base while the financial results were of secondary importance. During the transformation period that sector of economy required a special approach as it was the basic source of energy. In Central and Eastern Europe countries coal provided almost 80–90% of energy (World Bank Indicators 2001). At the same time the coal sector was a significant burden to state expenditures. During the years 1990–1995 the budget of

Ukraine or Rumania in an average year allocated ca. 3,5–4% of the year revenues for subsidizing of that sector (*Ukraine Coal Industry Restructuring* 1996). In the economy of shortages, mining also represented a significant component of the labor market. In 1992 in Russia, mining employed almost 980,000 people and in Ukraine almost 400,000 (ARTMIETEV, HANEY 2002). Implementation of transformations without an appropriate mitigation program involving government support would lead to serious economic and social consequences and in practical terms would make the transformations rather unrealistic. For those reasons the vast majority of the Central and Eastern European countries initiated implementation of reforms in the mining sector with some concerns.

Goal of the work, research methods, hypothesis and assumptions made

The basic goal of the work is to present the influence of the mining sector reform on the regional demographic structure. The complementary goal is to verify the influence of the individual components of the program on the size of employment in the mines. The research material covered four areas – typical mining regions situated in two countries: Novoshhtinsk and Anzero-Shudzensk in Russia and Gorlovka and Stakhanov in Ukraine. The following hypothesis was formulated – the reforms implemented in the mining sector result not only in changes in the employment levels but also influence the demographic situation in the region. Making the assumption that not all proposals of changes will prove equally effective was a consequence of the hypothesis formulated in that way. Some of the redundant miners will be forced (as a consequence of lack of employment opportunities) to search for employment outside their traditional domicile. As a consequence of government subsidies limitation and increasing the role of economic accounting a number of mines will be closed while in the others employment restructuring will take place. The above actions will influence the demographic structure of the mining region. The rank correlation coefficient was applied for investigating the relations between the identified characteristics. Although the so-called rank correlation method applies when the population is small, in this case the size of matched pairs of variables is highly similar and for that reason the method was applied (KRZYSZTOFIK, URBANEK 1986).

The coefficient computation method is represented by the following formula.

$$\delta = 1 - \frac{6 \sum D^2}{N(N^2 - 1)}$$

where:

δ – is the rank correlation coefficient,

D – difference between the rank of variants of a characteristic,

N – sample population.

As a complement to rank correlation the average deviation value was considered as computed from the following equation:

$$Dx = \frac{\sum |x^1 - \bar{x}|}{N}$$

where:

N – sample population, $\sum |x^1 - \bar{x}|$ an absolute value between the base variable (x^1), and the arithmetic average of the second characteristic \bar{x} .

The average deviation allows precise determination of the variability of the characteristic studied.

The drawing of conclusions was based on the inductive method – reaching general conclusions through verification of hypotheses based on empirical results. The paper uses the papers of The World Bank, first of all the Report by M. Haney and M. Shkaratan Mine Close and its Impact on the Community. Policy Research Working Paper No. 3083 of June 2003 and statistical data of the Central Statistical Office in Warsaw and the International Monetary Fund in New York. The study covers the years 1995–2003.

The case of Russia

In 1966, the government of Russia embarked on the special program for the employees of shut down mines. The case of Russia deserves particular attention because of the following conditions:

- high (even up to 60%) share of administrative staff in coal mines,
- low level of education of the miners (35% were just trained for the work, 38% possessed vocational education and only 28% possessed secondary or tertiary education) (FRIEBEL, GURIEV 1999),

- high incidence of accidents. During the years 1990-1996, 45,761 miners were victims of accidents in the mines. That result is based on the officially reported cases (*Russian Federation. 1997*).

The support program for the employees of shut down mines was generally based on foreign funds. During the years 1996-2003, the government of Russia obtained a loan for the above purpose from the World Bank amounting USD 1.3 billion and from the Japanese Bank for International Cooperation amounting USD 800 million (ARTMIETEV, HANEY 2002).

The Kuzbas basin is considered a typical mining region in Russia. The areas of Anzero-Sudzhensk and Novoshakhtinsk belong to the Komerowo district, which is an integral part of Kuzbas. Both areas suffered significantly from shut down of mines and were encompassed by the government support program.

Table 1
Number of mines closed in the area of Anzero-Sudzhensk and Novoshakhtinsk and changes in the levels of employment during the years 1996-2003

Region	Population		Mines closed	Share (%) of miners in total employment in 1996	Share (%) of miners in total employment in 2003
	1996	2003			
Anzero-Sudzhensk	136 000	86 000	2	37	14
Novoshakhtinsk	134 300	137 400	5	29	14

Source: Own work based on A. Corning Social impact monitoring of coal sector restructuring in Russia: a statistical analysis of survey results from 1996-2003. World Bank. Washington 2004.

In the area of Anzero-Sudzhensk 2 mines were shut down. As a consequence 13,766 people lost employment. The decision contributed to decreasing the share of miners in the total employment from 37% to 14%. The liquidation of mines caused a significant decrease in the number of residents in the region from 136,000 to 86,000. Liquidation of 5 mines in Novoshakhtinsk caused similar effects. 31,433 people lost their jobs and the share of miners in total employment decreased from 29% to 14%. However, during the years 1996-2003, the population increased from 134,300 to 137,400 respectively. Similar amount per one employee were allocated to support programs in both locations. During the studied period the total of USD 11.3 million was allocated to general support in Anzero-Sudzhensk area while in the area of Novoshakhtinsk that amount was USD 41.7 million (ARTMIETEV, HANEY 2002). Novoshakhtinsk basin deserves particular consideration as it received a special development strategy focused on support to small and medium enterprises. The program started in 1996 and during the same year the business incubation center was established that assumed a wide range of training and financial support to discharged miners. It should be highlighted that the region of Novoshakhtinsk was characterized by significant political stabilization and as

a consequences there were no changes of limiting the funds for the strategy developed. The support program for the miners from shut down mines consisted of the following components:

– consultations, training, public works, loans for establishment of own business, transfer to other mines, administrative creation of new jobs.

Each program component was then compared with the number of jobs created to allow determining the relations between the specified characteristics. The relations were measured using the rank correlation coefficient. The studies covered the areas of Anzero-Sudzhensk and Novoshakhtinsk.

Table 2
Value of rank correlation coefficient and average deviation depending on the aid program and creation of new jobs during the years 1996–2002

Aid program	Creating of new jobs		Average deviation Dx	
	Coefficient value Anzero-Sudzhensk	Coefficient value Novoshakhtinsk	Anzero-Sudzhensk	Novoshakhtinsk
Consultations	0.34	0.72	110	36
Training	0.36	0.77	98	54
Public works	0.91	0.81	36	22
Loans to start up own business	0.22	0.82	230	26
Move to another mine	0.92	0.11	26	13
Administrative creation of new jobs	0.91	0.91	81	22

Source: Own computations based on I. Artmietev, M. Haney. The Privatization of the Russian Coal Industry: Policies and Processes in the Transformation of a Major Industry. Policy Research Paper. World Bank. Washington 2002.

The values of rank correlation coefficients and the average deviations fluctuated depending on the support program and the area. In case of Anzero-Sudzhensk area a strong correlation (in excess of 0.9) was recorded in three cases, i.e. administrative creation of jobs, public works and transfer to another mine. In those cases the rank correlation coefficients were 0,91 and 0,92 respectively. No correlation was found in case of consultations, training and loans where the coefficient values did not exceed 0.4. That result proves poor correlations between the outlays and effects in the form of creating new jobs. The above distribution of results leads to another conclusion indicating significant diversification of effects depending on the region. In the area of Anzero-Sudzhensk the programs that ended in a success were those based on administrative decisions while the measures based on creating jobs by the miners themselves ended in a failure. The situation in the area of Novoshak-

htinsk was different. The loans for establishment of own businesses should be considered an important instrument in parallel to the administrative creation of jobs. The rank correlation coefficient was 0.82, which indicates important relations between the characteristics tested. Similarly high values were reached by the coefficients for consultations and training at 0.72 and 0.77 respectively. That later data in particular highlight the necessity of delivering a wide program of training and consultations. The educational preparation of the miners to take up employment outside the sector is low. Establishment of own business activity, in particular, requires acquisition of new knowledge, which is provided by the appropriate program of training. The difference in the average deviation level is also worth noticing. In the area of Anzero-Sudzhensk it is at least twice higher than in Novoshakhtinsk. The value of the average deviation for the program of training reaching the level of 110 indicates that the outlays for creating new jobs differed from the average by, in average, USD 110. In the area of Anzero-Sudzhensk the average deviation was almost 4 times higher than in Novoshakhtinsk. A similar difference occurred in case of the administrative creation of new jobs. A very significant disproportion occurred in case of the loan for establishment of own business activity. In Anzero-Sudzhensk it was 230 while in Novoshakhtinsk it was almost 9 times smaller. The above data is complemented by share of individual components in the overall program of creating jobs.

Table 3
Share of outlays on individual components of the jobs creating program depending on the region during the years 1996–2003 (%)

Program	Area	1996	1997	1998	1999	2000	2001	2002	2003
Consultations	Anzero-Sudzhensk	1	0	1	2	2	1	0	1
	Novoshakhtinsk	21	22	19	22	20	19	17	16
Training	Anzero-Sudzhensk	3	2	6	7	8	8	7	7
	Novoshakhtinsk	20	17	25	25	23	22	24	23
Loans	Anzero-Sudzhensk	5	7	7	8	6	5	7	8
	Novoshakhtinsk	17	11	21	19	23	21	22	21
Public works	Anzero-Sudzhensk	41	39	42	44	43	41	41	43
	Novoshakhtinsk	21	23	22	18	18	17	19	19
Move to another mine	Anzero-Sudzhensk	45	43	39	35	33	31	32	31
	Novoshakhtinsk	9	11	10	9	11	9	11	18
Administrative creation of jobs	Anzero-Sudzhensk	5	9	5	4	8	14	13	10
	Novoshakhtinsk	29	16	3	7	5	12	7	3

Source: Computations based on M. Haney and M. Shkaratan Mine Close and its Impact on the Community. Policy Research Working Paper No. 3083 of June 2003 and World Bank Indicators 2004.

The shares of outlays on individual components of the program of creating jobs for the miners from liquidated mines change depending on the region. In Anzero-Sudzhensk the basic funds were allocated to public works, transfer to other mine and administrative creation of new jobs. Almost 90% of all the funds was allocated to those components. During the years 1996–2003 the above distribution of outlays remained in practical terms on unchanged levels. The area of Novoshakhtinsk is outstanding as a consequence of the high share of outlays on consultations, training and loans. They captured ca. 65–80% of all the funds allocated for creating new jobs. Transfers to other mines played a smaller role. During the years 1996–2003, from 9% to 18% of outlays were allocated for that component. The outlays on administrative creation of jobs decreased significantly. In 1996 they represented as much as 29% of all the outlays while in 2003 just 3%.

Table 4
Number of jobs and cost of creating a work place based on the program during the years 1996–2003
(in K. RUB)

Sector	Anzero Sudzhensk	Novoshakhtinsk	Work place cost Anzero Sudzhensk	Work place cost Novoshakhtinsk
Construction	188	869	87.7	83.5
Machine industry	125	421	99.3	99.1
Timber industry	99	344	131.4	101.4
Food processing	98	322	112.1	108.3
Trade	88	299	117.8	100.1
Transport	83	211	101.8	99.7
Telecommunication	35	208	191.9	190.1
Agriculture	11	77	96.7	103.3
Other	89	644	–	–

Source: M. HANEYA, M. SHKARATAN.

The largest numbers of jobs were created in those sectors that can be considered coherent with the mining sector. Construction, machine and timber industries were able to assimilate new staff relatively efficiently. Numerous mining professions (e.g. carpenter, fitter, operator) did not require long-term training for reskilling¹. For that reason, indifferent of the region, almost 50% of the new jobs were created in those sectors of economy. Significantly smaller

¹ Evaluation of long – term viability of enterprises which receive support to create new jobs in the context of Local Development Programms, and analysis of the socio-economic characteristics of the jobs created in 1988–2000. Coal Sector Implementation Project. Moscow 2001.

potential was recorded in the sectors that, as a consequence of their specificity, require appropriate vocational preparation. Here transport, telecommunication and agriculture should be included. In the area of Anzero-Sudzhensk only 11 jobs were created in agriculture while in Novoshakhtinsk just 77. Those were the lowest results among the analyzed sectors of economy. Transport and telecommunication in Anzero-Sudzhensk managed to accept 83 and 25 miners respectively. In Novoshakhtinsk those sectors employed 211 and 208 of them respectively. The cost of creating a single job confirms the potential of easy reskilling of redundant miners for work in construction and machine industry. In construction industry that cost was within 83.5–87.7 K RUB while in the machine industry it reached around 99 K RUB. The above costs are among the lowest. The highest costs were those in telecommunication sector where the cost for one job created in Anzero-Sudzhensk was 191.9 K RUB and in Novoshakhtinsk 190.1 K RUB. High costs were recorded in agriculture as creating a job in that sector in Anzero-Sudzhensk cost 96.7 K RUB and in Novoshakhtinsk 103.3 K RUB, which was almost 20 K RUB more than in construction industry. The numbers of new jobs created for miners from shut down mines influenced the demographic structure of the region.

Table 5
Demographic structure of Anzero-Sudzhensk and Novoshakhtinsk areas in 1996 and 2003 (%)

Area	Structure	1996	2003	Difference
Anzero-Sudzhensk	women	40.6	56.5	15.9
	men	59.4	43.5	15.9
	Up to 18 years	12.2	15.6	3.4
	18–30	34.8	16.8	18
	31–55	39.1	27.9	11.2
	Over 55 years	13.9	39.7	25.8
Novoshakhtinsk	women	44.1	43.4	0.7
	men	55.9	56.6	0.7
	Up to 18 years	14.3	16.7	2.4
	18–30	32.4	33.7	1.3
	31–55	41.3	38.4	2.9
	Over 55 years	12	11.2	0.8

Source: Own work based on A. Amit Z. Tzannos. Active Labor Market Programs: A review of the Evidence from Evaluations. World Bank Social Protection Discussion Paper. January 2004.

During the years 1996–2003 the demographic structure in the area of Anzero-Sudzhensk was subject to major changes. The share of women in the population increased from 40.6% to 56.5% while the share of men in typical productive age group of 18–55 decreased significantly – by almost 15%. The

share of people over 55 years increased from 13.9% in 1996 to 39.7 in 2003, which gives the difference of 25.8%. The demographic structure in the area of Novoshakhtinsk remained practically unchanged. The differences concerning individual age groups were within the narrow range of 0.7 to 2.9%. The above disproportions should be considered of marginal size not influencing the population structure (ROGOZIŃSKI 1991). The results obtained allow drawing the following conclusions:

- creating jobs for miners from shut down mines requires establishing a special support program,
 - the jobs are created the fastest in those sectors that can be considered similar to mining as concerns the qualifications of employees (e.g. construction, machine industry),
 - the active form, i.e. establishing own business, training and consultations, should be considered the effective measures for creating jobs,
 - lack of support program causes a decrease in mining basin population.
- The area is left by people in productive age who can find jobs outside the traditional place of residence the fastest.

The case of Ukraine

As opposed to Russia, Ukrainian authorities did not develop a special support program for miners from shut down mines. As a consequence of budget constraints in mid-1990s a decision on liquidation of unprofitable enterprises was taken (*Ukraine Coal Industry Restructuring* 1996). During the years 1990-1996, in Ukraine, the subsidies to the mining sector averaged 4% of the state revenues per year (World Bank Indicators 2000). Additionally, coal mines were based on outdated technologies and in the vast majority they were unprofitable. In 1996, the government accepted the program to shut down 20 unprofitable mines. Gorkovka and Stakhanov are typical areas situated in the largest Ukrainian coal basin – Donbas. In Gorkovka 3 out of 6 existing mines and in Stakhanov all 4 existing mines were shut down.

Table 6
Number of shut down mines in Gorkovka and Stakhanov areas and changes in the level of employment during the years 1996–2003

Area	Population		Mines closed	Share (%) of miners in total employment in 1996	Share (%) of miners in total employment in 2003
	1996	2003			
Gorkovka	338 100	210 300	3	25	4.4
Stakhanov	112 300	97 000	4	19	0.4

Source: Own work based on – Ukraine: Employment. 2004.

Liquidation of mines caused a decrease in the population and a change in the structure of employment. The largest changes occurred in Gorkovka. In 1996 the number of residents was 338,100 while in 2003 only 210,300. Definitely smaller changes occurred in Stakhanovka with the decrease from 112,300 to 97,000 residents. At the same time the share of miners in total employment decreased. In Gorkovka in 1996 it was 25%, while in 2003 only 4.4%. In Stakhanovka, as a consequence of liquidation of all four mines the share of miners decreased practically to zero.

The demographic changes in the mining areas and changes in the employment patterns were under the major influence of industrialization of the Donbas basin. This is a strongly urbanized (ca. 85% of urban population) area with numerous manufacturing plants. In Gorkovka, in addition to heavy industry, a strong center of pharmaceutical and chemical industry exists. It is also situated in the vicinity of the large urban agglomeration of Donieck. The situation is similar in Stakhanovka. In that area machine and food industry plants are located. For that reason, despite lack of the support program for the released miners the possibilities of finding a different job (outside the mining sector) existed in the region.

Table 7
Share of individual sectors in employment of released miners during the years 1996-2003 (%)

Sector	Gorkovka	Stakhanovka	Work in Gorkovka area	Work in Stakhanovka area
Construction	21	23	46	81
Machine industry	19	11	40	91
Timber industry	11	10	44	83
Chemical industry	14	9	49	77
Light industry	7	9	48	86
Trade	6	8	46	88
Food processing	5	4	32	87
Transport	5	4	31	92
Telecommunication	4	4	34	92
Agriculture	3	2	37	10
Other	5	16	38	81

Source: *World Bank Indicators*. 2004.

Similar to Russia, also in Ukraine the released miners took jobs in typical sectors of economy such as mainly construction, machine, timber and chemical industries. Practically, 80% of the released miners found employment in those sectors. In Gorkovka the share of chemical industry was significant at 14%. This results mainly from the significant number of plants of that sector in the

area. The remaining sectors offered employment for narrow groups of released miners. Depending on the sector, new employment was found there by from 3 to 9% of the released miners. The above distribution of results is typical for each case analyzed. The different results were found as concerns the area covered by search for employment. In Gorkovka area less than a half of the released miners found employment in that area. The largest opportunities were offered by the chemical industry and almost 50% of miners took jobs in chemical plants in the area of Gorkovka. Equally high shares were recorded in case of machine, light, timber and construction industries. On the other hand work in transport, telecommunication and agriculture in that area was taken by less than 40% of the miners. The area of Stakhanovka offered larger employment opportunities. The vast majority of those searching for jobs found employment near to their former places of work. In the area of Stakhanovka 92% of the released miners took jobs in transport and telecommunication. The share of the machine industry is equally high. Construction and light industry secured employment for 81% and 86% of the released employees of the mines respectively. The above distribution of results influenced the decrease in the numbers of residents. As a consequence of lack of employment opportunities, almost 120,000 residents left the area of Gorkovka. Such a large decrease in population was caused by the limited offer of employment in the existing mines and other sectors of economy. The area of Stakhanovka also experienced the changes caused by shut down of all the mines. The number of residents decreased from 112,300 people in 1996 to 97,000 people in 2003 – a decrease by 15,300 residents, i.e. 12% of the total population. However, the absorptive labor market prevented a more pronounced decrease in population.

Table 8
Demographic structure of Gorkovka and Stakhanovka areas in 1996 and in 2003 (%)

Area	Structure	1996	2003	Difference
Gorkovka	women	51.1	55.7	0.6
	men	48.9	44.3	4.6
	up to 18 years	17.1	16.2	0.9
	18–30	24.2	12.2	12
	31–55	28.9	24.4	4.5
	over 55 years	29.8	47.2	17.4
Stakhanovka	women	49.9	50.7	0.8
	men	50.1	49.3	0.8
	up to 18 years	14.8	15.6	0.8
	18–30	29.7	31.5	1.8
	31–55	31.8	34.8	-3
	over 55 years	23.7	18.1	-5.6

Source: *Analysis of the implementation*. 2004.

During the years 1996–2003, the demographic structure in the area of Stakhanovka was not subject to any major changes. The share of individual age groups in the total population changed by within 0,8–5,6%. The largest difference occurred in case of the 55+ age group. A different distribution of results occurred in the area of Gorkovka. The productive age population group aged 18–30 emigrated the most often. In 1996, that group represented 24.2% of the entire population while in 2003 its share decreased to 12.2%.

Conclusion

Industrial areas dependent on a single economic sector are subject to major migration fluctuations. Not only the size, but also the structure of the population changes. That phenomenon emerged during the years 1996–2003 in Ukraine and Russia during the period of liquidation of hard coal mines. The mining regions are left by people in the production age group of 18–30 years. Monoculture based coal basins offer few opportunities for employment outside that sector. As a consequence the population migrates to other centers, which has direct influence on population structure. The appropriate support program is the factor mitigating those changes. On the base of correlation between individual components of the program and the number of new jobs it was established that the:

- outlays on training must focus on similar industries (e.g. construction, machine industry),
- administrative measures in the form of intervention work or transfer to work in other mines do not offer long-term benefits,
- outlays on training allowing acquisition of entirely new qualifications differing significantly from those of a miner (e.g. timber industry, telecommunication) show low effectiveness. This results from relatively high outlays (almost twice higher than in e.g. construction) on one hand and does not generate an increased number of jobs on the other.

The adequate level of industrialization in the region is a circumstance supportive for retaining the population structure in case of liquidation of mines. The possibility of working in other sectors makes the released employees stay in their current place of residence. They take jobs even in the sectors far from the mining industry, e.g. chemical industry, transport or even telecommunication. Such a case was recorded in Ukraine in the Donieck basin. Liquidation of mines in the area of Stakhanovka resulted in minor migrations only. As a consequence, the structure of population in that coal mining basin remained practically unchanged. The conducted analyses also showed that the miners are unwilling to leave their current place of residence and take

employment in various sectors of the economy. The fundamental factor determining the migration is lack of alternative employment.

The problem of liquidation of unprofitable mines appeared not only in the Central and Eastern Europe but also in other coal mining basins. It is caused by strengthening of the market economy principles and limitation of the role of the state that was expressed by subsidies to unprofitable enterprises. The implementation of new extraction technologies, use of renewable energy sources and pressure of ecologists on natural environment protection will be the additional factors contributing to reduction of employment in mines. For that reason the experiences of Russia and Ukraine might be helpful as guidelines for the other countries.

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