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RESTRUCTURING OF THE COAL INDUSTRY IN ECONOMIES IN TRANSITION

(Summary note by the secretariat)¹

Introduction

1. The coal industry in economies in transition has undergone a difficult transition in the last ten years. It faced a host of unfavourable factors such as a sharp decrease in coal demand, a more

¹ The secretariat received contributions from the following countries: Bosnia and Herzegovina, Bulgaria, China, Czech Republic, Kazakhstan, Hungary, Poland, Romania, Russian Federation, Slovakia, Slovenia, Turkey, Ukraine and Yugoslavia. Although the submitted country contributions provided a wealth of data on the current restructuring process of the coal industry, their coverage was not always complete and the focus was often uneven. Thus, the ECE secretariat has tried to make the data compatible and comparable so that they could be aggregated and made subject to a time-series analysis. Some of the results of that work that are given in Table 1 and Table 2 provide a major basis for this document. At the same time, the restructuring data in their original form as submitted by transition economies are given in Annex 1. In addition to this relatively short summary note, the ECE secretariat has also produced eight separate reviews covering 10 individual countries: Bosnia and Herzegovina, Bulgaria, Czech Republic, Kazakhstan, Poland, Romania, Russian Federation, Slovenia and Ukraine, as well as China.

competitive energy regulatory framework, a gradual withdrawal of state from the industry, complex social, employment and environmental tasks and introduction of new technologies favouring gas-fired power stations. Simultaneous changes in the electricity sector increased uncertainty as to the future of the coal sector and opened a number of dilemmas not only for the coal company management but also for political decision-makers. It is clear that while in the past the local governments were in position to intervene in the electricity market in various ways, the coal industry will not be able to count on its assistance in a situation where the inflow of foreign direct investments is gaining momentum and strong privatisation trends seem to be unavoidable for most of the countries in the region. In addition, the coal industry has had to prepare itself for the liberalisation that is forthcoming in selected countries with economies in transition. It includes an obligation to move closer to a stand-alone industry operation with profitability and competitiveness as major goals, although in many cases they are not expected necessarily to be achieved in the short-term or even medium-term. Historically, the political nature of the coal industry has created additional pressures in the restructuring process.

2. To contribute to a better understanding of this complex and sometimes controversial process in a very demanding economic framework for countries with economies in transition, the ECE secretariat has continued to collect selected basic data such as coal production, number of mines and pits, employment, state subsidies, productivity trends and investments in the industry. A data series from 1990 to 2000 was constructed covering 12 countries.² This sample is certainly representative and reliable with regard to making appropriate general conclusions on the coal industry restructuring in countries with economies in transition. Those 12 countries had 75% share in the total coal production of Europe and the Commonwealth of Independent States. At the same time, the share of 11 transition countries in the sample (without Turkey) in the coal production in countries with economies in transition reached 96 % in 2000.³ While not considering this research and this short note as providing definite answers on the nature of the ongoing coal industry transition, it certainly might provide useful insights and serve as a basis for further work on this challenging and important issue. In particular the construction of more comprehensive data including selected technical and financial elements could lead to a more reliable and far-reaching conclusions than those available in this note.

Main indicators on coal industry restructuring

3. As before, the countries were requested to provide six basic industry data for the 1990-2000 period. Summary tables are presented in the main text, while individual country tables are given in Annex. A first look at the data for the countries in the sample might create a favourable impression:

2 It should be noted that Turkey is not considered to be a country with an economy in transition. But given its relative income level, it was deemed appropriate to continue the collection of the data on Turkey and to include it in this brief note. China was also not integrated into this report.

3 Estimated coal production in million tons of oil equivalent (mtoe) for the year 2000 was: Bosnia and Herzegovina 2.2, Bulgaria 4.5, Czech Republic 23.2, Kazakhstan 38.4, Hungary 3.8, Poland 68.1, Romania 5.4, Turkey 24.7, Russian Federation 115.8 and Ukraine 42.1. In the same year, the total coal production in Europe and CIS countries was 438 mtoe while the output of economies in transition amounted to about 340 mtoe. Source: BP Statistical Review of the World Energy, June 2001, p.32.

while the coal production, number of coalmines and open cast mines and employment are decreasing, productivity is gaining momentum (Tables 1 and 2). Thus, the coal industry is responding to the underlying market forces with a determination to improve its performances in multiple ways.

4. The coal production has decreased from 1059,6 million tons in 1990 to 705 million tons in 2000. The number of mines and pits was also reduced from 946 to 650 in the same period. However, the most dramatic change within the physical indicators of the restructuring concerns the size of employment: it was halved from 2.02 million to about 1.0 million workers. This process has been costly in many respects and domestic governments and selected international organisations and financial institutions have

provided appropriate financial support. The support is classified as indirect as opposed to previously widely exercised direct support at the company level. The financing has been needed to deal with sometimes devastating economic, social and environmental consequences of this sizeable coal industry contraction in the region. Related measures and incentives included financing of early retirement, acquisition of skills outside the industry and / or coal-related depressed region, incentives for attracting new employers in the coal industry areas, tax and other financial schemes, landscape restoration, small business loans and reduction of polluting emissions.

Table 1. Dynamics of the major indicators of the coal industry restructuring, 12 economies in transition, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	1059.6	882	771.2	733.1	698.2	673.6	704.9
Number of mines / pits	946	934	904	836	783	702	650
Employees in thousand	2020.5	1788.8	1520.9	1294.1	1153.3	1056.8	1014.6
State subsidies, 1990=100	100	57.7	38.2	23.1	41.2	23.3	7.5
Productivity growth, 1990=100	100	120.3	149.5	111.6	128.6	153.8	179.0
Investment, 1990=100	100	45.9	53.6	71.1	59.1	34.0	35.6

Note: Countries included: Bosnia and Herzegovina, Bulgaria, Czech Republic, Hungary, Kazakhstan, Poland, Romania, Russian Federation, Slovakia, Slovenia, Turkey and Ukraine. Yugoslavia excluded for technical reasons (See Table A-13).

Source: ECE secretariat based on data provided by Governments.

Table 2. Dynamics of the major indicators of the coal industry restructuring, 12 economies in transition, 1990-2000

Indicator	1990-2000 period	
	Total change in per cent	Average annual rate of growth in per cent
Coal Production	-33.5	-4.1
Number of mines / pits	-31.3	-3.8
Employees in thousand	-49.8	-6.9
State subsidies	-92.5	-25.8
Productivity growth	79.0	5.8
Investment	-64.4	-10.3

Source: ECE secretariat calculations based on the data in Table 1.

5. In a bid to make the coal industry profitable and competitive to foreign coal suppliers as well as to be able to weather tough inter-fuel competition, the Governments in the region dramatically cut their direct financial support to the companies. Direct financial support to coal enterprises is practically on the verge of disappearance being on average only at 12% of the recorded level in 1990 in six countries where it is still used. Furthermore, direct financial support to coal companies has either been discontinued or was never in place in six other surveyed countries (Chart 1).

6. Investments in the coal industry in economies in transition have declined sharply, about 65% in the last ten years. As the size of the decline is larger than the production or employment contraction, the industry might lack needed investments to improve its competitiveness, which in turn could jeopardise the coal restructuring process. Those risks might be high in particular in Russian Federation. The investments slowdown also reflects obvious difficulties of the major coal enterprises to generate substantial net income and free cash flows. Certainly, a slow pace of privatisation that would involve foreign investors appears to be another factor hindering the coal investments.

7. Labour productivity data, calculated from the supplied output and employment information, seem to reflect the lack of investment (Tables 3 and 4). While labour productivity so calculated did increase 32.5% in the 1990-2000 period, it might not look impressive in view of a large operational and financial slack present in the sector. Individual countries showed uneven progress in improving productivity (Charts 2 and 3). Selected countries such as Hungary and Romania and to some extent Turkey and Poland have taken a lead in the process with Ukraine and Slovakia somewhat lagging behind. However, the differences in relative investment levels among countries do not always correspond to the productivity disparity (Chart 4). Since for most of the countries it is not known how comprehensive and sufficient initial investment levels were at

the beginning of the last decade, it might well be that a large increase of a very low and inadequate investment could not push productivity upwards and vice versa.

Table 3. Additional indicators on labour productivity and investment, the coal industry restructuring, 12 economies in transition, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal production, 000t / employee/year	0.52	0.49	0.51	0.57	0.61	0.64	0.69
Labour productivity, 1990=100	100	94.0	96.7	108.0	115.4	121.5	132.5
Investment per Mt of produced coal – a synthetic indicator, 1990=100	100	63.9	80.9	74.6	81.9	48.5	50.4

Source: ECE secretariat based on the data in Table 1.

Table 4. Dynamics of the major indicators of the coal industry restructuring, 12 economies in transition, 1990-2000

Indicator	1990-2000 period	
	Total change in per cent	Average annual rate of growth in per cent
Coal production, 000t / employee/year	32.5	2.8
Labour productivity, 1990=100	32.5	2.8
Investment per Mt of produced coal – a synthetic indicator, 1990=100	-49.6	-6.9

Source: ECE secretariat calculations based on the data in Table 3.

8. A simple statistical analysis, based on the coefficient of correlation, of the major indicators is used to gain a further insight into the nature of the coal industry restructuring (Table 5). Probably the most striking result of the exercise is a negative relationship between production (Q) and both reported productivity (P) and calculated labour productivity (LP) in the region. While in a “normal” non-transition coal industry this relationship is expected to be most of the time significantly positive, the very nature of the analyzed coal industry makes the relationship negative: a decrease of coal overproduction to match market demand should be accompanied by cuts in operational slack such as cuts in excessive employment. Given comparatively low initial productivity levels, drops in coal production are accompanied by relatively robust productivity

increases. This conclusion remains the same regardless of whether reported productivity (P) or calculated labour productivity (LP) are used.

9. Recorded productivity increases are unfortunately not positively correlated with investments in the coal industry. Apart from the systematic closure of underground mines in favour of open cast mining in countries where it has been possible, the productivity gains are mostly the result of the reductions in the coal labour force and not at all a consequence of increased or adequate investment outlays. If continued, this negative relationship could well not only limit expected future productivity increases but also bring it to a halt in a medium-term. The lack of required investments in the coal industry in countries with economies in transition and the inability of the state to inject the funds are probably some of the reasons that privatization is high on the policy-making agenda.

Table 5. Correlation coefficients, coal industry restructuring indicators

	Restructuring indicator								
	Q	#	N	S	P	Q/N	LP	I	I/Q
Production (Q)	1	0.769	0.950	0.933	-0.664	-0.645	-0.645	0.744	0.664
Number of mines (#)		1	0.921	0.787	-0.770	-0.977	-0.977	0.649	0.738
Employment (N)			1	0.907	-0.709	-0.849	-0.849	0.680	0.679
Subsidies (S)				1	-0.748	-0.674	-0.674	0.773	0.769
Reported productivity (P)					1	0.689	0.689	-0.820	-0.737
Th tons / employee (Q/N)						1	1	-0.496	-0.622
Labour productivity (LP)							1	-0.496	-0.622
Investments (I)								1	0.911
Investments / production (I/Q)									1

Source: ECE secretariat calculations.

10. Although indicative of the underlying trends in the coal industry restructuring in countries with economies in transition, an interested reader might wish to broaden and deepen this short note and its indicators. Only then could an attempt be made to come to solid and well-established conclusions. The additional data on the financial health of the sector would be valuable in judging the quality of the industry transition as well as on the coal ability to compete on price and non-price terms in the wider energy market. Environmental and related technical developments in the

coal industry in the region should be known with more precision. Those data are important in judging whether the industry is converting to clean-coal technologies and if yes, to what extent.⁴ Available information on selected countries hint that the coal industry in economies in transition has started to embrace selected elements of clean-coal technologies but probably not on such a scale that would have desirable economic, social and environmental effects.

Conclusion

11. Based on the six major indicators on coal industry restructuring in economies in transition, the industry is progressing towards a more viable, efficient and socially acceptable activity. The required size of the adjustment and needed financial resources pose great challenges both to the interested governments and coal companies. The dependence on the foreign financial inflows as well as on selected foreign legislative steps that have an impact on the industry prospects makes the course and the length of the restructuring less predictable for all players involved. The complexity of the task increases with a widespread and far-reaching energy market re-alignment in Europe as a whole with a promising future only to those companies which are technologically, economically and financially strong and competitive.

4 For example, the EU is currently setting standards for SO₂, NO_x and particulate emissions from large combustion plants, including coal-fired power stations. Also, the EU decision on whether the coal and power industry from economies in transition could qualify for emission credits will influence their attractiveness for direct foreign investments. At the same time, sales of clean-coal technology systems that reduce the formation of NO_x have passed one US\$ billion in the USA. It is obvious that a switch to a more clean-coal based operation is costly and requires not only additional finance but also a supportive domestic and international regulatory and business environment.

ANNEX

Dynamics of the major indicators of the coal industry restructuring, selected countries with economies in transition, 1990-2000

Table A1. Dynamics of the major indicators of restructuring, Bosnia and Herzegovina, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	18.1	1.9	1.9	5.9	6.5	7.4	7.4
Number of mines / pits	15	14	14	14	14	14	14
Employees in thousand	30.1	9.9	8.9	19.5	17.7	20.6	17.5
State subsidies, 1990=100	0	0	0	0	0	0	0
Productivity growth, 1990=100	100	32.4	37.2	51.5	62.6	61.4	72.0
Investment, in million US\$	...	...	0	17	10	5	8

Table A2. Dynamics of the major indicators of restructuring, Bulgaria, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	-	30.2	31.9	30.6	33.33	26.0	27.0
Number of mines / pits	-	33	33	29	29	30	20
Employees in thousand	-	37.612	37.006	34.477	33.104	27.733	20.313
State subsidies, 1993=100	-	100	62.45	4.99	17.85	8.2	12.1
Productivity growth, 1993=100	-	100	107.41	110.48	125.46	139.8	220.1
Investment	-	n.a	n.a	n.a	n.a	n.a	n.a

Table A3. Dynamics of the major indicators of restructuring, Czech Republic, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	101	85	75	73	67	58	65
Number of mines / pits	47	35	26	19	18	16	16
Employees in thousand	110	88.6	80.5	69.7	65.5	44	41
State subsidies, 1999=100	100	none	none	none	none	none	none
Productivity growth	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Investment	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Table A4. Dynamics of the major indicators of restructuring, Hungary, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	17.6	14.6	14.6	15.6	15	14.5	13.8
Number of mines / pits	41	26	23	19	18	17	11
Employees in thousand	49	26.2	20.4	16.5	16	12.4	11.3
State subsidies, 1990=100	100	28	30	28	61	23	9
Productivity growth , 1990=100	100	152	191	214	236	273	284
Investment	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Table A5. Dynamics of the major indicators of restructuring, Kazakhstan, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	131.4	111.9	83.3	72.6	69.7	58.7	74.8
Number of mines / pits	40/14	37/14	39/17	34/17	31/17	38/24	37/24
Employees in thousand	88.9	86.6	77.0	48.1	47.0	45.7	51.1
State subsidies, 1990=100	...	0	0	0	0	0	0
Productivity growth, 1990=100	100	79.9	146.4	74.8	95.8	108.9	108.7
Investment in million US\$	...	...	...	69.2	25.8	21.1	22.5

Table A6. Dynamics of the major indicators of restructuring, Poland, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	147	130	135	137	121	109.1	102.2
Number of mines / pits	70	68	65	56	53	53	41
Employees in thousand	388	319.6	274.5	243.3	207.9	173.6	155
State subsidies, 1990=100	100	none	none	none	none	none	none
Productivity growth, 1990=100	100	109	133	153	160	174.5	198.3
Investment, 1990=100	100	147	145	118	112	111	111

Table A7. Dynamics of the major indicators of restructuring, Romania, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	37.6	39.7	41.1	33.4	26.2	22.9	29.1
Number of mines / pits	100/37	100/37	100/37	100/37	59/35	40/32	33/32
Employees in thousand	134	121	97	82	52.7	47.3	46.6
State subsidies, 1990=100	100	55.1	61.0	13.3	12.1	9.7	9.5
Productivity growth, 1990=100	100	107	140	113	175	172.5	222.5
Investment in \$ million	231.15	46.64	47.79	17.7	38.5	28.3	30.6

Table A8. Dynamics of the major indicators of restructuring, Russian Federation, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	395,4	305,9	262,8	244,4	232,3	249,1	257,9
Number of mines / pits	238/63	232/65	214/67	174/67	124/105	119/112	106/119
Employees in thousand	559.1	431.2	360.5	315.7	278.8	252.4	242.2
State subsidies, in %	n.a..	6.33	5.54	4.48	4.19	1.67	1.12
Productivity growth, 1990=100	100.0	70.9	73.7	86.8	94.1	110.2	118.1
Investment in \$ million	4,941	840	1313	1323	829	284	319

Table A9. Dynamics of the major indicators of restructuring, Slovakia, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	4.8	3.5	3.8	3.9	4.0	3.7	3.6
Number of mines / pits	5	5	5	5	5	5	5
Employees in thousand	15.1	15.5	10.1	10	9.8	8.8	8.0
State subsidies, 1990=100	100	27	11	10	11.5	14.0	12.0
Productivity growth, 1990=100	100	247	332	n.a	n.a	135	144
Investment, 1990=100	100	33	100	166	160	44	68

Table A10. Dynamics of the major indicators of restructuring, Slovenia, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	5.1	4.9	4.7	4.9	4.9	4.6	4.6
Number of mines / pits	3	3	3	3	3	3	3
Employees in thousand	7.6	6.3	5.5	5.4	5.2	5.1	4.2
State subsidies, 1990=100	100	100	92	n.a	152	120	-
Productivity growth, 1990=100	100	117	126	135	140	134	164
Investment in \$ million	28.7	16.3	21	25	25.3	23.7	19.3

Table A 11. Dynamics of the major indicators of restructuring, Turkey, State Coal Industry (TKI) only, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	36.8	38.7	33.5	35.9	38.3	38.6	39.2
Number of mines / pits	-	-	-	13	13	13	13
Employees in thousand	29.65	25.33	22.53	20.45	19.63	19.15	17.41
State subsidies	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Productivity growth	-	-	-	-	-	-	-
Investment in \$ million	46.33	22.0	4.39	21.3	14.9	6.71	6.40

Table A12. Dynamics of the major indicators of restructuring, Ukraine, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	164.8	115.7	83.6	75.9	80.0	81.0	80.3
Number of mines / pits	268/6	259/7	259/6	260/6	271/5	205/5	197/3
Employees in thousand	609	621	527	429	400	_**	_**
State subsidies, % of price	75.4	82.2	0	43.7	37.8	6.56*	5.73*
Productivity growth, 1990=100	100	67.7	59.1	65.9	68.5	74.8	79.3
Investment in \$ million	n.a	n.a	n.a	n.a	n.a	327.44	247

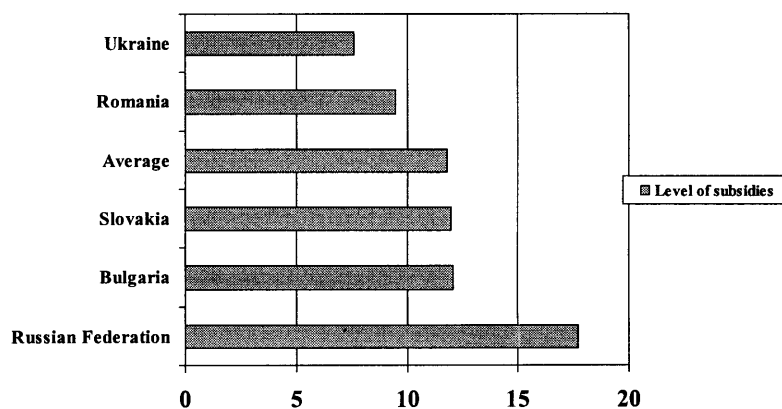
* in dollars per ton

** data provided for the year 2001 by the Ukraine authorities quote in total 530,000 employees

Table A13. Dynamics of the major indicators of restructuring, Yugoslavia, 1990-2000

Indicator	Year						
	1990	1993	1995	1997	1998	1999	2000
Coal Production, Mt	42.117	39.31
Number of mines / pits	12	12
Employees in thousand	23	23
State subsidies	0	0
Productivity growth, 1999=100	100	93.34
Investment	n.a	n.a

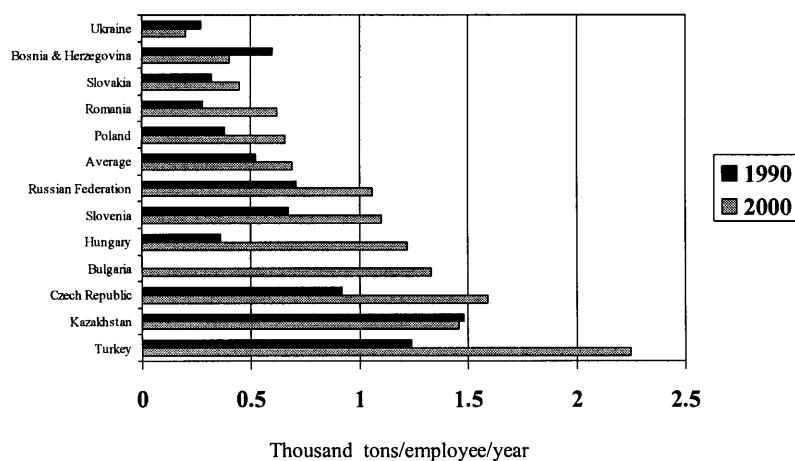
Chart 1. State subsidies to the coal industry, economies in transition in 2000, 1990=100



Note: In other four countries in the sample, the subsidies were discontinued

Source: See Tables 1 and 3 in the text.

Chart 2. Coal production, thousand tons/employee/year, economies in transition, 1990 and 2000



Source: See Tables 1 and 3 in the text.

Chart 3. Labour productivity in the coal industry, economies in transition, 2000, 1990=100

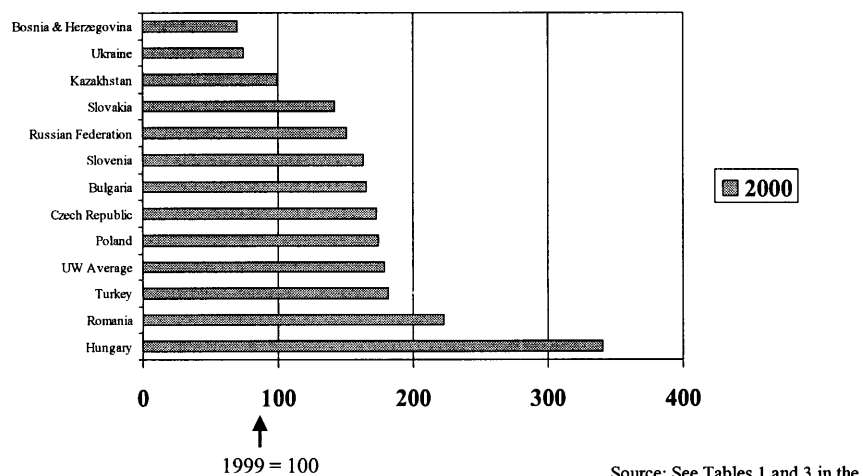


Chart 4. Investments per million tons of produced coal, selected economies in transition, 2000, 1990=100

