THE PACE AND PROCESS OF RESTRUCTURING: COAL MINES IN TRANSITION COUNTRIES

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ABSTRACT

Restructuring a state firm is often difficult, especially when it involves laying off a large number of workers. In this paper, we conduct a case study on two coal mining regions, Ostrava and Jiu Valley, in the Czech Republic and Romania. We evaluate the restructuring paths by measuring the value of labor both inside and outside miners. The efficiency loss of the actual path, as a percentage of the maximum feasible benefit of restructuring, was 9% in Ostrava and 27% in Jiu Valley. We explain the delayed restructuring in Jiu Valley as the combination of a genuine policy mistake under an uncertain environment; the desire of the conservative faction of the government to keep the miners as a political ally; and the behavioral condition of miners to fight for the status-quo.

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1. Introduction

Restructuring an inefficient state firm often poses difficulty, in particular when it involves laying off a large number of workers. The laying-off may be delayed, carried out only partially, or even reversed on occasion. In this paper we conduct a case study of such an episode in restructuring coal mines in the Ostrava region in the Czech Republic and the Jiu Valley region in Romania. We evaluate the efficiency of the restructuring paths in the 1990's, and assess the reasons for any inefficiency. Our analysis adds to our knowledge of reforming transition economies, and at a larger scale contributes toward understanding how and why some industries or economies transform while others do not.

In Section 2, we document the general facts of the restructuring experiences of the two regions. At the beginning of the 1990's, both of the two regions went through a sharp decline in coal production as the national industrial drive had ceased. Gradual restructuring, mostly downsizing of employment, followed in the Ostrava region. In the Jiu Valley region, on the other hand, there was no restructuring at all until 1997, followed by a massive layoff over two years. The layoff created a crisis in the regional labor market. The extreme swings of the Jiu Valley restructuring in contrast to the steady pace of the Ostravian restructuring provide an excellent case for inquiry in understanding the pace and process of restructuring state firm and of transforming regional economy.

In Section 3, We conduct a quantitative exercise in order to assess the efficiency of the restructuring paths in the two regions. We estimate the value of the (laid-off) miners' labor both inside and outside mining for various restructuring paths. We take the discounted sum of this value to be the measure of efficiency. We show that in both regions the most efficient path would have been a large-scale layoff over the first few years. The actual restructuring path of Ostrava was not far from the most efficient one whereas that of Jiu Valley was very much so: the efficiency-loss (i.e., the efficiency-gap between the most efficient and the actual paths) was 9% versus 27%.

In Section 4, we address the central question that arises from our quantitative exercise: why was restructuring delayed in Jiu Valley? The proximate reason is that the Romanian government of the early 1990's was ambivalent about restructuring and the miners were an active anti-reform force in national politics. At a deeper level, our study of the period reveal three key factors. First, there was a great deal of uncertainty about optimal policy in the early 1990's, which led to a genuine policy mistake. Second, the conservative faction of the government wanted to keep miners as a useful political force. Third, miners were behaviorally conditioned to fight against any erosion of the status-quo. These factors complement, rather than substitute, each other to form an explanation for the delayed restructuring.

2. Restructuring Experiences of The Two Regions

In this section, we describe the restructuring experiences of the two regions, Ostrava and Jiu Valley, based on, among other sources, the interviews that we conducted.[1] Each of the two regions is a well-defined geographic and economic zone that produces virtually all of deep-mined black coal in the respective country. In the 1980's, coal production was highly valued as a source of energy: the national production structure was skewed toward energy-intense heavy industries. With the beginning of transition came an abrupt decline in industrial production, which led to a sharp reduction in coal production. In Ostrava the reduction was in the order of 10 to 25 percent stretching over a couple of years; in Jiu Valley it was nearly 50 percent, all within the first year. Thus a sort of 'demand' shock set the stage for restructuring. Gradual restructuring, mostly downsizing of employment, followed in the Ostrava region. In contrast, in the Jiu Valley region there was no restructuring at all until 1997, followed by a massive layoff over two years. Tables 1 and 2 present the

[1] We interviewed government officials, mining company managers, union representatives, and researchers. Five interviews were in Prague and Ostrava in 2002, and fourteen in Bucharest, Jiu Valley, and Cluj in 2002 and 2003.

production and employment figures from 1990 to 2001.[2] Figures 1 and 2 visualize the strikingly different paths of restructuring between the two regions.

The different paths of restructuring between the regions mirrored those of national economy. The Czech Republic made a gradual but steady progress toward the market economy. Starting further away from the market economy, Romania undertook few reforms until a new government came to power in 1996. Between the two regions there was a marked difference in the miners' behavior toward restructuring. In the Ostrava region, the miners' union cooperated with the government - and the government consulted with the union - which led to a peaceful process of restructuring despite the significant decline in employment. In the Jiu Valley region, in contrast, the miners' union was not only against mining restructuring but was an active conservative force in national politics. Notably, miners made marches to Bucharest, called *mineriadas*, on several occasions to violently quell the progressive movement. In 1997, however, the new government managed to carry out the massive lay-off using a carrot and a stick: it provided a severance payment of up to 20 months of wage while keeping the charismatic union leader Miran Cozma in jail. When the released Cozma mounted another *mineriada* in 1999, the government outwitted him and put him back in jail for a 17 year sentence; the miners were finally defeated as a political force.

The gradual and steady path of the Ostravian restructuring resulted in a favorable unemployment experience for the ex-miners, whereas the delayed and massive layoff in Jiu Valley created a crisis in the labor market. This can be seen in the unemployment rates

[2] The improvement in labor productivity is largely due to downsizing. In particular, the Jiu Valley mines had a large slack in labor until 1997, given the large initial decline in output. Further, there was little investment in new technology in Jiu Valley throughout the period. Some Ostravian mines, however, adopted new technology in the early years, which contributed to the improvement in productivity.

presented in Tables 1 and 2.[3] Aside from the paths of restructuring, the contrasting unemployment situation stemmed in part from the initial condition. Jiu Valley is an isolated mono-industrial region, and could offer few opportunities to ex-miners. The Ostrava region had a larger and more diversified labor market, and could absorb layoffs with relative ease until the late 1990's, when the restructuring of the metallurgical industry strained the market. There was also a marked difference in the ex-miners' behavior toward job search. The Ostravian ex-miners took more initiatives for finding work and had a reputation for making good workers in new occupation. The Jiu Valley ex-miners, on the other hand, were more reluctant to accept low-wage work and had a tendency to protest for governmental help. Notably, following the massive layoff some ex-miners mounted a hunger strike in order to obtain benefits from the government, which became routinized subsequently (Dobrescu and Rughinis ???).[4]

3. Efficiency of The Restructuring Paths

The objective of this section is to quantitatively evaluate the efficiency of restructuring paths in the two regions from 1990 to 2001. We take the initial and the final mining employment to be given by the actual employment in 1990 and 2001, respectively, and consider various paths of layoff during the period. Given a layoff path, we estimate the value of the (laid-off) miners' labor both inside and outside mining. We take the discounted sum of this value to be the measure of social welfare. The optimal layoff path is then what

[3] We constructed these rates by subtracting official employment figure from the labor force. The official unemployment rates only measure registered unemployment, which underestimates unemployment during the downturn of the labor market. This problem was in particular clear and significant in Jiu Valley in the late 1990's. Incidentally, the official labor force is measured by summing up the official employment and unemployment figures. For the Ostrava region we fixed the size of labor force at the average over the period since there was little population growth or immigration during the period. For the Jiu Valley region the labor force was held at the average until 1996, and afterwards adjusted year-by-year by subtracting the significant net-immigration out of the region.

[4] The hunger strike should be understood euphemistically: most participants leave the protest site in the evening, presumably discontinuing hunger. Further, the participants consider granting of governmental benefits to non-participants as encouraging 'free riding,' which makes it clear that the participants perceive the strike as a legitimate means of obtaining *personal* benefits.

maximizes welfare, and the gap between this maximum welfare and that obtained under the actual path measures the inefficiency of the actual path. The detailed method of measurement is presented below.

3.1 Measuring the Value of Labor inside Mines

To measure the value of miners' labor in coal production, we start with the following production function:

$$Y_t = A_t K_t^{\alpha} L_t^{\gamma} \tag{1}$$

where Y_t is the output, A_t is the technology parameter, K_t is all non-labor input, including not only capital but also material, and L_t is labor input. To assess non-labor input during restructuring, we consulted the accounts of the dominant mining companies, the OKD in Ostrava and the CNH in Jiu Valley, for the 1993-2000 period.[5] The non-labor input share of output is on average .59 and .48, respectively, and there is no upward or downward trend in either company. Based on this, we assume that the observed shares are maintained throughout restructuring,[6] so (1) becomes:

$$Y_t = s^{\frac{\alpha}{1-\alpha}} A_t^{\frac{1}{1-\alpha}} L_t^{\frac{\gamma}{1-\alpha}} \tag{2}$$

where s denotes the non-labor input share.

The technology parameter A_t reflects factors such as the upgrading of equipment, the change in work practice, and the temporary impact of closing mines, which are important but not dominant aspects of restructuring in our case (see footnote 2). Since our focus is on

[5] The OKD produces about 80% of Ostravian coal, and the CNH is the only mining company in Jiu Valley.

[6] To elaborate on the rationale for constancy, it is plausible that the OKD could choose output and non-labor input (but not labor input) throughout the period. Then the marginal product of non-labor input would have been equal to the input price level, which implies that the non-labor input share was equal to α in (1). The CNH, on the other hand, probably could not choose output (and labor input) freely due to its more rigid output market, leaving no prediction on whether the non-labor input share should increase or decrease as we move from the early to the late 1990's: the 1997-1998 layoff would have increased the share of non-labor input as a substitute, but the accompanying reduction of output would have had the opposite effect. The CNH account suggests that the two effects roughly cancelled each other.

labor downsizing, we simply assume that these other aspects of restructuring keep in pace with labor downsizing, i.e., A_t only depends on L_t. Considering the actual restructuring paths as depicted in Figures 1 and 2, it is simple and reasonable to assume that the impact of A_t on production function is to make it linear with respect to L_t during restructuring, so (2) becomes:

$$Y_t = \bar{Y} + \tilde{A}(L_t - \bar{L}) \tag{3}$$

where $\bar{Y}$ and $\bar{L}$ are the final fixed levels of output and employment. The production function (3) is drawn as solid lines in Figures 1 and 2.[7] The function approximates the actual path of restructuring for the Ostrava region, while there is little reason to consider a more complex function for the Jiu Valley region. To emphasize, (3) is assumed to be valid during the 1990-2001 restructuring period, and is not meant to be a long-run production function.

The value of $\tilde{A}$, when production is measured at annual rate, is 150 tons/worker for the Ostrava region and 52 tons/worker for the Jiu Valley region. The coal price, when measured in USD, was stable over the period except in the early 1990's in Ostrava and in the late 1990's in Jiu Valley, and there is no trend upward or downward over the whole period in either region.[8] Avoiding the nominal noises of the unstable periods, we fix the price at the average, which was 35.4 USD and 22.5 USD, respectively. The upshot of all this is that the value of output that accrue to the would-be-laid-off miners is $p\tilde{A}(1-s)(L_t - \bar{L})$ in units of the current-period USD, where p denotes the coal price.

[7] For the Ostrava region, the function is drawn through the 1991 point rather than the 1990 point. The large output drop from 1990 to 1991 largely represents the initial demand shock, as mentioned in Section 2, rather than restructuring.

[8] The price was measured by dividing revenue by production volume and then converting this value to the USD by the exchange rate. If we discount the price by the Consumer Price Index instead, we obtain the same periods of instability and a somewhat downward trend over the whole period, which is expected since the real value of USD would depreciate over time.

3.2 Measuring the Value of Labor outside Mines

To measure the value of ex-miners' labor, we start with the following job-finding function:

$$M_t = BU_t^{\rho}, \tag{4}$$

where M_t is new employment, U_t is unemployment, and B is a parameter that indicates the labor market condition aside from unemployment, and ρ is an elasticity parameter. Let ϕ_t denote the job finding rate:

$$\phi_t = \frac{M_t}{U_t} = BU_t^{\rho-1}. \tag{5}$$

The reciprocal of this rate is the *expected* unemployment duration (i.e., the duration that would obtain if the rate is maintained into the future). We can estimate the job-finding rate, or equivalently the expected unemployment duration, from the panel data of actual unemployment duration: in each period follow the cohort of the newly unemployed and see how many of them remain unemployed in the following period.

Estimated this way, in the Ostrava region the expected unemployment duration increased from 7.8 months in the 1993-1995 period to 18.2 months in the 1999-2001 period, an increase of a factor of 2.3. Between the two periods unemployment increased by a factor of 3.0, which implies that $\rho = .24$ for the Ostrava region. However, this value is an overestimate since the unemployment duration data cover the greater Ostrava region and the drop in job-finding rate may have been more severe in the Ostrava region proper. In the Jiu Valley region, unemployment increased by a factor of 4.0 from the 1993-1996 period to the 1999-2000 period. We could estimate that the expected unemployment duration in the latter period was about three years, based on Chiribuca, et. al. (2000) and the data for the county that includes Jiu Valley. For the former period, we could only guess that the expected unemployment duration may have been about one year, based on peripheral information. Assuming the three-fold increase in the expected unemployment duration

between the periods, we have $\rho = .21$ for the Jiu Valley region.[9] Given the values of ρ, we can calculate from (5) that, when new employment is measured on a monthly basis, the parameter B is equal to 222 for the Ostrava region and to 97 for the Jiu Valley region.

Now we specify the unemployment inflow that feed into the job-finding function (4). Let $\hat{U}_t$ denote the unemployment of ex-miners, and $\check{U}_t$ that of the others: $U_t = \hat{U}_t + \check{U}_t$. The unemployment inflow of miners is given by the layoff path: $\hat{U}_0 = 0$ and

$$\hat{U}_{t+1} = (1 - \phi_t)\hat{U}_t + L_t - L_{t+1}. \tag{6}$$

Similarly, we have

$$\check{U}_{t+1} = (1 - \phi_t)\check{U}_t + Z_{t+1} \tag{7}$$

where Z_t is the inflow of non-ex-miners.

We set $\check{U}_0$ and Z_t so that the sequence of total unemployment corresponds to the data under the actual layoff path. Recall that in both regions unemployment was steady until 1997, after which it became significantly worse. In Ostrava the worsened situation was largely due to the layoffs in the metallurgical industry, unrelated to mining restructuring. Accordingly, we set

$$Z_{t+1} = \phi_t \check{U}_0 \tag{8}$$

for all periods except for the 1997-2000 period, and

$$Z_{t+1} = \phi_t \check{U}_0 + \bar{Z} \tag{9}$$

for the 1997-2000 period, where $\bar{Z}$ is a fixed additional layoff. In Jiu Valley the worsened situation was virtually entirely due to the layoffs in mining and those linked to mining. To preserve this linkage under various layoff paths, we set

$$Z_{t+1} = \phi_t \check{U}_0 + \theta(L_t - L_{t+1}) \tag{10}$$

[9] The lack of precision for ρ is not crucial for the main result, as the sensitivity analysis in Section 3.3 shows.

for all periods, where θ is the additional layoff as a fixed fraction of the mining layoff. The values of $\check{U}_0$ and $\bar{Z}$ that best simulate the monthly unemployment path for Ostrava were 14,900 and 2,500; the values of $\check{U}_0$ and θ that do the same for Jiu Valley were 8,000 and .78.

Now we can calculate the sequence of ex-miners' employment using (4) to (10):

$$N_{t+1} = N_t + \phi_t \hat{U}_t \tag{11}$$

where N_t denotes cumulative employment. We estimate the value of newly employed ex-miners' labor using the actual wages in the regions. In the Ostrava region, the gross annual average wage[10] when measured in units of coal and then converted to the USD,[11] was 3,507 USD in 1990 and grew at an annual rate of 4.5% on average over the years, reaching 5,709 USD in 2001. In the Jiu Valley region, for the 1993-2000 period the same method yields an average wage of 2,530 USD and a virtually zero growth rate. Let w_t denote the growth path of the gross average wage as described here. For the years beyond 2001, we assume that in both regions the annual growth rate of w_t will adjust gradually to a more typical rate of 2.0% during the 2001-2005 period, and thereafter stay at this rate.

How did the ex-miner's wage compare to the average wage in the regions? In Ostrava it was probably not far off from the average wage since ex-miners seem to have had little difficulty in adjusting to new occupation. In Jiu Valley, in contrast, ex-miners had great difficulty in adjusting to new occupation, and their wage was as low as a half of the average wage in the region.[12] Let λ denote the ex-miner's wage as a share of the gross average

[10] That is, before any taxes including social security tax paid by employer, which was 35% in the Czech Republic and 38% in Romania. The gross wage is the proper measure of the market value of labor.

[11] Thus we are measuring the value of labor both inside and outside mines in units of coal, and then multiply it by the price coal, which is assumed to be fixed in USD (see Section 3.2). Again, the fixed-price assumption avoids the nominal noises of periods when prices were unstable. If we discount the wage using the Consumer Price Index instead, the growth rate is virtually zero.

[12] The half figure is the estimate in Chiribuca, et. al. (2000). However, some of this differential is probably transitory and reflect the temporarily worse labor market condition and the trial-and-error aspect of job search. Ex-miners typically worked as laborers in construction, in public-works repair, and in black market (Larionescu, Rughinis, and Radulescu 1999).

wage. As a benchmark, we assume that λ is equal to 1.00 in Ostrava, and to .75 in Jiu Valley. Putting all this together, the value of the ex-miners' labor is $\lambda w_t N_t$ in each period.

3.3 Measuring the Efficiency of Restructuring Paths

Now we are ready to evaluate the paths of restructuring, using the above calibrated model. The value of (laid-off) miners' labor both inside and outside mining (i.e., $p\tilde{A}(1-s)(L_t-\bar{L})+\lambda w_t N_t$) is a measure of momentary welfare. For the actual path of restructuring, the momentary welfare path, in annual rate, is depicted as solid lines in Figures 3 and 4, with the 1990 level normalized as zero. In the Ostrava region, the momentary welfare has been increasing gradually in accordance to the gradual restructuring, except for a mild dip in the late 1990's due to the worsened unemployment situation. In the Jiu Valley region, the momentary welfare changed little until 1997, after which the large downward and then upward swing followed due to the massive layoff.

The welfare proper is the discounted sum of momentary welfare, and the optimal path of restructuring is the one that maximizes welfare:

$$\text{Max}\left\{\sum_{t=1}^{\infty}\beta^t[p\tilde{A}(1-s)(L_t-\bar{L})+\lambda w_t N_t]\right\} \tag{12}$$

where β is the discount rate.[13] Since the labor market flows are on a monthly basis, we set a period to be month-long and adjust output and wage appropriately. We assume $\beta = .995$, which is equivalent to an annual discount rate of about 6%.[14] We solved this maximization problem numerically. Given a sequence of L_t, we can calculate the expected discounted sum of the value of a miner's labor, that only depends on the timing of his layoff. Further, we can calculate the externality that a miner imposes to the other miners by congesting

[13] Note that the sum is over infinite horizon. This is conceptually proper if we view restructuring as a reallocation of labor that will be by default maintained indefinitely.

[14] Since the price and the wage are in units of current USD, the discount rate is a combination of the depreciation of the currency and time-preference.

the labor market,[15] that again only depends on the timing of his layoff. The timing of layoff can then be ordered by the expected discounted sum of the value of a miner's labor net of his externality. By construction, we can increase welfare by moving the timing of layoff form a low-value period to a high-value period. Starting with an arbitrarily chosen sequence of L_t, we updated it repeatedly by moving the timing of a single miner from the lowest-value period to the highest-value period until all periods of layoff had the equally highest value.

The optimal momentary welfare path, calculated this way, is depicted as dotted lines in Figures 3 and 4. For both regions, there is a sharp initial decline which indicates a massive layoff. In Ostrava, 63% of layoff takes place in the first month, and the entire layoff lasts 16 months. Even more dramatic, in Jiu Valley the layoff last only 4 months, 97% in the first month alone. At the beginning of the 1990's, under the benchmark parameter values, the value of the miner's labor in mining as a share of that in alternative employment is 62% in Ostrava and 32% in Jiu Valley. These value-differentials largely outweigh the congestion-effect of a massive layoff on the labor markets, which were initially in a fair condition. Subsequent to the massive layoffs, the momentary welfare improves as ex-miners find jobs. The unemployment duration, on average across ex-miners, is 12 months in Ostrava and 30 months in Jiu Valley. The shorter duration for Ostrava is because of a larger labor market: the unemployment rate is maintained below 15% throughout while in Jiu Valley it reaches over 50% in the first months.[16] The transitional impact of restructuring is over within the first two or three years in Ostrava and by the middle of 1990's in Jiu Valley, after which the momentary welfare follows the respective wage growth in the regions.

[15] See equation 4. Note that we are abstracting from the externality that miners impose on non-miners or vacant firms in the labor market. Whether this externality is overall positive or negative would depend on the labor market properties, in addition to those that we have assumed.

[16] The difference between the regions may be an exaggeration since we have assumed extra unemployment linked to, and in proportion to, mining unemployment in all periods in Jiu Valley, but not in Ostrava (see Section 3.2). In reality there would be extra unemployment linked to mining in Ostrava as well. Under any reasonable size of it, however, a large difference in the labor market outcome between the regions would remain.

The main result of the exercise is that the actual pace of restructuring was too slow in both regions, and particularly so in Jiu Valley since there was no restructuring at all until 1997.[17] The inefficiency of actual restructuring can be measured as the difference in welfare (i.e., the sum in (12)) between the optimal and the actual paths as a share of welfare under the optimal path. This measure of inefficiency is 8.8% for the Ostrava region, and 26.7% for the Jiu Valley region. Thus the actual restructuring path was three times more inefficient in Jiu Valley than in Ostrava. A natural question is how sensitive the results are to the assumed parameter values. In this regard there are three key parameters, the productivity parameter $\tilde{A}$, the ex-miner's wage factor λ, and the job-finding elasticity ρ. The first two parameters matter only as a ratio, i.e., holding $\tilde{A}/\lambda$ constant, any change is only re-scaling of welfare (see (12)). To see the extent to which the optimal restructuring can be slowed down, we increase this ratio by 50%, which is probably the reasonable upper bound. We also set $\rho = 0$, which implies that job creation is completely irresponsive to an increase in unemployment. Under these sets of values, the initial layoff as a percentage of entire layoff decreases to 21% in Ostrava and to 44% in Jiu Valley, and the layoff duration increases to 50 and 68 months, respectively. Therefore, the optimal restructuring path is moderate relative to the benchmark, but still exhibits quicker layoffs than the actual path.[18]

4. Understanding The Inefficient Restructuring Paths

In this section we address the central question that emerges from the quantitative exercise: why was restructuring delayed in Jiu Valley? A proximate reason is the general lack of interest in restructuring that was prevalent in Romanian society in the early

[17] The layoff of 1997 in Jiu Valley, on the other hand, is justifiable: given that there was no restructuring until then, the optimal path would be a massive layoff as occurred.

[18] The inefficiency measure for the actual path, under these alternative parameter values, is 5.6% in Ostrava and 26.5% in Jiu Valley. The little change in inefficiency from the benchmark in Jiu Valley is the result of two off-setting effects: the inefficiency of inaction in the early 1990's is reduced but the layoffs of the late 1990's is now too fast. See footnote 17.

1990's. Having inherited one of the most distorted planned economies, the government was nonetheless ambivalent about market reform. The president Iliescu's faction of the government in particular seems to have genuinely believed that the reform could do without a large-scale enterprise restructuring, and certainly did not envision the massive layoffs that took place under the successor government.

We cannot completely discount the validity of these conservative views. Our exercise does not address the distributive consequences of restructuring or the non-monetary social impact of a large-scale restructuring such as a spread of alcoholism and higher crime and divorce rates, as observed in the aftermath of the 1997 layoff (see Larionescu et. al. (1999) and Kideckel (2000)). Also, our exercise is an *ex-post* evaluation, and the economic logic of restructuring may have been less evident in the early 1990's. For example, there may have been an expectation of a recovery of demand for coal after its initial collapse, which was of course never materialized. The question, however, remains in that the restructuring was not slow but rather totally absent for seven years.

A more sinister reason for the delayed restructuring can be ascertained from the miners' active role in national politics. The purpose of the *mineriadas*, the miners' marches, in the early 1990's was to violently repress progressive voices such as intellectuals and students as well as right-wing politicians. Notably, a 1991 *mineriada* forced the resignation of the reform-minded prime minister Roman, the arch-rival of the president Iliescu. It was widely believed that the conservative faction of the government called for the miners' action. Thus the conservative faction may have wanted to keep miners as a useful political force, contributing to the delayed restructuring. Conversely, the massive layoff by the progressive government may have been in part motivated by its desire to eliminate a oppositional force while possible.

The miners' action was ultimately a failure: a compensated gradual layoff from the early on would have served them better. Part of this failure could be that miners underestimated the necessity of restructuring, as the conservative faction of the government

did. A significant part of the explanation, however, lies in the peculiar status of miners under the communist regime: the miners acquired reputation for setting the tone for labor relation and considered themselves as the backbone of the society. For example, the 1977 revolt, the last before the 1990's, achieved various improvement in miners' livelihood and heralded a series of similar action in the other regions.

That a labor union may fight a losing battle to the end is not new. A good example is the 1984 British miners' strike. The British miners went on a year-long strike against restructuring despite the offer of generous severance payment. In the end the strike achieved nothing but the lost pay and ruined reputation for the miners. The miners, at least the union leadership, seems to have been driven by more than narrow economic interests of miners, perhaps the ideology of socialist order. The Jiu Valley and the British episodes seem to share an element of ideologically motivated and behaviorally conditioned action.

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Table 1: Ostrava Region

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Mines:												
Production in thousand tons	29,843	24,749	23,437	23,351	22,448	21,849	21,854	21,312	20,599	18,478	18,898	19,331
Employment in mines	62,087	60,796	53,553	44,448	38,429	36,652	35,131	33,306	31,208	25,140	22,714	21,482
Labor productivity	481	407	438	525	584	596	622	640	660	735	832	900
Labor Market:												
Unemployment rate in percent	1.2	6.5	4.8	7.1	6.5	5.6	1.7	8.7	14.5	18.3	19.8	20.2
Average wage in crowns	43,284	50,916	62,640	78,432	92,076	109,296	128,076	139,356	151,608	159,612	161,436	166,524
Average wage in USD	2,096	2,331	2,993	3,632	4,319	5,558	6,371	5,933	6,342	6,228	5,648	5,910

Table 2: Jiu Valley Region

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Mines:												
Production in thousand tons	4,998	4,527	4,921	5,040	5,450	5,368	5,972	4,927	3,962	3,502	3,701	4,033
Employment in mines	33,562	34,433	34,648	35,275	36,307	35,247	35,061	18,578	16,109	15,601	15,591	15,029
Labor productivity	149	131	142	143	150	152	170	265	246	224	237	268
Labor Market:												
Unemployment rate in percent				8.7	9.1	9.5	11.9	18.8	33.2	44.9	43.4	
Average gross wage in thousand lei				1,191	2,998	4,619	6,691	12,081	17,948	25,449	37,243	
Average gross wage in USD				2,163	2,500	3,135	2,994	2,326	2,791	2,290	2,367	

Figure 1: Restructuring Path in Ostrava

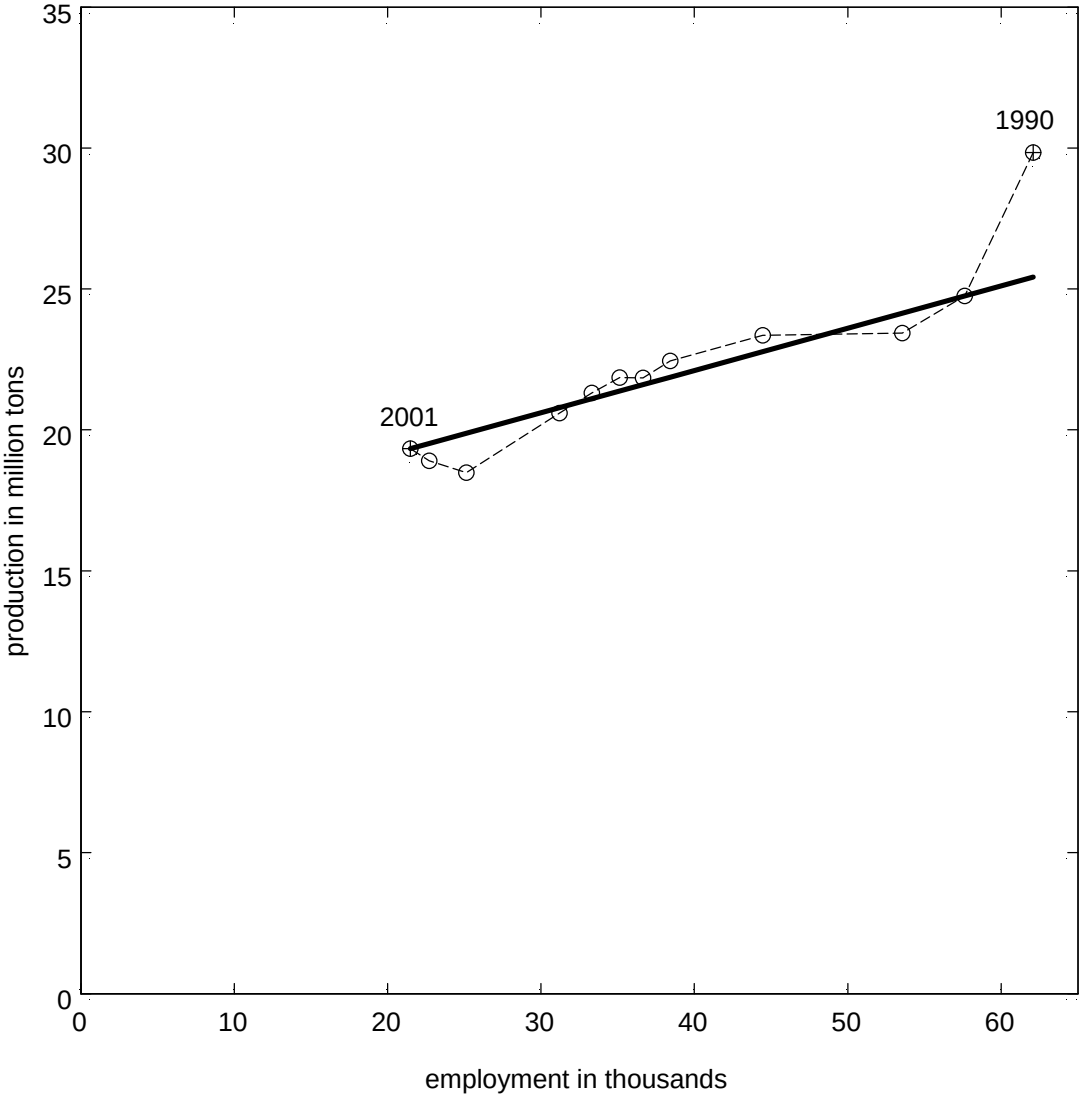

Figure 2: Restructuring Path in Jiu Valley

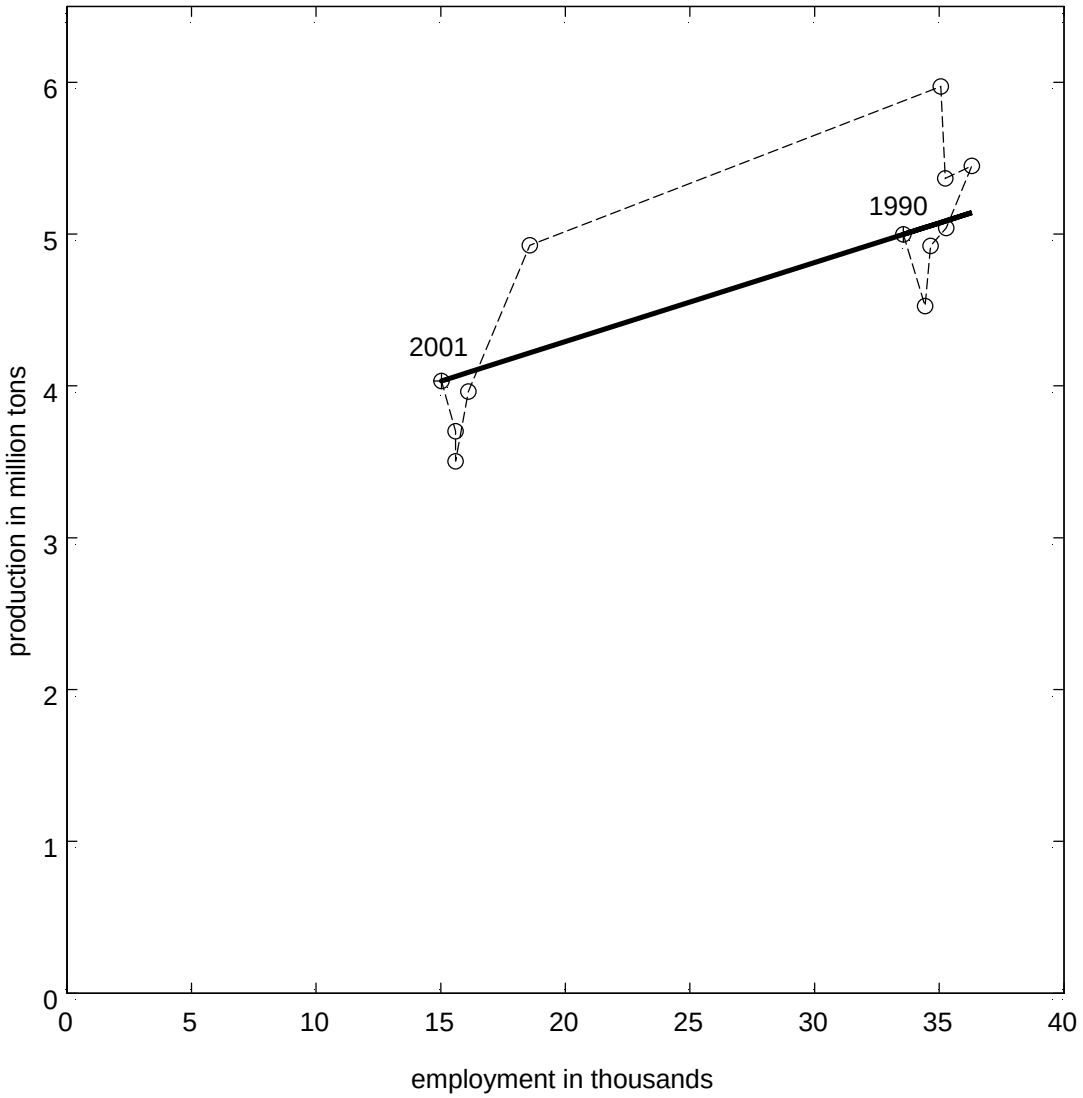

Figure 3: Welfare Path in Ostrava

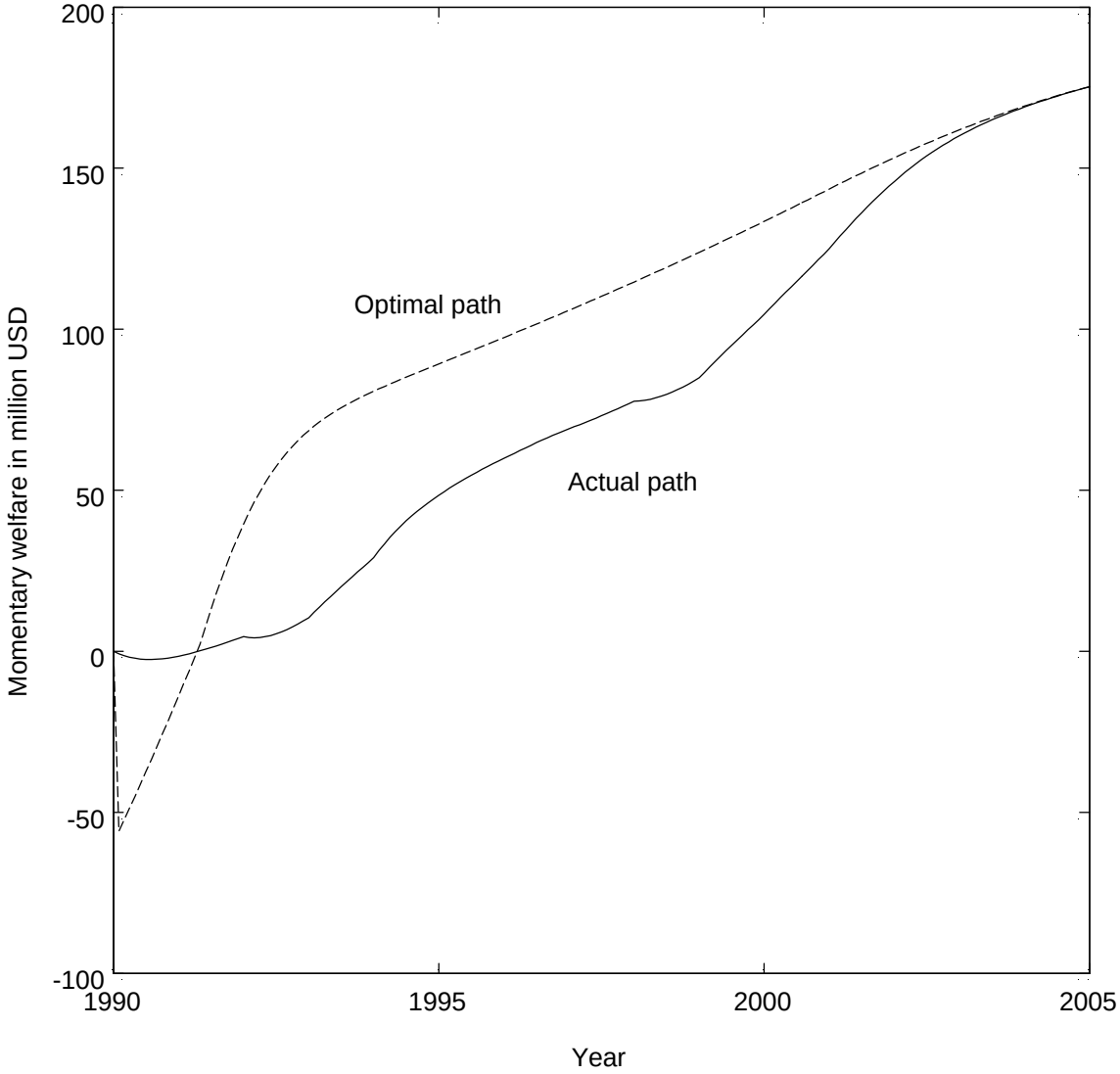

Figure 4: Welfare Path in Jiu Valley