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Regional Unemployment in Poland: A Legacy of Central Planning*

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Abstract

We model job reallocation and unemployment as outcomes jointly determined by the structure of inherited social capital within a two-sector Optimal Speed of Transition model. Treating regions of Poland as independent labour markets, the socio-economic inheritance of regions is found to be a legacy of planning that determines regional job reallocation rates. In turn, higher rates of (instrumented) regional job reallocation is shown to boost regional unemployment turnover, reduce the duration of frictional and increase the incidence of structural unemployment. At the regional level, the benefit system facilitates the job reallocation process and accumulates out-of-date human capital.

Keywords: Social Capital, Job Reallocation, Regional Unemployment and Poland.

Journal of Economic Literature: Classification Numbers J6, L0 and O5.

INTRODUCTION

A large theoretical literature exists on the Optimal Speed of Transition (OST). These models recognise that large-scale worker reallocation is required to restructure the State-Owned-Sector (SOS) and facilitate the entry of the New-Private-Sector (NPS) during transition, (see Aghion and Blanchard 1994, Burda 1993 and Gavin 1993). The analysis assumes that labour reallocation should go through the state of unemployment. Job destruction in the SOS should create inflows into unemployment and job creation in the NPS should induce outflows from unemployment. This literature highlights the need for an unemployment benefit system at the start of transition to encourage restructuring and free resources for use in the NPS. In addition, government institutions could be used to control the speed of job reallocation during transition.

In contrast to this literature we prefer to model job reallocation and unemployment as outcomes jointly determined by the structure of inherited social capital within a two-sector OST model. The speed of transition is dictated by legacies of planning rather than by government control. Higher rates of job reallocation are predicted to boost unemployment turnover, reduce the duration of unemployment for effective job seekers and increase the stock of ineffective job seekers in Long Term Unemployment (LTU).

We find evidence for our theory across regions of Poland during the period 1994-1996. Throughout our empirical analysis we treat each region (voivodship) of Poland as an independent labour market. This is justified on the grounds that inter-regional job (worker) flows have been virtually absent during transition, (see Faggio and Konings (1999)). The advantage of a regional analysis within Poland, compared to a study across

CEE countries, is that the inherited socio-economic structures of regional labour markets can be expected to be rather idiosyncratic, while economic institutions such as social security and macroeconomic environment are the same.

Boeri and Scarpetta (1996) point out that most of the growing polarisation in employment performance across Polish regions can be explained by the inherited regional socio-economic structures of the planning system. Regions inherited rather idiosyncratic sector and occupation structures¹. Exposure to world markets rendered the capital accumulated by many firms hopelessly out-of-date. Many eastern regions of Poland tended to be historically CMEA market oriented and enjoyed a privileged position in terms of allocation of resources over the forty years of central planning. These regions had a high concentration of Mining, Defence and Natural Resource Extraction industries. A stylised eastern region is one with a large industrial conglomerate surrounded by private agricultural holdings with social capital not easily adaptable to the market economy.

Yet, many western regions of Poland had produced goods for export outside the CMEA before 1990 and had developed better infrastructure, thus inheriting social capital that was more adaptable in the global economy. Repkine and Walsh (1999) estimate the empirical relevance of historical trade links to be very significant for the recovery of industrial production. In this paper we demonstrate that regional differences in inherited socio-economic structures are the key to understanding the regional evolution of job reallocation and unemployment across Poland during the first seven years of transition.

The empirical literature thus far, [Boeri (1997), Borish and Noel (1996), EBRD (1996) and OECD (1997)], in cross-country studies document strong job reallocation but

¹ Boeri (1999) notes that worker mobility across sector and occupation was low in Poland. Given the idiosyncratic sector inheritance of regions this could explain the lack of workers flows across regions.

unemployment stagnancy, or a low turnover with long duration, as a stylised feature of Central and Eastern Europe (CEE) countries. Boeri (1998) and Brixiova (1997) provide a theoretical explanation for this empirical observation by allowing flows of workers from the SOS to the NPS or non-activity to mostly by-pass unemployment. They propose that inflows into unemployment are mainly ineffective job seekers that accumulate in LTU, attracted by the presence of ill-conceived generous unemployment benefits. As outlined in Boeri (1999), structural unemployment comes from the lack of adaptability of specialised pre-transition educational attainment and work experience to the market system. This leads to serious structural mismatches, exposed during periods of dramatic changes in the structure of employment. Our regional analysis of job and unemployment flows will confirm that specialised pre-transition human capital has had negative effects on the transition process. This contentious issue we highlight in this paper, is that the benefit system was used by effective job seekers during periods of job reallocation.

The aggregate picture of immense job reallocation and unemployment stagnancy is generated by aggregating over regions with varying inherited socio-economic structures, job reallocation rates and unemployment evolutions during transition. The socio-economic inheritance of regions, as a legacy of planning, is shown to determine regional job reallocation rates during transition. In turn, higher rates of (instrumented) regional job reallocation are shown to boost regional unemployment turnover, reduce the duration of unemployment for effective job seekers and boost the incidence of “bad” human capital characteristics in LTU. At the regional level, we find that the job flows do not by-pass unemployment. In fact, unemployment turnover, duration and human capital composition are systematically driven by the degree of regional job reallocation. The

unemployment benefit system has facilitated the job reallocation process. Yet, we also confirm that structural unemployment is a serious legacy of planning in regions that have engaged in job reallocation and is a form of hidden unemployment in regions that have to a large extent resisted job reallocation.

Our empirical evidence at the regional level supports the theoretical frameworks of OST models that focus on the role of labour demand dynamics. We incorporate structural labour supply issues into our model but work with a fixed labour force. The latter point has been heavily criticised by Boeri (1999). There is no doubt that the matching of job seekers from the SOS to vacancies in the NPS, or a lack of regional job reallocation, happened alongside mass downsizing of the labour force². Our analysis of male under a year unemployment and firm data clearly zones into the dynamics of the labour force, ignoring the dynamics of non-activity, across regions of Poland.

In section I, we write down our theoretical framework and predictions. Section II develops our taxonomy of regional social development. In section III we examine regional job reallocation rates with reference to our taxonomy. In section IV we examine regional unemployment turnover and duration conditioned on human capital characteristics and our taxonomy. In section V we present our econometric model of regional hazard rates from unemployment. Section VI puts forward some conclusions and policy issues.

² Participation rates under planning were extremely high. Boeri (1999) finds the flows between employment and unemployment were only 15 per cent of total labour market flows in the face of mass labour force exit. This percentage was based on quarterly data, classifying under three-month unemployment spells as job to job flows. Yet, such spells in the Live Register data become important as job reallocation increases.

I. THE THEORY

In this section we model the unemployment turnover rate within an independent labour market undergoing a transition to a market economy. Before transition the labour force, E , is employed in the SOS. The transition process ends when $E = 0$. The model focuses on the partial reallocation of SOS workers, E , at the start of transition across three states during the transition process: the restructured previously SOS, the NPS and unemployment. In this section we model regional worker separation rates and hiring rates during transition and examine the impact of such job reallocation on unemployment. We first build microfoundations for aggregate regional separation rates.

Firm Level Restructuring in the SOS

The core element of the model is that L workers/insiders in a state-owned firm dictate the timing of restructuring³. Two conditions have to be satisfied before workers vote for restructuring. The first is a *risk aversion* constraint introduced by Aghion and Blanchard (1994),

$$rV_N \leq \lambda rV_R + (1 - \lambda)rV_U \quad (1)$$

The expected income stream for a worker, ex-post restructuring, must be at least as great as the current income stream in the non-restructured state, rV_N . A worker is given a probability λ of remaining in the restructured firm, and earning an income stream of rV_R , and a probability $(1-\lambda)$ of becoming unemployed with an expected income stream of

³ Workers councils took effective control of state owned firms at the start of transition in Poland. These councils were in place in 1981 but had no power as long as managers were backed from the centre. In 1990 they assumed control and could veto decision making within the firm. Privatisation through liquidation was the most popular method used, which lead to insider majority ownership. Because of majority insider voting privatisation did not lead to automatic restructuring. This lead to delays in the restructuring process and the distribution of profits among workers in the form of higher wages.

rV_U . The second is a *viability* constraint that requires retained workers to induce profit stream that covers labour rents and restructuring costs ex-post restructuring,

$$\pi_R \geq (rV_R - rV_U)\lambda L + \sigma \quad (2)$$

where π_R is the ex-post profit stream, λL are the retained workers from the inherited employment stock and σ the sunk costs associated with restructuring. We first examine the implication of condition (1) for wage setting. The expected income stream after restructuring must compensate the worker for the risk of becoming unemployed and for the forgone expected income stream from the non-restructured state. The expected income stream in the event of a flow into unemployment, rV_U , is written down as,

$$rV_U = b + \left(\frac{H}{U} \right) \left(\frac{w}{r} - V_U \right) \quad (3)$$

The expected income of a worker in unemployment is the sum of the benefit level, b , and an expected capital gain, that is the uncertain discounted income gain from a probability of being employed and earning an income, w , in the outside labour market. The probability of being employed from unemployment is determined by the numbers hired in the outside labour market or the NPS, H , from the unemployment stock, U . The expected income stream for a worker in the state of unemployment in (3) can be rewritten as the following,

$$rV_U = \Omega = \frac{1}{\phi} b + \frac{\phi - 1}{\phi} w \quad (4)$$

where $1 \leq \phi \leq \infty$. If the probability of being hired in the outside labour market is zero, $(H/U)=0$, then $\phi=1$ and the expected income stream for a worker in unemployment, Ω , is just the benefit level, b .

The expected income stream for a worker in the non-restructured state, rV_N , is modelled as an outcome of a simple rent sharing model. The firm sets a wage for their inheritance of insider workers L subject to the constraint that the flow of labour rent, $(W - \Omega)L$, reflects the flow of product market rent, π_N , in the non-restructured state. We express the expected income of workers in a non-restructured firm as the following,

$$W_N = rV_N = \Omega + \frac{\pi_n}{L} = \Omega + C \quad (5)$$

If workers are to vote for restructuring, condition (1) must hold. The minimum ex-post income stream, rV_R , necessary to induce a vote for restructuring ex-ante can be found by substituting outcomes in (4) and (5) into (1), is written as follows,

$$W_R = rV_R = \Omega + \frac{C}{\lambda} \quad (6)$$

Workers require a premium for exposing themselves to the risk of becoming unemployed during the restructuring process, as $0 < \lambda < 1$. This risk premium is a form of an efficiency wage payment, as defined in Konings and Walsh (1994). There is always an ex-ante expected income stream that induces a worker vote for restructuring, meeting condition (1), but an increase in the ex-post profit stream must be induced to finance the retained workers income stream and restructuring costs, condition (2). The minimum ex-post profit stream necessary in the presence of condition (1) holding is found by substituting (4) and (6) into (2),

$$\pi_R = (W_R - \Omega)\lambda L + \sigma = \pi_N + \sigma \quad (7)$$

The retained workers, ex-post restructuring, must be able to induce a profit stream that is at least as big as the profit stream in the non-restructured state as well as covering the sunk cost associated with restructuring. The minimum ex-post total labour rent

required in the firm ex-post restructuring is not higher than that ex-ante, but the rent per retained worker has increased reflecting the required premium for undertaking the risk of restructuring.

In order for (7) to hold, sunk cost expenditures in conjunction with the retained labour force and inherited capital stock, k , must be able to induce an additional profit shift, $\pi^*(\sigma(S), \lambda, k(S))$, that covers at least labour rents, π_N , and the sunk cost of restructuring, σ . Sunk cost expenditures and the ability to adapt the inherited capital stock to induce profits are both determined by factors external to the firm, in particular the quality of social capital in a region that a firm has access to, such as telecommunications, banking and legal infrastructures. In addition it can be related to the amount of obsolete capital, the nature of the product inherited by a firm⁴. The ability of firms to restructure depends on the socio-economic inheritance of a firm coming out of planning, S . This determines the proportion of the labour force retained in a firm, $\lambda^*(S)$. High restructuring costs, σ , and/or a low responsiveness of profitability to sunk cost expenditures, due to obsolete physical capital, will induce workers ex-ante not to vote for restructuring, $\lambda^* = 1$. Yet, if the socio-economic inheritance of a firm is good, even in anticipation of a low labour retention rate, workers will vote for restructuring once ex-post profitability and labour income per retained worker jointly satisfy conditions (1) and (2), $0 < \lambda^* < 1$.

Regional Job Separation Rates

Regions that inherited better social capital are predicted to have more firm level restructuring in the previously SOS, inducing higher worker separation rates. The aggregate separation rate from previously state owned regional employment, E , is

determined by aggregating over the employment size weighted layoff rate of firms in a region,

$$(1 - \lambda(S)) = (1 - \sum_{i=1}^n \phi \lambda_i^*(S)) \quad (8)$$

The number of laid off job seekers, F , from the initial stock of SOS workers, E , after a defined period of transition is $(1 - \lambda(S))E$. We now turn to modelling hiring rates in the NPS using a conventional model of matching.

Regional Hiring Rates

The aggregate hiring function, H , in the NPS will be modelled by the convention followed in Layard et al. (1991),

$$H = f(cF, V(S)) = [cF]^{(1-\alpha)} [V(S)]^\alpha, \quad \text{where } 0 < c < 1 \quad (9)$$

During the transition period vacancies, V , come on stream in the NPS. We model vacancies to be higher in regions with better social capital. Such vacancies are matched to job seekers that come on stream during transition, F . Only a proportion, c , of the job seekers is considered by the NPS to have effective human capital. Given the microfoundations offered by Pissarides (1990) we assume constant returns to scale in the matching process⁵. In other words, as the size of the job market increases, in terms of the number of job seekers and vacancies, the matching process becomes more efficient. Thus the hiring rate in the NPS can be written as,

$$\frac{H}{F} = cf \left(\frac{V(S)}{cF}, 1 \right) = c \left(\frac{V(S)}{cF} \right)^\alpha \quad (10)$$

⁴ A Polish firm that historically traded poor quality products within the CMEA market is less likely to restructure when compared to a Polish firm that historically traded with high quality products to the EU.

⁵ Homogeneous effective job seekers, cF , search randomly over V vacancies and can only make one application in a defined period. The probability that no job seeker i applies for a vacancy j is, $cF[\ln(1-1/V)] \cong e^{-cF/V}$. Hence the hiring rate H/F is proportional to cF/V .

The unemployment turnover rate is defined as the unemployment inflow rate plus the outflow rate. Assuming that layoffs experience an unemployment spell we define the unemployment inflow rate as in (8) and the unemployment outflow rate as in (10).

Regional Unemployment Rates

Regions with a more advanced social capital structure will have more vacancies coming on stream in the NPS and more layoffs due to restructuring of what was previously the SOS. Such simultaneous job creation and destruction, in the NPS and SOS respectively, will induce higher job reallocation rates and leads us to our first prediction of the model,

Prediction One: *Regional Unemployment Turnover Rates are predicted to monotonically increase with Job Reallocation Rates (instrumented by the social economic inheritance of a region labour market) during the transition period.*

We define the unemployment rate in a steady state as the inflow rate over the outflow rate, by setting the gross inflow equal to the outflow and hence leaving unemployment unchanged. An alternative way of expressing it is the inflow rate times the average duration of unemployment spells,

$$\frac{U}{E} = \frac{F/E}{H/F} = (1 - \lambda(S)) \left[\frac{F(S)}{c^{\frac{1-\alpha}{\alpha}} V(S)} \right]^\alpha \quad (11)$$

The unemployment rate has both frictional and structural components. As social capital increases, S , we observe more job destruction from restructuring firms, thereby increasing the inflow rate into unemployment. The average duration is determined by the degree of structural unemployment, as defined by $(1-c)F$, in the inflow. Frictional

unemployment is determined by the speed of matching the effective job seekers to vacancies, which is in turn driven by the size of the regional job market.

Regions with a more advanced social capital structure are predicted to have higher job reallocation rates, which reduces the average duration of frictional unemployment. The stock of frictional unemployment should be lower due to a faster exit rate of job seekers.

***Prediction Two:** Regional Unemployment Hazard Rates of effective job seekers are predicted to monotonically increase with Job Reallocation Rates (instrumented by the social economic inheritance of a regional labour market) during the transition period.*

It is also predicted that in regions with a more advanced social capital structure, increased restructuring in the SOS will increase the numbers of older, less educated workers with out-dated work experience in the unemployment pool with a very low probability of exit.

***Prediction Three:** The regional numbers of ineffective job seekers in unemployment are predicted to monotonically increase with, while their hazard rates remain independent of, Job Reallocation Rates (instrumented by the social economic inheritance of a region labour market) during the transition period.*

While no monotonic relationship is predicted between the job reallocation rates and the unemployment rate, there are clear predictions concerning unemployment turnover and human capital specific hazard rates.

II. REGIONAL TAXONOMY OF SOCIO-ECONOMIC DEVELOPMENT

Some previous studies have developed regional labor market taxonomies of Poland, for example, Huber and Scarpetta (1994) and Góra and Lehmann (1995). In this section we outline the taxonomy of Polish regions based on the level of socio-economic development that persisted across regions up to 1996. Our taxonomy ranks all 49 voivodships (the highest regional administrative units) in a continuum of restructuring. We also bundle voivodships into six groups which represent development from Group I (least developed) to Group VI (the most developed) for use in our summary statistics.

Our classification scheme ranks voivodships by six socio-economic development indicators. Using a Borda electoral scheme, the sum of the six rankings establishes the score for each region. Thus, the highest possible score is 6, when a region is always ranked number one, and the worst possible score is 294, when a region is always ranked last, at 49. The regions are then sorted in ascending order. Large discrete breaks in the score of voivodships determined the hiatus between our six regional groupings, leading to the regional taxonomy of Table 1.

< Table 1 about here >

In Table 2 we provide summary statistics of the six indicators of development within our taxonomy of regions. Each indicator is designed to capture the degree of socio-economic regional development achieved over transition. As suggested by the correlation matrix in Table 2, these development indicators tend to be highly correlated across the 49 regions. We now discuss each indicator in turn.

< Table 2 about here >

A: Share of Services in Total Regional Employment, per cent in 1996: A developed service sector is an important part of social capital infrastructure. The most (least) developed region has 63 (26) per cent of employment classified as services.

B: Number of Telephones in a region per 100 inhabitants in 1996: Restructuring in firms is likely to be influenced by the quality of social capital such as the quality of public infrastructure in the region. One simple indicator for this is the number of telephones per 100 inhabitants. The most (least) developed region has 31 (8) phones per 100 inhabitants.

C: Domestic Investments per 1000 inhabitants, percentage distribution across regions in 1996: Regions with viable products will have attracted domestic investment flows over the transition period. This contrasts with regions that hosted privileged Soviet Bloc oriented trade in the planning system, which in addition lose their subsidies. The most (least) developed region has 15 (0.5) per cent share of the investment funds made available to the economy.

D: Foreign Direct Investments per 1000 inhabitants, percentage distribution across regions in 1996: As documented in Repkine and Walsh (1999), firms that were EU oriented at the start of transition attracted a large amount of FDI from the European market. The most (least) developed region has 38(0) per cent share of FDI in the economy.

E: Share of Building and Construction in Total Regional Employment, per cent in 1996: With development one would expect greater development of new offices, hotels, housing and restaurants. In Table 2 the most (least) developed region has a 8 (2) per cent share of Building and Construction in total regional employment.

F: Share of Agriculture in Total Regional Employment, per cent in 1996: The agricultural sector was largely privately owned before transition, had a very low capital/output ratio, and was characterised by a substantially lower level of productivity than other sectors of the economy. Restructuring of this sector was urgently required with the opening up of Poland to world markets. A relatively high employment share of agriculture in a region at the end of 1996 is therefore indicative of a relative lack of restructuring of the agricultural sector in that region. There exists another mechanism that relates the share of agricultural employment to restructuring. Much of private agriculture that remained during transition was subsistence farming, which served as a buffer for labour shed in industry, Leiprecht (1997). However, as more restructuring occurs, more opportunities exist elsewhere and, *ceteris paribus*, the lower should be the employment share of agriculture. The most (least) developed region has 6 (62) per cent share of Agriculture in total regional employment.

In summary, four of the six indicators are based on stock and the two investment indicators are based on flow values, which reflect unequivocally the relative stage of development in 1996. Yet, one can show that the rankings of regions reflect a persistent pattern when based on values of these indicators in preceding years. The taxonomy reflects a systematic ranking of regions in their stage of development that persists during the transition period. The ranking of regions is geographically portrayed in chart 1.

< chart 1 about here >

In chart 1 we show that, with the exception of Warsaw and Lodz, all regions in our regional groupings I, II and III are located in eastern regions of Poland. Eastern regions host firms experiencing a poor social capital inheritance, while western regions

host firms with superior social capital. In the next section we calculate regional job reallocation rates and show that they are conditioned on distinct stages of socio-economic development, the legacy of history.

III. SOCIO-ECONOMIC DEVELOPMENT AND JOB REALLOCATION.

The Amadeus Company Accounts Data is used to construct regional job reallocation rates over the period 1994 to 1996. The data consist of all incorporated companies across all sectors that satisfy one of the following conditions: Employment > 100, Total Assets > 16 million US dollars and Operating Revenues > 8 million US dollars. We use the regional job reallocation rates constructed by Faggio and Konings (1999). They use the indices developed in Davis and Haltwinger (1992). We define a discrete measure of firm i growth over the period $t-1$ to t in region j as follows:

$$g_{ijt} = \left(\frac{y_{ijt} - y_{ijt-1}}{(y_{ijt} + y_{ijt-1})/2} \right) \quad (12)$$

To examine the contribution of expanding and declining firms to the overall evolution of regional employment we sum the growth rates of each growing firm (POS), weighted by firm employment size, S_{ijt} , and sum the absolute growth rates of each declining sector (NEG) weighted by their size S_{ijt} ,

$$\begin{aligned} POS_{jt} &= \sum_{i=1}^n S_{ijt} g_{ijt} && \text{if } g_{ijt} > 0, \text{ and} \\ NEG_{jt} &= \sum_{i=1}^n S_{ijt} |g_{ijt}| && \text{if } g_{ijt} < 0. \end{aligned} \quad (13)$$

The annual net change, NET_{jt} , in regional employment is a net outcome that is induced by employment growth in expanding firms being offset by employment declines in declining firms. The reallocation of jobs within regional employment is captured by the $REALLOCATION_{jt}$ index calculated as follows:

$$\begin{aligned}
NET_{jt} &= POS_{jt} - NEG_{jt} \\
REALLOCATION_{jt} &= POS_{jt} + NEG_{jt} - |NET_{jt}|
\end{aligned}
\tag{14}$$

Faggio and Konings (1999) analyse and model regional job reallocation rates across five CEE countries including Poland. In what follows we summarise some of their key results for Poland. They find that the vast majority of job reallocation occurs within region and not between regions. This indicates the lack of job mobility across regions of Poland. In addition, striking differences in job flows are observed within regions. For example in Warsaw, our top ranked region in social development, over the period 1994-1997 the annual job creation rate was 4.7 per cent, the annual job destruction rate was 5.4 per cent, leading to an annual job reallocation rate of 9.7 per cent. Annually, nearly 10 per cent of employment is reallocated away from one set of firms towards another. In contrast in Zamoj, our weakest region in social development, the annual job creation rate was 2 per cent, the annual job destruction rate was 4 per cent, leading to an annual job reallocation rate of 4 per cent. The factors behind simultaneous job creation and destruction were examined at the firm level. Downsizing of large firms, changing ownership structures and historical trade orientation, EU versus CMEA markets, were deemed to be key factors inducing higher job reallocation rates within regions.

In table 3 we confirm within our taxonomy of social development, that the socio-economic inheritance of regions is an important factor behind their ability to simultaneously downsize firms coming from the SOS and create jobs in the NPS over the period 1994-1996.

< Table 3 about here >

Job reallocation rates are higher the more advanced the socio-economic inheritance of regions and the further we are into the transition process. The differences between within regions job turnover over the first seven years of transition can also be confirmed using the labour force survey in 1996. One can calculate the percentage of males in regional employment who have not changed jobs since the beginning of transition. The most developed regions have around 35 per cent of males and the least developed regions have around 60 per cent of males remaining in the same pre-transitional job in 1996.

In the next section we examine whether there is a systematic relationship between unemployment turnover and duration by human capital characteristics, in terms of age, education and previous job tenure across the regional groupings of our taxonomy.

IV. SOCIO-ECONOMIC DEVELOPMENT AND UNEMPLOYMENT.

The annual inflow rate and outflow rate by region using official Live Register data are constructed as follows,

$$\text{The inflow rate} = (I_{t \rightarrow t+1} / (U_t + U_{t+1})/2) \quad (15)$$

$$\text{The outflow rate} = (O_{t \rightarrow t+1} / (U_t + U_{t+1})/2) \quad (16)$$

where $I_{t \rightarrow t+1}$ and $O_{t \rightarrow t+1}$ are, respectively, the gross regional flows of individuals into and out of unemployment over the period t to $t+1$, U_t and U_{t+1} are the regional stocks of unemployment at time t and $t+1$, respectively.

< Table 4 about here >

Table 4 presents the regional inflow rates, outflow rates and shares of long unemployment spells in the regional unemployment stocks for the years 1994-1996. As stated in prediction one of section I, we observe that the unemployment turnover rate (inflow plus outflow rate) increases as we move from Group I to Group VI in each time period. Also, the annual turnover rate increases over the period 1994 to 1996 within each grouping due to increased job reallocation within regions over time. By 1996 Group VI had similar throughputs to those experienced by Great Britain in the midst of structural change in employment in the mid-1980s. The duration of unemployment, as measured by the share of long spells, declines as we move from Group I to the most advanced regions in social capital, Group VI, in each year. As in prediction two of section I, it seems that as unemployment turnover increases over time we see a secular decline in the share of LTU, or in the average duration for each grouping within the taxonomy.

The above suggests a clear-cut relationship between the socio-economic inheritance of regions/job reallocation rates, unemployment turnover and duration. We next turn to human capital characteristics and document the experience of males in regional unemployment flows and stocks by duration, age, education and length of previous employment tenure within our taxonomy of social development.

< Table 5 about here >

Table 5 documents the age compositions of the new registrations and those with duration of unemployment greater than a year using our taxonomy of regions for the year 1994 - 1996. The inflows have a similar share of all age groups, particularly in 1996, for all degrees of regional development. Yet, there is a slightly greater relative number of over 34 years of age in the inflows of the more advanced regions. In the LTU stock the share of under 34 years of age is in the majority in the least advanced region. As we move across the more advanced regions we observe that the LTU stock hosts a far greater number of older workers particularly those over 45 years of age. This suggests that in advanced regions older workers separated from employment during the restructuring of the SOS seem to compound in structural unemployment with little hope of exit.

< Table 6 about here >

Tables 6 documents the education compositions of the new registrations and the long-term unemployed for the same years across our taxonomy. The inflows have a similar share of all education types, particularly in 1996, with a slight bias to having a greater number of males with basic educational attainment in the inflows of the more advanced regions. As we move across the more advanced regions we observe that the LTU stock hosts a greater number of workers with basic education. This again suggests

that the probability of exit within and across regions for different education groups in unemployment is not the same.

< Table 7 about here >

The tenure (of previous employment) compositions of the unemployed are shown in Table 7. The inflows have a greater relative number of males with more than ten years previous job tenure in the more advanced regions. The most advanced regions also host a greater number of workers with long previous job tenures in LTU. The probability of survival for different tenure groups in unemployment within regions seems to vary. Work experience under central planning seems to be considered a negative attribute that identifies workers with unfavourable human capital characteristics.

In summary, we do observe differences in the regional composition of inflows and LTU by age, education and previous job tenure across our taxonomy of social development. In keeping with prediction three of section I, the regional LTU stock in the more restructured regions of Poland have greater shares of older, less educated individuals coming recently out of pre-transition jobs. The greater share of such human capital characteristics in LTU in advanced regions seems to suggest that greater restructuring of the SOS can induce greater levels of structural unemployment. Such human capital seems to compound in unemployment irrespective of the advancement in regional job reallocation.

To verify whether this is the case, we compute regional hazard rates for males conditional on the above mentioned human capital characteristics. We calculate regional hazard rates using duration specific stocks of the Polish live register data by age, education, and previous job tenure. The probability of exit for cohorts in the under 3

months duration category, $ESTU_t$, is computed by tracking this cohort into the between 3 to 6 months duration category, $LSTU_{t+1}$, to find out how many remain in unemployment three months later. We adopt a similar methodology to calculate the probability of exit for cohorts in the under 6 months duration category, the short-term unemployed, STU_t . We track the numbers present in the under 6 months duration category and compare them to those who remain in the pool of between 6 and 12 months category, the medium-term unemployed, MTU_{t+1} , six months later. To calculate the probability of exit for cohorts in the under 12 months duration category we work with the under 12 months and between 12 and 24 months duration category one year later, LTU_{t+1} .

Hence, we calculate the fraction of those leaving unemployment within three months conditional upon being under three months in unemployment as the following:

$$a_{t \rightarrow t+1} = (ESTU_t - LSTU_{t+1}) / ESTU_t \quad (17)$$

We calculate the fraction of those leaving unemployment within six months conditional upon being under six months in unemployment as,

$$b_{t \rightarrow t+1} = (STU_t - MTU_{t+1}) / STU_t \quad (18)$$

We calculate the fraction of those leaving unemployment within a year conditional upon being under a year in unemployment as,

$$c_{t \rightarrow t+1} = ((STU_t + MTU_t) - (LTU_{t+1})) / (STU_t + MTU_t) \quad (19)$$

In Table 8 we report these under three, six and twelve months conditional hazard rates by age, education and previous job tenure for the overall live register.

< Table 8 about here >

We observe that in all regions the exit rates from unemployment during the first three, six or twelve months are non-increasing with age. The duration of benefits that can

last up to a year might create incentives to move into MTU but to avoid LTU and so exits can be delayed when we compare exits across our taxonomy. On the other hand, a clear trend emerges when we give males up to one year to exit. In Table 8 with reference to the twelve month hazard one should note that the exit rates for the young and prime age unemployed do increase as we move from Group I to Group VI, but this trend is less obvious as we move up age groups. The results suggest that most age groups have a lower probability of flowing into LTU in regions more advanced in job reallocation. This explains the larger presence of younger people in the LTU pool as we move from Group VI to Group I. Older groups have a low probability of exit even in more advanced regions.

Next we examine the hazard rates in Table 8 by education. We observe that within all regions the exit rates from unemployment during the first three and six months are similar for those with basic or secondary education but increase in the presence of a university degree. Yet, for all regions those with secondary qualifications do better than those with basic qualifications when given twelve months to exit. The regional hazard rates under a year show that the exit rates for basic and secondary education increase as we move from Group I to Group VI but are similar for cohorts with university degrees. The results imply that all education groups have a lower probability of flowing into LTU in the more advanced regions.

Finally, we examine the overall regional hazards by duration of previous tenure. In all regions and duration categories the exit rates from unemployment are highest among the individuals with no work experience. There is little difference between those with less or greater than ten years work experience when given less than 6 months to exit.

The under a year regional hazard rates do show the benefit of having less than ten years of job tenure, i.e. they show us the advantage of work experience during transition compared to a recent separation from a pre-transition job. The under a year regional hazard rates show that paradoxically in all regions the exit rates from unemployment during the first year decrease with previous job tenure. This result is, however, in line with our thesis: for many individuals the human capital acquired on the job in the planned system became largely redundant after the onset of transition, particularly for the older less educated workers. Yet we note that the exit rates for all tenure groups seem to increase as we move from Group I to Group VI.

Our analysis in this section suggests that the predictions of section I have empirical relevance. The different inherited social capital across regions and dynamics of regional labour demand in Poland seem to have pushed unemployment turnover and duration in a systematic way. Regional unemployment turnover rates seem to monotonically increase with job reallocation rates (or the social economic inheritance of a region labour market) during the transition period. The analysis of regional unemployment hazard rates suggests that the duration of most job seekers decrease with regional job reallocation. Yet, it is also clear that in regions with a more advanced social capital structure increased restructuring seems to increase the numbers of older, less educated and out-dated work experience in LTU. In addition such human capital seems to have relatively long duration spells in unemployment irrespective of the stage of regional job reallocation.

In the next section we provide econometric evidence for our theoretical motivated assertions, that the social economic inheritance of a region labour market dictates the

speed of regional job reallocation. In addition, that job reallocation determines the probabilities of exit from unemployment conditional on duration, age, education and previous employment tenure.

V. ECONOMETRIC EVIDENCE

The quarterly unemployment Live Register data for the period 1994-1996 at the regional level (voivodship level) is grouped or folded data. We therefore estimate a Logit model on group data. The logit function is defined as the log of the odds ratio, the proportion of the number of successes (exits from unemployment) to failures in the defined population, after being exposed to a certain treatment, controlling for other characteristics. The model that we estimate can be written as,

$$\log\left(\frac{P_{ijqt}}{1 - P_{ijqt}}\right) = \beta_0 + \beta_1 X_{ijqt} + \varepsilon_{ijqt} \quad (20)$$

Where P_{ijqt} denotes the proportion of successes by type age, education or previous job tenure i , by region j in quarter q and year t . Since we have a number of explanatory variables, β_1 is here a row vector and X_{ijqt} , a column vector. Weighted least squares estimation produces the minimum χ^2 estimates of β_1 .

In tables 9, 10 and 11, we present the empirical results of modelling the annual hazard rate of males in the under a year duration category conditioned on being exposed to defined age, education, tenure and regional job reallocation rates. In the first column of each table we group the entire population of males who have been unemployed for less than 12 months by age, education or job tenure, respectively. Besides (implicitly) controlling for duration and gender, we also control explicitly for regional job reallocation, additional region-specific effects, seasonal and macro effects. Since job and unemployment flows are jointly determined by the inheritance of regional social capital from planning we instrument regional job reallocation rates with RANK, among other

dummies, to avoid an endogeneity problem. RANK takes on a value of 1 to 49, the ranking of the regions in table 1.

In the other columns of table 9, 10 and 11 we estimate the instrumented impact of regional job reallocation rates on sub-populations of under a year males grouped by various categories of age, education and job tenure. This is to test the hypothesis that while the average duration of the unemployment declines with the rate of regional job reallocation, the impact on various human capital characteristics is not uniform. In particular those who are either older than 44 years, have only basic educational attainment or have previous tenure exceeding 10 years may be structural unemployed and not respond to the advances in regional job reallocation.

< Table 9 about here >

The results for age groupings are presented in table 9. The default category for age in column one is 15-24 years. We note that instrumented job reallocation rates have an important partial impact on the annual hazard rates for males in unemployment under a year. So, any male unemployed with duration of less than 12 months residing in a voivodship advanced in restructuring has a much higher probability of exit. *Ceteris paribus*, increases in regional job reallocation reduces dramatically the average duration of under a year unemployment spells. The second important point that we can infer, from the first column of table 9, relates to the partial effects that age characteristics have on the annual hazard rate of males. *Ceteris paribus*, the odds ratio is found to decrease monotonically with age. In the second, third, fourth and fifth column we explore the thesis that as males get older the ability of regional job reallocation to reduce unemployment duration decreases. We observe declines in the response of the odds ratio

to regional restructuring as age increases. Males over 44 years of age seem to have a “bad” human capital characteristic, and do not respond at all to regional job reallocation.

< Table 10 about here >

The same analysis for education is undertaken in table 10. In column one we note that instrumented job reallocation rates retain their impact on the annual hazard rates for males in unemployment under a year. *Ceteris paribus*, the odds ratio is found to decrease monotonically with education. In the second, third and fourth column we explore the thesis that less educated males respond less to regional job reallocation in terms of reducing unemployment duration. We observe declines in the response of the odds ratio to regional restructuring with education attainment. Males with only basic education have a particularly "bad" human capital characteristic, as they do not respond to regional restructuring.

< Table 11 about here >

We undertake the same analysis for job tenure in table 10. In column one the instrumented job reallocation rates retain their impact on the annual hazard rates for males in unemployment under a year. *Ceteris paribus*, the odds ratio is found to decrease monotonically with job tenure. In the second, third and fourth column we observe declines in the response of the odds ratio to regional restructuring in males with work experience. Males with only work experience in their pre-transition jobs have a particularly "bad" human capital characteristic, as they do not respond at all to regional restructuring.

The tenure results might seem somewhat paradoxical. In western economies we would expect a positive relationship between work experience and the exit rate from

unemployment. We find that a male worker who flows into unemployment from a pre-transitional job that he held onto during transition has a significantly lower chance of exiting unemployment than someone who comes from a job started during transition or who is a new entrant. In addition, such males will not respond to regional job reallocation. This supports the thesis that work experience during planning may not be valuable in the market system.

This econometric exercise confirms the assertion that the degree of regional job reallocation has an important impact on the average duration of male unemployment during transition. Yet, this effect interacts in an important way with human capital characteristics. In particular, we find that while most males are more likely to have shorter unemployment duration in more advanced regions in terms of job reallocation (social capital), certain groups of males have become structural unemployed during the reallocation process. Males over 44 years of age, males with only basic education or with work experience only in a pre-transitional job.

Since unemployment turnover and the share of males with such bad characteristics is slightly higher in the inflows in more advanced regions, this explains why the stock of LTU in more advanced regions is accumulating relatively more males with such human capital characteristic. As shown in table 6, in 1996 over 60 per cent of LTU males in regional group VI have the characteristic long previous job tenure. This compares with only 30 per cent in regional group I. In regions that have undertaken restructuring this represents severe mismatch in human capital that was accumulated prior to transition and that seems to be outdated in the market system.

VI. CONCLUSIONS

The presence of independent labour markets across Poland hosting idiosyncratic inherited socio-economic structures but common economic institutions provides us with an ideal setting to study unemployment during transition. The dynamics of labour demand were modelled within the spirit of a two-sector OST model. The model predicted that the socio-economic inheritance of a region should determine the speed of job reallocation. In turn, higher rates of regional job reallocation should boost regional unemployment turnover, reduce the duration of frictional and increase the incidence of structural unemployment. The model predicts that at the regional level, the unemployment benefit system should facilitate the job reallocation process, as well as accumulating individuals with ineffective human capital.

We find evidence for these predictions across Polish regions during transition. No monotonic relationship exists in theory, equation (11), and empirically, as portrayed in figure 1, between job reallocation rates and the unemployment rate. Yet, clear-cut predictions can be made concerning job reallocation, unemployment turnover, duration and human capital composition. Advanced regions of Poland in terms of job reallocation have higher unemployment turnover rates and, for most, reduced unemployment duration. The benefit system is used by most as a temporary “pit-stop” to help reallocate workers to jobs in the NPS. In addition, the restructuring of the former SOS and movement of workers to the NPS leaves some human capital characteristics structurally unemployed accumulating heavily in males with basic education, out-dated work experience and old age.

The severe structural component of unemployment observed in advanced regions is not yet as evident in the least restructured regions. Instead, in the latter regions structural unemployment takes, to varying degrees, the form of hidden unemployment in the non-restructured previously SOS. Any attempt to speed up the restructuring process in the previously SOS in eastern regions will induce structural unemployment on a much larger scale to that observed in western regions. As discussed in a more general context by Commander and Tolstopiatenko (1996), this may have serious implications for future taxation and welfare payments. It may therefore be wise for the government, as part of a regional development policy and strategy to join the EU, to invest strongly in the social capital of eastern regions using transfers from western regions.

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TABLE 1

Taxonomy of Polish regions ^a

I	II	III	IV	V	VI
41. Ciechanowskie	32. Chelmskie	25. Czestochowskie	17. Walbrzyskie	8. Katowickie	1. Warszawskie
42. Ostroleckie	33. Kieleckie	26. Bialostockie	18. Slupskie	9. Zielonogorskie	2. Szczecinskie
43. Krosnienskie	34. Radomskie	27. Plockie	19. Elblaskie	10. Legnickie	3. Poznanskie
44. Sieradzkie	35. Tarnowskie	28. Suwalskie	20. Gorzowskie	11. Bydgoskie	4. Wroclawskie
45. Przemyskie	36. Koninskie	29. Kaliskie	21. Lubelskie	12. Opolskie	5. Krakowskie
46. Bialskopodlaskie	37. Skierniewickie	30. Rzeszowskie	22. Torunskie	13. Koszalimskie	6. Lodzkie
47. Siedleckie	38. Nowosadeckie	31. Piotrkowskie	23. Leszczynskie	14. Bielskie	7. Gdanskie
48. Lomzynskie	39. Tarnobrzeskie		24. Pilskie	15. Jeleniogorskie	
49. Zamojskie	40. Wloclawskie			16. Olsztynskie	

^a Ranked in ascending order by a rank score that sums the ranked positions in six social development indicators summarised by the taxonomy in Table2.

Table 2

Summary Statistics of Social Development Indicators by Regional Group (RG)

Indicator	A	B	C	D	E	F
RG I						
Mean	29.4	10.0	00.7	00.4	02.7	53.3
Std. Dev.	02.7	01.6	00.2	00.5	00.8	06.3
Min	25.9	08.0	00.5	00.0	01.6	41.2
Max	33.0	14.0	01.0	01.7	03.8	62.0
RG II						
Mean	32.4	11.0	01.1	00.7	03.8	45.4
Std. Dev.	03.2	01.3	00.4	00.6	00.4	03.3
Min	25.6	10.0	00.5	00.0	03.2	40.3
Max	37.2	13.0	01.8	01.5	04.3	50.4
RG III						
Mean	35.0	13.0	01.4	00.5	04.6	38.2
Std. Dev.	04.5	02.5	00.5	00.3	00.6	03.7
Min	29.8	10.0	00.7	00.3	04.0	32.8
Max	41.2	18.0	02.3	01.1	06.2	43.7
RG IV						
Mean	43.7	13.0	01.2	00.8	04.6	25.6
Std. Dev.	0.43	00.7	00.5	00.4	00.6	07.5
Min	37.0	12.0	00.7	00.3	03.3	13.7
Max	49.8	14.0	02.4	01.6	05.5	36.9
RG V						
Mean	46.1	14.0	03.1	02.0	06.4	18.4
Std. Dev.	04.2	02.3	03.1	01.9	01.6	06.3
Min	40.7	11.0	01.1	00.4	04.8	06.4
Max	54.0	17.0	11.0	06.1	09.7	25.0
RG VI						
Mean	54.3	21.0	05.2	08.9	07.0	12.1
Std. Dev.	04.8	05.6	04.6	13.0	01.1	05.2
Min	49.0	16.0	02.4	01.1	04.9	05.7
Max	63.0	31.0	15.4	38.0	08.2	21.0

A: Share of Market and Non-Market Services in Total Regional Employment, per cent in 1996

B: Regional Telephones per 100 inhabitants in 1996.

C: Investments per 1000 inhabitants, percentage distribution across regions in 1996.

D: Foreign Direct Investments per 1000 inhabitants, percentage distribution across regions in 1996.

E: Share of Building and Construction in Total Regional Employment, per cent in 1996

F: Share of Agriculture in Total Regional Employment, per cent in 1996

Correlation	A	C	D	E	F	G
A	1.0					
B	0.74	1.0				
C	0.51	0.63	1.0			
D	0.47	0.69	0.84	1.0		
E	0.70	0.56	0.62	0.40	1.0	
F	-0.92	-0.65	-0.53	-0.39	-0.80	1.0

Table 3

Job Reallocation Rates
by Regional Social Development Grouping

	Regional Grouping	Job Reallocation Rates
1994	I	1.03
	II	2.12
	III	2.56
	IV	3.48
	V	4.37
	VI	6.94
1995	I	2.19
	II	4.44
	III	4.45
	IV	4.63
	V	5.71
	VI	7.98
1996	I	2.57
	II	4.51
	III	4.81
	IV	5.45
	V	5.87
	VI	8.44

Source: Amadeus Company Accounts Data

Table 4

Male Inflow, Outflow Rates and LTU Share by Regional Group

	<i>Group</i>	<i>Inflow Rate</i>	<i>Outflow Rate</i>	<i>LTU Share</i>
1994	I	0.71	0.87	.46
	II	0.72	0.77	.40
	III	0.78	0.83	.42
	IV	0.73	0.91	.41
	V	0.85	1.00	.37
	VI	0.96	1.10	.33
1995	I	0.92	0.87	.38
	II	0.95	1.00	.34
	III	0.96	1.04	.35
	IV	1.02	0.97	.34
	V	1.10	1.13	.30
	VI	1.10	1.24	.30
1996	I	0.91	1.14	.35
	II	0.88	1.10	.34
	III	0.97	1.21	.33
	IV	1.04	1.30	.31
	V	1.13	1.37	.28
	VI	1.12	1.48	.27

Source: Polish Live Register.

Table 5

Composition of Male Unemployment Inflows and Long Term Unemployment
by Age and Regional Group

		1994							
		15-24		25-34		35-44		>44	
Group		Inflow	LTU	Inflow	LTU	Inflow	LTU	Inflow	LTU
I		.48	.36	.25	.30	.19	.22	.08	.12
II		.47	.34	.25	.28	.18	.24	.10	.14
III		.42	.32	.25	.27	.21	.25	.12	.16
IV		.42	.31	.25	.26	.23	.27	.10	.16
V		.42	.27	.23	.24	.23	.28	.12	.21
VI		.38	.23	.22	.21	.23	.29	.17	.27

		1995							
		15-24		25-34		35-44		>44	
Group		Inflow	LTU	Inflow	LTU	Inflow	LTU	Inflow	LTU
I		.51	.32	.23	.29	.18	.24	.08	.15
II		.48	.31	.23	.28	.20	.25	.09	.16
III		.46	.28	.23	.26	.21	.25	.10	.21
IV		.44	.28	.23	.25	.22	.27	.11	.20
V		.45	.25	.22	.23	.22	.27	.11	.25
VI		.41	.21	.21	.19	.24	.27	.14	.33

		1996							
		15-24		25-34		35-44		>44	
Group		Inflow	LTU	Inflow	LTU	Inflow	LTU	Inflow	LTU
I		.38	.30	.29	.28	.22	.25	.11	.17
II		.38	.28	.28	.26	.23	.26	.11	.20
III		.36	.25	.26	.24	.24	.25	.14	.26
IV		.36	.25	.25	.23	.25	.27	.14	.25
V		.38	.23	.23	.21	.25	.26	.14	.30
VI		.33	.18	.22	.16	.26	.24	.19	.42

Source: Polish Live Register.

Table 6

Composition of Male Unemployment Inflow and Long Term Unemployment Pool
by Education and Regional Group

1994						
Group	University		Secondary		Basic	
	Inflow	LTU	Inflow	LTU	Inflow	LTU
I	.01	.01	.72	.65	.27	.34
II	.01	.01	.71	.64	.28	.35
III	.02	.01	.68	.61	.30	.38
IV	.01	.01	.65	.61	.34	.38
V	.01	.02	.66	.57	.33	.41
VI	.03	.04	.58	.58	.39	.38
1995						
Group	University		Secondary		Basic	
	Inflow	LTU	Inflow	LTU	Inflow	LTU
I	.01	.01	.73	.64	.26	.35
II	.01	.01	.71	.62	.28	.37
III	.02	.01	.69	.59	.29	.40
IV	.01	.01	.65	.57	.34	.42
V	.01	.01	.67	.56	.32	.43
VI	.03	.03	.63	.54	.34	.43
1996						
Group	University		Secondary		Basic	
	Inflow	LTU	Inflow	LTU	Inflow	LTU
I	.01	.01	.65	.63	.34	.36
II	.01	.01	.66	.61	.33	.38
III	.02	.01	.63	.56	.35	.42
IV	.01	.01	.60	.55	.39	.43
V	.01	.01	.62	.55	.37	.44
VI	.03	.03	.59	.53	.38	.44

Source: Polish Live Register.

Table 7

Composition of Male Unemployment Inflow and Long Term Unemployment Pool
by Tenure and Regional Group

1994		<i>Tenure</i>					
		<i>None</i>		<i>0-10 Years</i>		<i>>10 Years</i>	
<i>Group</i>	<i>Inflow</i>	<i>LTU</i>	<i>Inflow</i>	<i>LTU</i>	<i>Inflow</i>	<i>LTU</i>	
I	.37	.32	.36	.40	.27	.28	
II	.31	.22	.39	.45	.30	.33	
III	.28	.21	.36	.42	.36	.37	
IV	.24	.18	.38	.41	.38	.41	
V	.27	.18	.35	.37	.38	.45	
VI	.22	.19	.35	.31	.43	.50	

1995		<i>Tenure</i>					
		<i>None</i>		<i>0-10 Years</i>		<i>> 10 Years</i>	
<i>Group</i>	<i>Inflow</i>	<i>LTU</i>	<i>Inflow</i>	<i>LTU</i>	<i>Inflow</i>	<i>LTU</i>	
I	.38	.29	.37	.40	.25	.31	
II	.32	.21	.42	.41	.26	.38	
III	.30	.23	.35	.36	.35	.41	
IV	.25	.17	.38	.42	.37	.41	
V	.27	.17	.38	.35	.35	.49	
VI	.25	.17	.35	.27	.40	.56	

1996		<i>Tenure</i>					
		<i>None</i>		<i>0-10 Years</i>		<i>> 10 Years</i>	
<i>Group</i>	<i>Inflow</i>	<i>LTU</i>	<i>Inflow</i>	<i>LTU</i>	<i>Inflow</i>	<i>LTU</i>	
I	.23	.27	.48	.41	.29	.32	
II	.19	.19	.55	.43	.26	.38	
III	.17	.19	.43	.35	.40	.46	
IV	.15	.16	.47	.40	.38	.44	
V	.17	.15	.45	.33	.38	.52	
VI	.17	.14	.39	.25	.44	.61	

Source: Polish Live Register.

Table 8

Under a year average Hazard Rates for Male Unemployed
by Age/Education/Tenure by Regional Group^a

Three Month Hazard Rates (a_{t-y+1})

Group	Age				Education			Tenure		
	15-24	25-34	34-44	>45	Uni.	Sec.	Basic	None	0-10	>10
I	.21	.17	.16	.12	.36	.18	.16	.24	.16	.15
II	.25	.23	.22	.19	.39	.23	.22	.29	.22	.21
III	.22	.21	.15	.15	.38	.20	.18	.25	.18	.17
IV	.20	.23	.20	.16	.28	.21	.19	.27	.19	.19
V	.28	.26	.24	.17	.36	.25	.24	.31	.25	.23
VI	.30	.28	.29	.22	.35	.25	.31	.35	.28	.25

Six Month Hazard Rates (b_{t-y+1})

Group	Age				Education			Tenure		
	15-24	25-34	34-44	>45	Uni.	Sec.	Basic	None	0-10	>10
I	.37	.35	.35	.31	.52	.35	.35	.39	.33	.36
II	.39	.37	.36	.31	.53	.37	.36	.43	.36	.35
III	.39	.37	.35	.31	.52	.37	.35	.45	.35	.34
IV	.43	.39	.35	.29	.51	.38	.37	.50	.36	.35
V	.46	.43	.41	.33	.54	.43	.41	.50	.41	.40
VI	.48	.48	.46	.36	.54	.44	.47	.53	.46	.42

Twelve Month Hazard Rates (c_{t-y+1})

Group	Age				Education			Tenure		
	15-24	25-34	34-44	>45	Uni.	Sec.	Basic	None	0-10	>10
I	.72	.67	.65	.56	.80	.69	.65	.70	.67	.66
II	.74	.70	.67	.57	.82	.71	.66	.72	.70	.67
III	.75	.72	.70	.58	.80	.73	.67	.73	.73	.68
IV	.78	.75	.72	.60	.81	.75	.70	.77	.74	.72
V	.81	.77	.75	.61	.81	.77	.72	.80	.77	.72
VI	.85	.81	.78	.62	.80	.80	.76	.82	.82	.74

^a These rates are averaged over the flows between 1994-95 and 1995-96.

Source: Polish Live Register.

Table 9

Weighted Least Squares Logit for Grouped Data:
Annual Exit Rate of Male under a year stock conditioned on age.

Odds Ratio (t-stat)	Age	Age 15-24	Age 25-34	Age 35-44	Age > 44
Observations	1556	389	389	389	389
R ²	0.75	0.82	0.77	0.79	0.53
Adj. R ²	0.74	0.80	0.73	0.75	0.46
Age 15-24		-	-	-	-
Age 25-34	.84 (-11.1)*	-	-	-	-
Age 35-44	.73 (-19.9)*	-	-	-	-
Age > 44	.41 (-13.1)*	-	-	-	-
**Region Job Reallocation	1.26 (3.4)*	1.49 (3.7)*	1.32 (2.6)*	1.19 (1.7)*	1.11 (0.8)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Seasonal Dummies	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes

- Significant at the 5% level.
- **Instrumented with RANK, Regional, Seasonal and Year Dummies

Table 10

Weighted Least Squares Logit for Grouped Data:
Annual Exit Rate of Male under a year stock conditioned on Education.

Odds Ratio (t-stat)	Education	University	Secondary	Basic
Observations	1167	389	389	389
R ²	0.75	0.80	0.71	0.50
Adj. R ²	0.74	0.77	0.66	0.42
<i>University</i>		-	-	-
Secondary	.77 (-5.1)*	-	-	-
Basic	.61 (-9.5)*	-	-	-
**Region Job Reallocation	1.3 (3.7)*	1.28 (2.6)*	1.26 (2.0)*	.75 (-1.2)
Regional Dummies	Yes	Yes	Yes	Yes
Seasonal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes

- Significant at the 5% level.
- **Instrumented with RANK, Regional, Seasonal and Year Dummies

Table 11

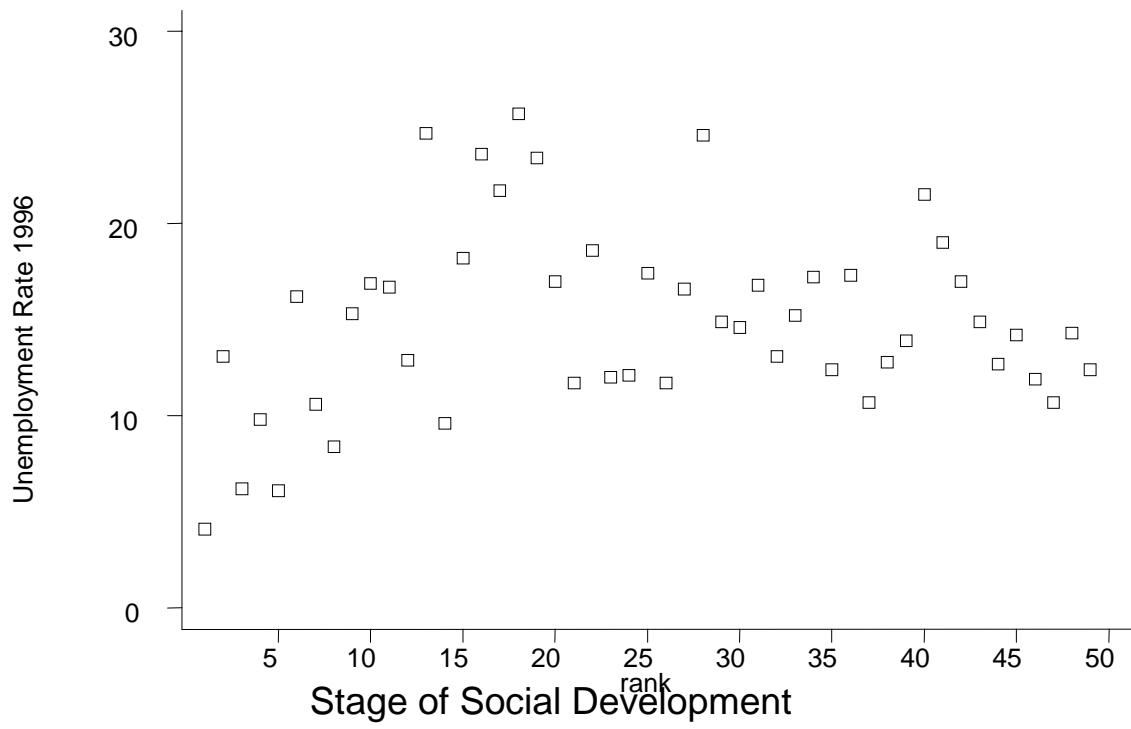
Weighted Least Squares Logit for Grouped Data:
Annual Exit Rate of Male under a year stock conditioned Job Tenure.

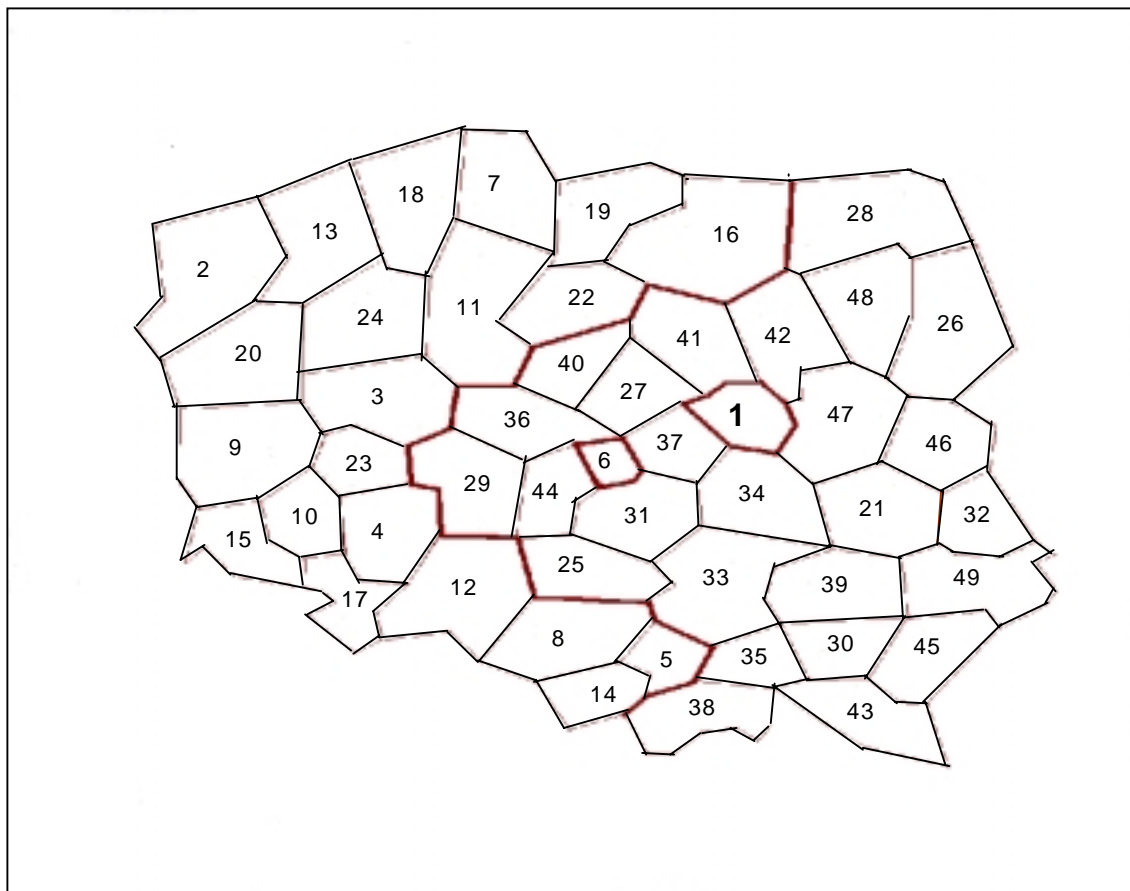
Odds Ratio (t-stat)	Job Tenure	No Tenure	Tenure 0-10	Tenure > 10
Observations	1167	389	389	389
R ²	0.62	0.74	0.76	0.67
Adj. R ²	0.60	0.71	0.72	0.62
<i>No Previous Tenure</i>		-	-	-
Tenure 0-10	.93 (-3.3)*	-	-	-
Tenure > 10	.74 (-14.5)*	-	-	-
**Region Job Reallocation	1.28 (2.9)*	1.49 (3.4)*	1.43 (2.6)*	1.11 (0.9)
Regional Dummies	Yes	Yes	Yes	Yes
Seasonal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes

- Significant at the 5% level.
- **Instrumented with RANK, Regional, Seasonal and Year Dummies

Figure 1

Unemployment and the ranking of Polish regions by degree of restructuring





*Ranked in ascending order by a rank score that sums the best six ranked positions in seven social development indicators

1	Warszawskie	19	Elblaskie	37	Skierniewickie
2	Szczecinskie	20	Gorzowskie	38	Nowosadeckie
3	Poznanskie	21	Lubelskie	39	Tarnobrzeskie
4	Wroclawskie	22	Torunskie	40	Wloclawskie
5	Krakowskie	23	Leszczynskie	41	Ciechanowskie
6	Lodzkie	24	Pilskie	42	Ostroleckie
7	Gdanskie	25	Czestochowskie	43	Krosnienskie
8	Katowickie	26	Bialostockie	44	Sieradzkie
9	Zielonogorskie	27	Plockie	45	Przemyskie
10	Legnickie	28	Suwalskie	46	Bialskopodlaskie
11	Bydgoskie	29	Kaliskie	47	Siedleckie
12	Opolskie	30	Rzeszowskie	48	Lomzynskie
13	Koszalimskie	31	Piotrkowskie	49	Zamojskie
14	Bielskie	32	Chelmskie		
15	Jeleniogorskie	33	Kieleckie		
16	Olsztynskie	34	Radomskie		
17	Walbrzyskie	35	Tarnowskie		
18	Slupskie	36	Koninskie		

Chart 1 Location of Regions by their rank