T/ 76 A 10

Discussion Paper No. 95–03

The Polish Labour Market in Transition

Viktor Steiner, ZEW Mannheim

Eugeniusz Kwiatkowski, University of Lodz

1995 K 1583

The Polish Labour Market in Transition

by

Viktor Steiner
Zentrum für Europäische Wirtschaftsforschung (ZEW)
Centre for European Economic Research
Mannheim, Germany

and

Eugeniusz Kwiatkowski
University of Lodz, Poland

April 1995

Abstract: The paper presents an empirical analysis of labour force dynamics in Poland in the period 1992 – 1993. Transitions between employment, unemployment and non-participation in the labour force at the individual level are derived from panel data of the Polish Labour Force Survey. These transitions are related by means of a dynamic microeconometric model to various demographic and socio-economic characteristics of the labour force, labour market indicators and other structural variables. Based on estimated transition rates between all three labour force states and some simplifying assumptions we derive steady-state or 'equilibrium' unemployment rates for various groups of the labour force. It is shown that these differ greatly between demographic and socio-economic groups and how this is related to differences in the various transition rates between labour force states.

1 Introduction

The transition of the centrally planned economies in Central and Eastern Europe and its impact on labour markets has been the topic of much recent research effort [for summaries see, among others, Boeri/Keese (1992), Boeri (1994a, b), Burda (1993), Franz (1994), OECD (1994, 1995), Commander/Coricelli (1995)]. Following the first phase of the transition process where research and policy discussions mainly focused on the impact of the various governments' stabilization programmes on the main macroeconomic aggregates, recent research has shifted to more detailed analyses of labour market developments related to the economic restructuring process. One frequent observation is that the dynamics of employment and unemployment do not correspond to what one may expect to occur in the transition process from a centrally planned to a market economy [Boeri (1994a)]. In particular, the fact that outflows from unemployment into employment are relatively small compared both to the inflows in these countries and to the levels observed in most market economies is generally considered as indicative of the presence of serious obstacles to the restructuring process.

The development of the Polish labour market is no exception in this respect, but offers some special insights due to its role as the first country which introduced stabilization and liberalization programmes in early 1990. These programmes had a profound impact on 'open' unemployment. Within less than a year the Polish aggregate unemployment rate increased from virtually zero to some 12 percent in 1991 and kept on increasing after the aggregate demand shock engendered by the stabilization programmes had faded away. Several factors have been offered as partial explanations for this latter increase, including a strong increase in labour supply of people previously not attached to the labour market, the effects of re-allocation shocks on regional labour markets due to the industrial mono–structures inherited from the system of central planning, regional and occupational mismatch, and institutional rigidities in the labour market [see OECD (1993) for a comprehensive summary].

Several of these factors have been analysed on the basis of aggregate or regionally disaggregated unemployment flow and vacancy data [see, among others, Lehmann/Kwiatkowski/Shaffer (1991), Góra/Lehmann (1992), Kwiatkowski (1994), and on a comparative basis with other transition economies Boeri (1994a, b) and Scarpetta (1995)]. Given the very limited informational content of these data and the additional problems of their interpretation related to structural breaks in the short time–series available, it will come as no surprise that this research has yielded few definite results. Furthermore, these aggregate studies cannot account for differences in labour force behaviour between various demographic and socio–economic groups which, from the experience in market economies, can be expected to be of great importance for an explanation of unemployment. Although there is some evidence

that unemployment, and especially long–term unemployment, is heavily concentrated among particular groups of the labour force [Kotowska (1993), Witkowski (1993, 1994)], there has been little systematic microeconomic analysis of labour force dynamics for Poland so far.

As for other transition economies, the analysis of the Polish labour market labour has to take into account that, first, the economic restructuring process should lead to large–scale adjustments of the labour force and, secondly, the impact of these adjustments on employment, unemployment and labour force participation is likely to be different for various demographic and socio–economic groups. This calls for a dynamic analysis of labour force behaviour at the individual level. In this paper, we therefore extend the traditional stock–flow analysis of labour force dynamics introduced by, among others, Hall (1972), Toikka (1976), Marston (1976) and Clark/Summers (1979) making use of the microdata of the quarterly Polish Labour Force Survey. This allows us to relate individual transitions between the three labour force states employment, unemployment and non–participation to various demographic and socio–economic characteristics, labour market indicators and other structural variables.

To isolate the main factors affecting these transition rates we estimate a dynamic microeconometric model of individual labour force transitions between these three states making use of the first four waves of the Polish Labour Force Survey which were undertaken as a pure panel, i.e. follow the same individuals in each of four consecutive quarters. Based on estimated transition rates and some simplifying assumptions we then calculate steady–state or 'equilibrium' unemployment rates – defined by the equality of inflows into and outflows from unemployment – for various groups in the labour force. These calculations together with the estimation results for the main determinants of the various transition rates provide a detailed description of labour force dynamics in the period 1992 – 1993 and useful information for labour market policy analysis.

The remainder of the paper proceeds as follows. In the next section, we describe general labour market developments in Poland between 1990 and 1993 to set the scene for the following empirical analysis of labour market transitions, which refers to the second stage of the transition process in the period 1992 – 1993. Since these developments are already well documented in the literature, our presentation will be brief and rather selective here. In section 3 the way we derive transitions between the various labour force states from the Polish Labour Force Survey is described and empirical transition rates between these states are presented. The empirical model we use to analyse the determinants of individual labour force transitions is set out in section 4. Estimation results for the various transition rates are presented and discussed in section 5, while in section 6 the implications of these estimates for the 'equilibrium' unemployment rate are illustrated, and section 7 concludes.

2

2   Labour market developments 1990 – 1993

The transition to a market economy in Poland initiated by the stabilization and liberalization programmes in early 1990 has caused significant changes in the labour market. These programmes comprised the liberalisation of prices and foreign trade, the introduction of a stricter financial regime for state enterprises, the introduction of internal convertibility of the Polish currency and a tight macroeconomic policy stance. They engendered a negative aggregate shock, a combination of depressed aggregate demand and a credit squeeze [Góra (1991), Blanchard/Commander/Coricelli (1994)]. This aggregate shock played a decisive role in the first stage of the transition process when real GDP declined by 11.6% in 1990 and by 10.0% in 1991.

Although real wages declined by almost 25% in 1990 and have remained at a low level in subsequent periods, this decline was not sufficient to compensate for the large decline in aggregate demand and the simultaneuous substantial increase in labour supply. The shortage of labour which existed permanently under the centrally planned economy disappeared and was superseded by open unemployment on a large scale. While there were as little as 9.8 thousand unemployed people and 254.5 thousand vacancies at the end of 1989, one year later there were 1126.1 thousand unemployed people and as little as 5.4 thousand vacancies. The unemployment rate increased from virtually zero to an average rate of 12% in 1991.

Even after this strong increase in open unemployment the Polish economy was left with a substantial share of hidden unemployment which had existed throughout the period of the centrally planned economy. According to some estimates, hidden unemployment in the Polish industry amounted to 25% of total industrial employment at the end of the 1980's [Rutkowski (1990)]. Although some employment adjustments did occur in the Polish economy during the first two years of transition – total employment fell by 6.1% in 1990 and by 3.7% in 1991 – the reduction in employment was smaller than the decline in output, implying a decrease in labour productivity. This suggests that, rather than being a source of rising open unemployment in the years 1990 – 1991, hidden unemployment even increased in this period. This conclusion is also supported by a closer look at the development of output and employment in selected industries which shows that, with the exception of the coal and textile industries, labour productivity did not increase in this period [see Kwiatkowski (1994)].

Some sluggishness in the reduction of employment resulted from the behaviour of state enterprises which used 'soft' methods of employment adjustment and labour cost reduction. Due to the strong position of workers councils and the two main trade unions ('Solidarity' and 'OPZZ', the official union established under the period of martial law) in public enterprises, the management avoided mass layoffs and the firing of core groups of workers. In case layoffs were unavoidable, marginal groups of workers (part–time workers and so–called 'peasant–workers') were fired. A

survey conducted in public enterpises [see Kwiatkowski (1993a)] showed that instead of layoffs alternative methods of employment adjustments were predominantly used including cuts in overtime and standard hours, freezing recruitments, and early retirement. Due to this practice prevalent in state enterprises, employment did not adjust fully to the decline of output.

Apart from demand factors, the increase in labour supply also played an important role in the built–up of unemployment in this period. Due to the sharp fall in real incomes at the beginning of the transition period, so–called 'secondary' workers, i.e. household members not included in the labour force under socialism, entered the labour market. In terms of an 'added–worker effect' this may be due to the attempt to compensate for lost household income by those households affected by unemployment. Alternatively, these workers could also have been encouraged to enter the labour market by the legal regulations concerning unemployment benefits because at the start of the transition period all registred unemployed were eligible to unemployment benefits, there was no previous work requirement and the entitlement period was open–ended.[1] Whatever the reason for the increase in labour supply of some 450 thousand people in each of the two years 1990 and 1991, it contributed, in a definitional sense, to more than 40% of the increase in unemployment in this period [Witkowski (1994: 59)].

Since 1992 the situation in the Polish labour market has changed markedly. Although real GDP increased by 2.6% in 1992 and 3.8% in 1993, registered unemployment was still rising in that period and reached a level of almost 2.9 million people or 16% of the labour force at the end of 1993 [GUS (1994)]. Labour productivity also increased substantially in most industries suggesting a reduction of hidden unemployment. Due to demographic factors, labour supply kept on increasing in 1992 and 1993 and, although the number of additional workers entering the labour market was somewhat lower than in the previous period, contributed the lion's share to the increase in unemployment in this period. On the other hand, labour force participation rates both of males and females declined somewhat, especially among the youngest and oldest age groups [Witkowski (1994)].

Another important feature of the Polish labour market is the strong variation of the situation in regional labour markets. If we take the voivodships, which are administrative units, as regional labour markets, one can distinguish between three types of regions – agricultural, industrialized and modern, where the latter refers to regions with high shares of services and non–agricultural private employment [for details of this classification see Lehmann/Kwiatkowski/Schaffer (1991)]. Due to the

---

[1] This law was changed in September 1990. According to the new law, people are eligible to unemployment benefits if they have worked at least 180 day over the last 12 months. In December 1992 the period of drawing benefits was limited to 12 months

strong regional concentration of agricultural and industrial production inherited from the socialist system of central planning and the low level of regional mobility – partly explainable by the absence of a well functioning housing market – these reallocation shocks may have resulted in a higher mismatch between the unemployed and vacancies in regional labour markets. Tentative empirical evidence for this hypothesis comes from the fact that, in a few periods, the rise in the unemployment rate was accompanied by an increasing vacancy rate, i.e. some outward–shift of the Beveridge curve [Kwiatkowski (1994)], and a slight increase in regional mismatch indices [Boeri (1994a), Table 8].

Apart from regional differences, unemployment rates also differ substantially by gender, age and education. Female unemployment rates are generally higher than those of males, even after controlling for age, education and other socio–economic characteristics of the unemployed [GUS (1993:102), Kotowska (1993)]. Irrespective of gender, older people have a much lower unemployment rate than youth, which can to some extent be explained by the extensive use of early retirement schemes, especially in the first phase of the transition period. As regards educational attainment, the unemployment rate is the lowest among people with higher education and the highest for those with only basic vocational education [GUS (1993:104)].

In a definitional sense, the increase of unemployment resulted from the fact that inflows into unemployment were higher than outflows from the unemployment pool [GUS (1994)]. The difference between the two flows was especially large in the middle of the period under consideration, which was connected with the increased inflow of school–leavers into the labour market. However, there is no clear upward trend of inflows into unemployment within the period under consideration. With moderate inflows and rather low outflows, the share of long–term unemployment has has been increasing with the passage of time. While in July 1992 the number of people on the register for more than 12 months already amounted to 975 thousand (38.5% of the unemployment stock), in December 1993 this figure had reached the level of 1,290 thousand, i.e. almost 45% of the unemployment stock [GUS (1994)] Long–term unemployment is concentrated among females, the younger age groups and people with a low level of education [Witkowski (1993)].

As in other transition economies, labour market policies played an important role in the development of Polish unemployment.[2] The number of people participating in 'active' labour market policy programmes, which include training schemes, intervention works, public works and expenditures on start–up loans, has more than doubled to more than between 1990 and 1992 reaching a level of some 217 thousand, but was somewhat reduced in 1993. However, due to the sharp rise in

---

[2] The following relies on OECD (1993, chapter VI) and, in particular, Góra (1994); for a comparison with other transition countries see Scarpetta/Reutersward (1994).

unemployment the share of people covered by these schemes dropped from about 17% to 6% of the unemployment stock. These programmes have covered about 30% of all long–term unemployed registered in this period.

Due to the tightening of the eligibility criteria for receiving unemployment benefits the share of recipients has dropped from about 70% in 1990 to some 40% in 1993. Aside from those losing entitlement to unemployment benefits because of long–term unemployment the strong increase of people entering the labour market for the first time also contributed to this decline. The ratio of the average level of unemployment benefits to the average wage – the average replacement ratio – reached its peak with 37% in 1991 and has decreased slightly since then. Starting from a very low level, the increase in the minimum wage exceeded that of the average wage by a large margin and also outpaced the increase in the average level of unemployment benefits.

A more thorough understanding of the developments described in this section and the potential impacts of labour market and social policies on labour force behaviour requires an analysis of the factors determining individual transitions between employment, unemployment and non–participation in the labour force. As described in the next section, the Polish Labour Force Survey provides the necessary information for such an analysis.

3   Labour Force Transitions in the Polish Labour Force Survey

Our empirical analysis is based on individual labour force transitions derived from the Polish Labour Force Survey (PLFS) which is a representative sample of the Polish population aged 15 years and above run on a quarterly basis since May 1992 (for details see Szarkowski and Witkowski, 1994). For our purpose, the following features of the PLFS are of special importance.

In the first four rounds, carried out in May, August and November 1992, and in February 1993, the PLFS was conducted as a pure panel, since May 1993 it is run on a rotating basis. Since there was very little sample attrition in the consecutive three waves, the number of individuals was almost the same in each of the first four waves. For technical reasons related to the econometric model described in the next section, our emprical analysis will be restricted to the pure panel part, where individuals were followed over four consecutive quarters. In May 1992, 45319 individuals aged 15 or more were surveyed who accounted for 0.158 per cent of the total Polish population in this age group.

The survey allows us to distinguish between three labour force states, namely

6

- *employment*,

- *unemployment*, and

- *non–participation* in the labour force,

where these states are defined according to ILO recommendations. In particular, the classification of the relevant question in the PLFS starts from the employment state followed by unemployment and leaving non–participation in the labour force as the residual state. This sequence guarantees that every person belongs only to one state in the reference week which covers the 15th day of the middle–month of each quarter.

In this classification, employment includes (i) persons who, during the reference week, earned money working for at least one hour, i.e. were employed or self–employed, or (ii) persons who, during the reference week, temporarily did not work but formally were employed or self–employed, or (iii) unpaid family workers. Included in the unemployment state are those who (i) were not in employment in the reference week, and (ii) were actively looking for a job, and (iii) were ready to take up a job in the reference week or the following one[3]. Persons not included into these two states are, by definition, non–participants in the labour force. Table 1 shows the distribution of individuals between the three labour force states as derived from the first four waves of the PLFS.

The distribution of the population between the three labour force states has not changed much within the observation period. In February 1993, the share of employed people has been one percentage point below its level in May 1992, whereas both the share of the unemployed and the non–participants have increased. The unemployment rate implied by the distribution in Table 1 has increased from 12.8 to 14.2 percent in this period, which corresponds closely to the development of the unemployment rate as derived from the register data. It's not clear to what extent these changes are due to seasonal effects or to the impact of the restructuring process.

\

---

[3] This definition differs from the one used by the labour offices to register someone as unemployed. According to the Polish legal regulations, a person is unemployed if he/she fulfills the following criteria: (a) is able to work, (b) is out of work, (c) is ready to work, (d) is registered at a local labour office, (e) does not receive a pension, (f) does not own his/her own business, and (g) does not own his/her own farm with an area of more than two ha. Despite these differences, the number of unemployed in May 1992 according to the register–based data of the labour offices was only 25 thousand persons lower than the number coming from the PLFS.

7

Table 1   Distribution of labour force states in the PLFS, May 1992 – February 1993

Labour force state	92/II	92/III	92/IV	93/I
Employment	23837	24388	24137	23699
%	52.60	53.16	52.77	51.66
Unemployment	3484	3879	3794	3913
%	7.69	8.46	8.29	8.53
Non–participation	17647	17563	17787	18228
%	38.94	38.28	38.89	39.74
Missings	351	47	21	31
%	0.77	0.10	0.05	0.07
Total	45319	45877	45739	45871
%	100.00	100.00	100.00	100.00

Note: 92/II refers to the second quarter in 1992 etc.

Source: The Polish Labour Force Survey (PLFS), waves 1 – 4; own calculations.

The fact that the distribution of labour force states has changed little in the observation period does not necessarily imply that gross flows between these states are small. Obviously, if inflows and outflows between states are roughly in balance net flows will be small and the stocks of people in each state will remain fairly stable. To get some idea on the relative importance of the flows between the various labour force states we calculate empirical transition rates based on the information contained in Table 1. These transition rates are given by the respective flow of people from a particular state into the two alternative states relative to the stock of people in the former state at the beginning of the period and are reported in Table 2. For example, 1133 of all employed people in May 1992 (4.74%) left the employment state between May and August 1992; of these, 428 became unemployed and 704 dropped out of the labour force implying transition rates into these two states of 1.80 and 2.95, respectively.

As far as quarterly transition rates are affected by seasonal factors, changes in these rates within the observation period do not represent a genuine structural change. To account for seasonal and other irregular effects, we also report the average value of the transition rates over the three periods in the bottom line of Table 2. In addition to the quarterly and averaged transition rates, we also report the outflow rate from any one of the three states which is simply given by the sum of the two respective transition rates. For example, on average over the observation period the quarterly outflow rate from unemployment was 20.36%.

Table 2 Quarterly empirical transition rates between labour force states (in %), May 1992 – February 1993

Quarter	P^{eu}	P^{en}	P^e	P^{ue}	P^{un}	P^u	P^{ne}	P^{nu}	P^n
92/II – 92/III	1.80	2.95	4.75	17.54	6.66	24.20	3.89	3.91	7.80
92/III– 92/IV	1.82	2.97	4.79	16.71	5.34	22.05	2.16	1.50	3.66
92/IV – 93/I	1.98	1.84	3.82	10.02	4.80	14.82	1.19	1.24	2.43
⊘ 92/2 –93/I	1.87	2.59	4.45	14.76	5.60	20.36	2.41	2.22	4.63

Note: The superscripts j, k (j,k = e,u,n) refer to, respectively, the employment, unemployment and non–participation states, where j indicates the state of origin and k the state of destination. Outflow rates are indicated by a single superscript and are given by the sum of the transition rates from the state of origin to the two alternative states, e.g. $P^e = P^{eu} + P^{en}$. Average (⊘) transition rates are means across rows.

Source: The Polish Labour Force Survey (PLFS), waves 1 – 4; own calculations.

As Table 2 shows, except for the transition rate from employment into unemployment all rates have declined between 92/II and 93/I. The transition rate from employment into non–participation was much higher than into unemployment in the first two periods, but dropped below the level of the latter in the last period. This seems to reflect the wide–spread use of early retirement schemes as a means of labour force adjustment rather than just seasonal factors. Since the slight increase in the transition rate into unemployment was over–compensated by the sharp fall of the transition rate from employment into non–participation the outflow rate from employment in the last period was substantially lower than at the beginning of the observation period. At a level of about 4% per quarter the outflow rate from employment seems rather low given the need of large–scale economic restructuring and is, in fact, substantially lower than in most market economies.

The average quarterly outflow rate from unemployment of about 20% is also at a relatively low level. Furthermore, a considerable share of all outflows from unemployment end in non–participation rather than in employment. The reduction of the outflow rate from unemployment over the observation period is mainly due to the drop in the transition rate into employment in the last quarter, which could be due to seasonal factors, whereas the level of the transition rate into non–participation has been relatively stable over the observation period.

Averaged over the observation period, the quarterly outflow rate from non–participation was at a similar level as the outflow rate from employment. The transition rate from non–participation into employment as well as into unemployment and, hence, the outflow rate from non–participation declinced substantially over the observation period. The relatively high transition rates between May and August 1992 are at least partly due to school leavers entering the labour market, whereas the decline of the transition rate into employment in the second period may also be the result of seasonal factors.

These transition rates do not only vary over time, depending both on the stage of the economic transition process and on the business cycle as well as on seasonal factors, but are related to various socio–economic and structural factors, the effects of which may differ qualitatively for any one of these transitions. For example, the transition rate from employment into unemployment typically decreases with age, whereas the transition rate from employment into non–participation for males may be rather constant up to a certain age limit and then sharply increase after reaching the early retirement age; for females, it may also be relatively high in the middle age groups for family reasons. On the other hand, transition rates from unemployment into employment are, for various reasons, usually quite low for older workers, whereas leaving the labour force is often a more feasible option for them than for younger workers. These and other effects are typically highly correlated with the intervening effects of other variables and can only be sorted out by analyzing them within a microeconometric model, to which we now turn.

4   A Markov Model of Individual Labour Force Transitions

A convenient and common assumption in the analysis of labour force dynamics is that transition rates (probabilities) between labour force states follow a simple Markov process (chain).[4] This implies that transition rates only depend on the state of origin and, possibly, a set of exogenous variables, but not on the history of the process. Of course, this assumption is rather restrictive since it rules out certain potentially important state dependence effects in individual labour force behaviour, which may be especially important for the explanation of the dynamics of unemployment [see Boeri (1994a, b)]. However, given the information on the occurrence and timing of events contained in the PLFS, we will also have to rely on this assumption for the following empirical analysis.[5] It should also be noted that a high share of long–term unemployed or a low average outflow rate from unemployment do not contradict the assumption that transition rates at the *individual level* are constant over the unemployment spell. Declining transition rates in heterogeneous populations can be the result of a sorting process if individual rates differ but are constant over time because, in this case, those with high transition rates would leave the state relatively quickly leaving an increasing share of people with low rates behind; as a result, average transition rates will decrease with process

---

[4]   In the statistical literature, the terms transition rates (probabilities) and Markov process (chain) refer to continuous (discrete) time stochastic processes. Since our model is based on quarterly observations on an individual's labour force state, it is in discrete time. However, in order to remain consistent with the terminology found in the labour economics literature and also used in section 3 we use the terms transition *rates* rather than *probabilities* in the text.

[5]   In particular, this assumption circumvents the problem that we do not observe the duration someone has already been in a particular state at the beginning of the observation period, i.e. the left–censoring of observations.

time.[6]   It is therefore very important to statistically control for population heterogeneity in the estimation, which we do by including, in addition to the standard control variables, a random effect that accounts for unobserved time–invariant individual differences in transition rates.

The transition rate from any one of the three labour force states, j, into any one of the two alternative states, k, for individual i (i=1,...N) in quarter t (t=92/II, 92/III, 92/IV, 93/I) is specified as a random–effects multinomial logit model, i.e.

$$P_i^{jk}\left(t|x_{ijk}(t),\varepsilon_{ij}^m\right)=\frac{\exp\left(\beta'_{jk}x_{ijk}(t)+\varepsilon_{ij}^m\right)}{1+\sum_{\ell=1}^{2}\exp\left(\beta'_{j\ell}x_{i\ell}(t)+\varepsilon_{ij}^m\right)},\quad j,k=e,u,n;$$

where $x_{ijk}(t) =$ vector of covariates of individual i in quarter t referring to the transition from state of origin j into destination state k

$\beta_{jk}\quad =$ comformable vector of coefficients to be estimated

$\varepsilon_{ij}^m\quad =$ time–invariant individual effect for state of origin j, with

$$E(\varepsilon_{ij})=\sum_{m=1}^{M}\psi(\varepsilon_{ij}^m)\varepsilon_{ij}^m=0;\quad \sum_{m=1}^{M}\psi(\varepsilon_{ij}^m)=1$$

$$E(\varepsilon_{ij}^m x_{ijk}(t))=0,\quad \forall\, m\,(m=1,2,...M),\,\forall\, j,\, k,$$

with E the expectation operator.

The set of explanatory variables, x_{ijk}, may differ for the various states of origin and also between the states of transition; they may also depend on the quarter of the observation period. The time–invariant individual effect, ε_{ij}, accounts for unobserved population heterogeneity in the transition rates and is assumed to come from an arbitrary discrete probability distribution with a finite number (M) of mass points, ε_{ij}^m, with probabilities $\psi(\varepsilon_{ij}^m)$; we allow for individual differences with respect to the state of origin. As usual, it is assumed that the individual effect is uncorrelated with the set of all explanatory variables in the model.

---

[6]   Steiner (1994) shows for the West–German labour market that transition rates from unemployment into employment are in fact constant if population heterogeneity is adequately controlled for and so–called 'duration dependence' in the unemployment process is a statistical artifact due to a sorting effect in the unemployment pool.

Defining an indicator variable

$$\delta_{ijk} = \begin{cases} 1, & \text{if for individual } i \text{ a transition occurs from state } j \text{ into state } k \\ 0, & \text{otherwise} \end{cases}$$

the sample likelihood for this model is given by

$$L = \prod_{i=1}^{N} \sum_{m=1}^{M} \psi(\varepsilon_{ij}^{m}) \prod_{j=1}^{2} \left[P_i^{jk}\left(t_i | x_{ijk}(t_i), \varepsilon_{ij}^{m}\right) \right]^{\delta_{ijk}} \prod_{\tau=1}^{t_i-1} \left(1 - P_i^{j}\left(\tau | x_{ijk}(\tau), \varepsilon_{ij}^{m}\right)\right)$$

with the transition rates as defined above.

Our model specification deviates from the standard multinomial logit model by its panel structure and, related to that, the inclusion of an individual effect.[7] It can be shown that estimation based on this likelihood function is formally equivalent to estimating the multinomial logit model on a pooled sample of all observations [see Amemyia (1985, chapter 11), Kiefer (1990)]. The main difference is that the likelihood function is written in terms of conditional transition rates, the determinants of which are the main focus of the empirical analysis here. In our model complications arise because, due to the individual effect, all observations of an individual are correlated. We take this into account by estimating the mass points, ε_{ij}^{m}, and their probabilities, $\psi(\varepsilon_{ij}^{m})$, simultanously with the other parameters of the model, i.e. the β coefficients, where estimation is by maximizing the full likelihood function as given above for each state of origin separately.

Since we expect structural differences in transition models for males and females, we estimate them separately. In case of employment as state of origin, we have excluded the self–employed and unpaid family workers from the sample, since for these groups employment termination is assumed to be governed by other factors than for the rest of the sample. We have also restricted the sample to those between 16 and 65 years of age. Means of explanantory variables in each of the transition models and, in case of dummy variables, the reference categories are given in the tables summarizing the detailed estimation results in the appendix.

The sets of explanatory variables taken into account in the estimation of the various transition models comprise individual and household characteristics (age, disability;

---

[7] Góra/Lehmann (1995) also estimate multinomial logit models of transitions between the three labour force states based on the PLFS. However, the dependent variables in their various 'transition' models refer to changes between state of origin and any one of the two alternative states within the period May 1992 to May 1993, whatever the quarter and the time span between two transitions in this period. For this and several other reasons their models are seriously misspecified and their estimation results are, in our opinion, therefore not interpretable.

12

education, marital status and, for females, children by age group), various labour market indicators (type of region, urban agglomoration and the regional unemployment rate) and time dummies which should account for changes in general labour market conditions associated with the economic transition process as well as for seasonal effects. In addition to these variables, dummies for broad occupational groups (blue–collar worker, white–collar worker etc.) and industry as well as a dummy to distinguish between state and private sector are included in the transition models from employment as state of origin. The transition models from unemployment also take into whether the previous employment spell was terminated by layoff or for other reasons, and a dummy for the eligibility of unemployment benefits as explanatory variables. One shortcoming of our data base is that wages are only included starting with the third round of the PLFS and could thus not be used for our analysis.

For some variables, categories had to be aggregated due to the relatively small number of observations in some of them. Since the necessary number of observations in each category also depends on the frequency of transitions between states, the aggregation of categories differs somewhat across the transition models and also between gender. In particular, this relates to industry and occupational dummies in the employment transition models, and educational and also age dummies in all the models. For example, we would have preferred to distinguish between higher and lower management in the occupational classification, or higher and the various types of secondary education, but that proved not feasible in all cases due to the small number of certain labour force transition in these groups.

Some of the explanatory variables in the models may warrant some explanation. The number of children in specific age groups was obtained by merging the household part of the PLFS, which has an identifier variable relating children in the household to the household head and his/her spouse, to the personal records. For females, we also include interaction terms of these variables and marital status. Following the regional classification scheme of Lehmann/Kwiatkowski/Shaffer (1991) referred to in section 2, we distinguish between four types of regions: agricultural, heavy industrialized, modern, and 'other' as derived from the industry classification in the PLFS. Finally, the general labour market situation in regional labour markets is proxied by the voivodship unemployment rate as derived from the PLFS.

5   Determinants of Individual Labour Force Transitions

To start with, we estimated all transition models with the full set of relevant explanatory variables and up to four mass points. We then excluded those variables which were completely insignificant even without taking into account unobserved individual effects. Proceeding from these reduced versions of the transiton models we estimated different versions with respect to the number of mass points assumed a

priori and decided on their necessary and sufficient number to account for unobserved population heterogeneity on the basis of likelihood ratio tests. As it turned out, this number varies between two and three depending on the state of origin and also on gender; in case of the transition model from unemployment for males the individual effect was statistically insignificant and the model was therefore re–estimated without it. Estimated coefficients of the various transition models as well as mass points and their probabilities are reported in Tables A1 – A6 in the appendix.

In sections 5.1 – 5.3 we present estimation results for these models in a more intuitive way by comparing the level of the transition rates for a reference group – as defined in the notes to the tables below – with the respective transition rates implied by a partial change of statistically significant explanatory variables in the model. For the reference group we report both quarterly transition rates and the mean of these rates within the observation period, where changes in the former derive from the effects of the quarterly dummies. The comparision of the partial effects of certain variables will be with respect to the mean value of the quarterly transition rates of the reference group, which should remove seasonal and irregular effects. In addition to transition rates, we also report the percentage share of people in a particular state at the beginning of the observation period in May 1992 who were still in that state at the end of the observation period in February 1993. Following terminology known from duration analysis, this share will also be termed *survival rate*, for short.

All transition and survival rates reported in the following tables refer to their expected value with respect to the random effects, i.e. for each state of origin they are calculated as weighted sum over the respective number of heterogeneity groups where the weights are the estimated probabilities of the mass points.

5.1   Transitions from Employment into Unemployment and Non–Participation

The effects of significant variables on the transition rates from employment into unemployment and non–participation as well as on the survival rate are summarized in Table 3 for males and Table 4 for females.

To start with the survival rate, the tables show that about 88 percent of all males and 90 percent of all females who had been employed in May 1992 were still employed in February 1993 without interruption. Alternatively, about 12 percent of males or 10 percent of females had become unemployed or dropped out of the labour force in this period. Transition rates from employment into unemployment were increasing both for males and females over the period, while transition rates into non–participation

were generally decreasing.[8] Averaged over the observation period, the female reference group had a lower transition rate from employment into unemployment and also a somewhat lower transition rate into non–participation than the male reference group. The latter result may seem surprising at first sight, but it can be explained by the definition of the reference group which refers to singles.

Turning to the effects of explanatory variables in the model, we find that transition rates into unemployment are relatively high for both males and females in the younger age groups. Whether this is due to job–shopping behaviour of youth, as observed in most market economies, or to employers' discrimination against youth cannot decided on the basis of these estimates. However, because of the general shortage of new jobs the latter explanation seems the more plausible one. The youngest age group also has high transition rates into non–participation, the level of which is almost as high as for the oldest age group. Whereas for the latter group this result is readily explained by early retirement as a means of labour force adjustment (see section 2), for the youngest age group the high transition rates into non–participation reflect temporary withdrawal from the labour force probably due to the unfavourable labour market situation; in case of male youth it could also be associated with the military service. Whatever the reason, it is clear that the rather low survival rates in employment both for the youngest and oldest age groups are primarily due to their very high transition rates into non–participation.

Marital status and – in case of females – the presence of children in particular age groups have only weak effects on transition rates from employment. On the other hand, at least for males disability has a relatively strong effect on the transition rate into non–participation, whereas the transition rate into unemployment is in fact reduced by disability. This reflects the importance of disability pensions as a means of labour force adjustment.

Irrespecitive of gender, due to a lower transition rate both into unemployment and into non–participation employees with higher educational attainment have higher survival rates in employment than any other educational group[9]; both transition rates are virtually identical for males and females. For the other educational groups results differ by gender; for males transition rates into unemployment are generally lower than for those with only primary education, which defines the reference group, whereas for females they are somewhat higher. Transition rates into non–participation for those with only primary education are also higher than for almost any other group, but these differences are rather small, at least in absolute terms.

---

[8] To reiterate, time–variant transition rates do not necessarily contradict the Markov assumption which refers to their independence from process time.

[9] Due to the small number of observations, for females we have aggregated higher and post–secondary education.

15

Table 3 Effects of explanatory variables on transition rates from and the survival rate in employment (in %), males

Variable change relative to reference group	Transition into		Survival until 93 / I
	Unemployment	Non-Participation	
Reference group			*88.36*
92 / II - 92 / III	3.14	1.79	—
92 / III - 92 / IV	3.30	1.55	—
92 / IV - 93 / I	3.80	1.06	—
Ø quarterly rate	*3.41*	*1.47*	—
Age ≤ 20 years	4.15	11.11	67.62
20 years < Age ≤ 25 years	4.70	2.23	83.40
45 years < Age ≤ 55 years	2.19	4.16	84.74
Age > 55 years	2.07	15.17	64.74
Married	2.01	1.13	92.86
Disabled	2.70	6.89	77.62
Higher education	1.47	0.78	95.27
Post-secondary education	1.70	0.26	96.04
Secondary general education	1.56	1.73	92.47
Secondary vocational education	2.32	1.03	92.31
Basic vocational education	2.52	0.90	92.13
Management	1.81	0.87	94.12
Professionalist	1.89	0.90	93.81
White collar worker	2.12	1.63	91.26
Private sector	6.15	2.30	80.03
Construction	9.55	1.99	73.87
Agriculture / forestry	6.21	2.71	79.01
Transport	2.54	1.57	90.33
Trade	8.28	1.16	77.94
Other industries	6.92	1.23	80.68
Community services	4.81	1.35	85.22
Science, education and art	5.68	3.25	79.01
Health care and social aid	6.09	1.27	82.43
Other services	6.69	2.07	79.35
20 000 ≤ Population < 100 000	4.11	1.40	86.77
Modern region	3.54	0.87	89.53
Agricultural region	4.27	1.09	87.16
Voiv. unemployment rate + 50%	4.90	2.18	83.05
Voiv. unemployment rate − 50%	2.42	1.00	92.13

Note: Calculations are based on Table A1 in the appendix. The definition of the *reference group* is: 25 < Age ≤ 45 years, single, not disabled, only primary education, blue-collar worker in the state sector in manufacturing, living in a rural area in a heavily industrialized region with an average unemployment rate.

16

Table 4   Effects of explanatory variables on transition rates from and the survival rate in employment (in %), females

Variable change relative to reference group	Transition into		Survival until 93 / I
	Unemployment	Non-Participation	
Reference group:			*90.26*
92 / II - 92 / III	2.58	1.75	—
92 / III - 92 / IV	2.64	1.26	—
92 / IV - 93 / I	3.15	1.15	—
Ø quarterly rate	*2.79*	*1.39*	—
Age ≤ 20 years	5.90	6.17	73.02
20 years < Age ≤ 25 years	3.97	4.34	81.48
45 years < Age ≤ 55 years	2.52	2.95	87.59
Age > 55 years	1.22	8.26	78.84
Married	2.62	2.32	88.68
Children 11 - 18 years	2.66	2.10	89.05
Married with children 3 - 10 years	2.82	1.25	90.48
Married with children 11 - 18 years	2.92	0.75	91.31
Disabled	2.51	3.00	87.51
Higher education	1.46	0.79	94.31
Secondary general education	2.91	0.80	91.23
Secondary vocational education	2.89	0.90	91.07
Basic vocational education	2.85	1.07	90.79
Management	0.34	1.68	94.82
Professionalist	1.14	1.58	93.30
White–collar worker	1.83	1.49	92.01
Private sector	5.56	1.81	83.55
Construction	5.15	2.26	83.47
Agriculture / forestry	6.75	2.55	79.29
Transport / communication	0.82	1.62	93.90
Trade	3.90	1.28	88.20
Health care and social aid	2.86	1.04	90.84
Population < 20 000	2.72	1.75	89.65
Population ≥ 100 000	2.22	1.45	91.30
Agricultural region	2.85	1.09	90.75
Other regions	1.65	1.51	92.35
Voiv. unemployment rate + 50%	4.07	1.27	87.88
Voiv. unemployment rate - 50%	1.87	1.49	91.94

Note: Calculations are based on Table A2 in the appendix. The definition of the *reference group* is: 25 < Age ≤ 45 years, single, no children, not disabled, only primary education, blue-collar worker in the state sector in manufacturing, living in a rural area in a heavily industrialized region with an average unemployment rate.

17

Relative to male and female blue–collar workers all other broad occupational groups have substantially lower transition rates into unemployment, whereas the effects of occupational status on transition rates into non–participation differ by gender. In particular, females in management positions have a very low unemployment risk, whereas their transtion rate out of the labour force is – in contrast to males in management positions – relatively high. Irrespective of gender, transition rates of white–collar workers into unemployment are lower and into non–participation are higher than those of blue–collar workers. Generally, the higher up the occupational scale the higher the survival rate in employment, although differences between occuptional groups are not very large.

Employment in the private sector substantially increases the transition rate into unemployment and, to a much lesser extent, also into non–participation both for males and females. The transition rate into unemployment also varies greatly between sectors of employment. For males it is substantially higher in almost any other industry than in manufacturing, and it is three times as high for those employed in the construction industry as for those working in manufacturing; for females industry differences are less systematic and generally much smaller. Since seasonal factors should be accounted for by the quarterly dummy variables in the model, these industry effects indicate important structural differences in the economic restructuring process between industries. Transition rates into non–participation also vary by industry and gender, but the differences are much less pronouned here.

Compared to these strong industry effects, the type of region has only relatively weak effects on transition rates, at least after controlling for size of agglomoration and the regional unemployment rate. For both males and females, transition rates into unemployment (non–participation) are somewhat higher (lower) in agricultural than in heavily industrialized regions; as a result, survival rates in employment are virtually identical in both regions. The effect of living in a 'modern' rather than in a heavily industrialised region on the transition rate into unemployment is statistically insignificant for females and weakly positive for males. Furthermore, even large variations in the regional labour market situation – described here by differences in the voivodship unemployment rate of ±50 percent relative to the national average – have only modest effects on the individual transition rate into unemployment. The effect on the transition rate into non–participation differs qualitatively by gender, for females it works in the opposite direction to the effect on the transition rate into unemployment. However, these effects are relatively small, as is the overall effect on the survival rate in employment.

5.2 Transitions from Unemployment into Employment and Non–Participation

The effects of significant variables on the transition rates from unemployment into employment and non–participation as well as on the survival rate in unemployment are summarized in Table 5 for males and in Table 6 for females.

About 45 percent of all males and 53 percent of all females already unemployed in May 1992 were still unemployed in February 1993. Interpreting this relatively small gender difference one has to take into account that it is associated with large differences in transition rates into employment – also termed re–employment probabilities, for short. For the female reference group the transition rate into non–participation is – averaged over the observation period – even somewhat higher than their re–employment probability, whereas for males the latter is more than three times their transition rate into non–participation. Given the maintained assumption that transition rates do not depend on process time, their estimated mean values for the male and female reference groups would imply quite similar estimates for the average duration of a completed unemployment spell – about 4.4 quarters for males and 4.2 quarters for females.[10] However, if females were not to withdraw from the labour market to a large extent, long–term unemployment would be much more severe for them than for males.

For males, quarterly transition rates have fallen substantially between May 1992 and February 1993. In particular, at the end of the observation period their re–employment probability has dropped to some 12 percent, only about half the level it obtained in May 1992. In contrast, for females this probability has, starting from less than half the level for males, slightly increased over the period and obtained almost the same level as that for males in the last quarter. Although we control for the voivodship unemployment rate these temporal changes in transition rates may primarily reflect seasonal effects rather than structural changes in unemployment behaviour. The former interpretation would also be compatible with the result that the strong decline in re–employment probabilities is restricted to males who are much more likely to become employed in industries where seasonal factors are important. On the other hand, the decline of transition rates into non–participation of both males and females over the observation period does suggest some behavioural rather than seasonal effects.

---

[10] In this case, the expected completed duration in any given state is simply the reciprocal of the sum of the transition rates from this state into the two alternative states.

Table 5   Effects of explanatory variables on transition rates from and the survival rate in unemployment (in %), males

Variable change relative to reference group	Transition into		Survival until 93 / I
	Employment	Non–Participation	
Reference group			*45.41*
92 / II – 92 / III	23.34	6.56	—
92 / III – 92 / IV	17.61	4.52	—
92 / IV – 93 / I	12.42	4.39	—
∅ quarterly rate	*17.79*	*5.16*	—
45 years < Age ≤ 55 years	10.34	8.03	54.15
Age > 55 years	6.04	18.20	43.21
Married	22.67	4.83	37.69
Disabled	10.70	9.89	49.81
Higher / post–secondary / secondary general education	23.35	6.80	33.64
Secondary vocational education	20.37	4.99	41.22
Layoff	18.21	3.05	48.51
Unemployment benefits	14.64	2.90	55.83
Population < 20 000	14.45	7.15	47.89
Population ≥ 100 000	15.62	5.30	49.16
Modern region	21.68	6.72	36.30
Agricultural region	14.26	2.64	57.17
Other regions	12.68	5.50	54.54
Voiv. unemployment rate + 50%	14.41	7.22	47.84
Voiv. unemployment rate − 50%	21.65	3.63	41.33

Note: Calculations are based on Table A3 in the appendix. The definition of the *reference group* is: 25 < Age ≤ 45 years, single, not disabled, only primary education, no layoff from previous job, receives no unemployment benefits, living in a rural area in a heavily industrialized region with an average unemployment rate.

Turning to the effects of personal characteristics on transition rates, we find low re–employment probabilities for both unemployed males and females aged 45 years and above, and especially for those in the oldest age group. On the other hand, this latter age group has very high transition rates into non–participation and, as a result, survival rates in unemployment even below those of prime–aged males and females in the reference groups. This result indicates that for elderly people unemployment acts as intermediate state before leaving the labour force for early retirement after the age limit has been reached.

Table 6   Effects of explanatory variables on transition rates from and the survival rate in unemployment (in %), females

Variable change relative to reference group	Transition into		Survival until 93/I
	Employment	Non–Participation	
Reference group			*52.38*
92 / II – 92 / III	10.06	15.50	—
92 / III – 92 / IV	12.32	10.60	—
92 / IV – 93 / I	11.32	11.31	—
∅ quarterly rate	*11.23*	*12.47*	—
20 years < Age ≤ 25 years	10.75	14.61	50.51
45 years < Age ≤ 55 years	6.85	20.44	48.54
Age > 55 years	2.35	29.62	44.60
Married	7.83	15.56	52.72
Married with children 3 – 10 years	11.77	10.05	54.67
Disabled	7.68	13.32	55.71
Higher / post–secondary / secondary general education	19.00	10.61	46.53
Secondary vocational education	17.41	10.99	47.57
Basic vocational education	15.15	8.77	52.14
Layoff	12.29	7.70	57.12
Unemployment benefits	9.98	5.72	63.73
Population < 20 000	13.32	11.97	50.61
20 000 ≤ Population < 100 000	11.86	9.65	55.07
Agricultural region	11.61	10.76	53.97
Other regions	12.78	5.49	59.61
Voiv. unemployment + 50%	8.97	16.76	50.12
Voiv. unemployment rate – 50%	13.67	9.02	53.59

Note: Calculations are based on Table A4 in the appendix. The definition of the *reference group* is: 25 < Age ≤ 45 years, single, no children, not disabled, only primary education, no layoff from previous job, receives no unemployment benefits, living in a rural area in a voivodship with an average unemployment rate.

As expected, the effects of marital status differ by gender; married males have a higher re–employment probability than singles and a somewhat lower transition rate into non–participation, whereas for females being married has the opposite effects. The estimation results do not allow us to discriminate between the hypothesis that gender differences in re–employment probabilities are due to discriminatory hiring behaviour of firms from the alternative hypothesis that these differences are related to voluntary labour supply decisions within the household.   However, this latter hypothesis seems inconsistent with the effects of children in the household; the re–employment probability of married females with children aged between 3 and 10

21

years is higher and their transition rate into non–participation is lower than for those without children, whereas one would rather expect the opposite effects due to the higher value of non–market work in the household in the presence of children.

As to the effects of educational attainment on individual unemployment behaviour, we find that re–employment probabilities of unemployed males and females with higher, post–secondary or secondary general education are substantially higher than for those with only primary education.[11] Secondary vocational education, and for females also basic vocational education, increases re–employment probabilities relative to the reference groups, too, although this effect is somewhat smaller than for general higher education. Since transition rates into non–participation are not affected much by educational attainment, for each of these groups the survival rate in unemployment is generally lower than for the respective reference group; in particular, it is relatively low for males with higher general education.

While transition rates from unemployment are not very much affected by whether or not the previous employment spell was terminated by a layoff or for other reasons, eligibility to unemployment benefits increases the survival rate both for males and females by about 10 percentage points. This relatively strong effect is mainly due to a reduction in the transition rate into non–participation, especially for females for whom it drops from more than 12 to some 6 percent per quarter. This suggests that some unemployed would leave the labour force earlier were they not to draw unemployment benefits and that some 'open' unemployment is therefore due to an entitlement effect.

Whereas the degree of urban agglomoration – proxied by the size of the resident population – has only small effects on survival rates in unemployment, at least for males the type of resident region does have quantitatively important effects. For males living in regions classified as 'modern' according to the taxonomy used here re–employment probabilities are considerably higher than for those resident in heavily industrialized regions, which defines the reference group. On the other hand, for males re–employment probabilities in agricultural regions are lower than in the reference region and the transition rate into non–participation is also relatively low for them.

As to the local labour market situation, even large variations in the voivodship unemployment rate have only small effects on individual survival rates in unemployment. However, looking at transition rates reveals that two counteracting effects are at work here, the relative importance of which differs by gender; a higher voivodship unemployment rate – here set at 50 percent above the average rate –

---

[11] These categories had to be aggregated because of the relatively small number of observations referring to some of them.

reduces the re–employment probability and increases the transition rate into non–participation. Whereas for males the net effect is a slightly higher survival rate in unemployment, for females the latter over–compensates the former effect and thus reduces the survival rate. An analogous asymmetry also exists for a corresponding reduction in the voivodship unemployment rate.

5.3 Transitions from Non–Participation into Employment and Unemployment

The effects of significant variables on the transition rates from non–participation into employment and unemployment as well as on the survival rate in non–participation are summarized in Table 7 for males and in Table 8 for females.

Transition rates from non–participation are substantially higher for the male than for the female reference group and, irrespective of gender, for the reference group the transition rate into employment is higher than the rate into unemployment. All transition rates show a remarkable decline over the observation period, which suggests some behavioural change in labour force participation. The outflow from non–participation in the observation period has been rather high, especially for the male reference group; less than 50% of all males who had been out of the labour force in May 1992 were still out in February 1993, for females this share is about 70%.

There are only a few significant effects of explanatory variables on transition rates from non–participation. As expected, almost all disabled persons and those aged 55 years and above stay out of the labour force. The share of people remaining out of the labour force is also very high among the youngest age group, especially in case of females. Since for youth the transition from non–participation often marks the beginning of working life their low transition rate into employment indicates special problems for new entrants into the labour market during the economic transition process. This is probably related to the reduction of firms' vocational training activities in the economic restructuring process [see OECD (1993, chapter 4)].

Table 7   Effects of explanatory variables on transition rates from and the survival rate in non–participation (in %), males

Variable change relative to reference group	Transition into		Survival until 93 / I
	Employment	**Unemployment**	
Reference group			*48.21*
92 / II – 92 / III	19.57	15.20	—
92 / III – 92 / IV	14.68	8.10	—
92 / IV – 93 / I	9.24	7.15	—
Ø quarterly rate	*14.50*	*10.15*	—
Age ≤ 20 years	8.58	4.37	74.70
20 years < Age ≤ 25 years	16.06	5.45	54.73
45 years < Age ≤ 55 years	8.25	4.48	75.24
Age > 55 years	4.46	1.81	89.64
Married	26.49	7.82	31.37
Disabled	6.53	3.21	82.56
Secondary vocational education	12.08	19.11	36.22
Basic vocational education	15.80	20.83	27.90
Population < 20 000	7.14	12.20	59.44
20 000 ≤ Population < 100 000	6.91	12.28	59.79
Population ≥ 100 000	6.85	12.30	59.89
Voiv. unemployment rate + 50%	13.00	15.44	41.01
Voiv. unemployment rate – 50%	15.70	6.48	53.31

Note: Calculations are based on Table A5 in the appendix. The definition of the *reference group* is: 25 < Age ≤ 45 years, single, not disabled, only primary education, living in a rural area in a voivodship with an average unemployment rate.

The large difference in transition rates into employment between married and single males could either be due to discriminatory hiring behaviour of firms, which seems possible in the still large state sector, or could indicate more intensive job search activities of those who have to care for a family. For females, marital status affects transition rates from non–participation only in connection with the presence of older children in the household.

Relative to primary education, transition rates from non–participation into unemployment are substantially higher for secondary and basic vocational education both for males and females, and for the latter also in case of basic vocational education. These high transition rates would imply high unemployment rates for these groups were they not, as shown in the previous section, counteracted by relatively high transition rates from unemployment into employment.

Table 8   Effects of explanatory variables on transition rates from and the survival rate in non–participation (in %), females

Variable change relative to reference group	Transition into		Survival until 93 / I
	Employment	Unemployment	
Reference group			*70.19*
92 / II – 92 / III	10.92	8.27	—
92 / III – 92 / IV	8.25	4.02	—
92 / IV – 93 / I	4.73	4.37	—
Ø quarterly rate	*7.97*	*5.55*	—
Age ≤ 20 years	5.22	4.00	80.94
45 years < Age ≤ 55 years	4.81	2.31	86.15
Age > 55 years	3.79	0.67	91.89
Married	8.41	4.00	72.92
Children < 10 years	6.69	5.83	72.65
Children 11 – 18 years	15.47	4.44	55.58
Married with children 11 – 18 years	3.92	6.56	77.73
Disabled	4.52	2.46	86.48
Higher / post–secondary / secondary general education	10.65	10.08	53.83
Secondary vocational education	10.51	11.68	50.82
Basic vocational education	6.72	11.39	59.48
Population < 20 000	5.54	6.11	74.82
20 000 ≤ Population < 100 000	4.01	6.54	77.57
Population ≥ 100 000	3.74	6.62	78.05
Agricultural region	9.55	5.26	67.09
Voiv. unemployment rate + 50%	6.42	7.78	68.56
Voiv. unemployment rate – 50%	9.63	3.85	70.28

Note: Calculations are based on Table A6 in the appendix. The definition of the *reference group* is: 25 < Age ≤ 45 years, single, no children, not disabled, only primary education, living in a rural area in a voivodship with an average unemployment rate.

Transition rates into employment for both males and females living in rural areas are much higher than for those living in urban areas, where this effect is the stronger the larger the population size of the area. These differences could be due to a correlation of population density with the predominant industrial structure in an area.   In particular, 'heavily industrialized' regions, the dummy variable for which turned out statistically insignificant for both males and females, with relatively few new job openings tend also to be densely populated.   On the other hand, irrespective of the population density, transition rates into unemployment are somewhat higher in urban than in rural areas.   As to the type of region, except for a higher transition rate into employment of females living in agricultural regions there are no significant effects

on transition rates from non–participation. Finally, variations in the regional labour market situation have the expected asymmetrc effects on individual transition rates; a higher regional unemployment rate is associated with a lower (higher) transition rate into employment (non–participation). Contrary to what one would expect from an 'added worker' argument, these effects are quantitatively more important for males.

6 Labour Force Transitions and the 'Equilibrium' Unemployment Rate

Given that flows into and out of the various labour force states are in balance, i.e. stocks do not change, and that the transition rates do not depend on the history of the process – the Markov assumption referred to in section 4 – the 'equilibrium' distribution of the labour force among the alternative states only depends on the various transition rates and not on the initial state distribution. Here, 'equilibrium' is simply defined by the equality of inflows and outflows, without any normative implication, of course. Of the three labour force states the share of unemployed people when flows into and out of unemployment balance is of special interest for labour market analysis and policy. In a three–state model, the 'equilibrium' unemployment rate would be given by [Marston (1976)]

$$U^* = \left\{ 1 + \left[\frac{\left(P^{ne} + P^{nu}\right)P^{ue} + P^{ne}P^{un}}{\left(P^{ne} + P^{nu}\right)P^{eu} + P^{nu}P^{en}} \right] \right\}^{-1} ,$$

where the transition rates are defined in the note to Table 2 in section 3. Note that U^* not only depends on the transition rates directly affecting the unemployment state, i.e., P^{eu}, P^{ue}, P^{nu}, and P^{un}, but indirectly on all other transition rates since they define the share of employed people and the size of the labour force.

From the equation above, the partial effect of a change in any of the transition rates on U^* can be signed as follows

$$U^* = U^*(\underset{+}{P^{eu}}, \underset{+}{P^{en}}, \underset{-}{P^{ue}}, \underset{-}{P^{un}}, \underset{-}{P^{ne}}, \underset{+}{P^{nu}})$$

Hence, the 'equilibrium' unemployment rate will be the higher the higher the transition rates from employment into either of the two alternative states and the higher the transition rate from non–participation into unemployment, and it will be the lower the higher the transition rates from unemployment into either of the two alternative states and the higher the transition rate from non–participation into employment. As these transition rates in turn depend on the various explanatory variables discussed in the previous sections, the level of U^* can be directly related to these factors.

Since flows between the various labour force states were not in balance in the observation period on which our empirical analysis is based, U* is probably only a rough approximization to the 'equilibrium' unemployment rate at best. It seems nevertheless interesting to report for this unemployment rate implied by the estimated transition rates of our model. These calculations are summarized for certain important factors which can be expected to remain stable in the immediate future in Table 9.[12]

Table 9   Effects of selected explanatory variables on the 'equilibrium' unemployment rate

	Males	**Females**
Reference group	*16.2*	*15.3*
Married	7.9	15.5
Age ≤ 20 years	27.1	31.1
Age > 55 years	25.4	18.9
Disabled	22.3	18.0
Higher general education	6.1	7.0
Secondary vocational education	11.7	12.9
Modem region	13.2	15.3
Agricultural region	23.0	14.9

Note: Calculations are based on Tables 3 – 8 and the definition of the 'equilibrium' unemployment rate (U*) in the text; the male and female reference groups are defined as in the notes to these tables; unemployment rates are in percent.

For the reference groups defined in the previous sections we find that the implied unemployment rates are quite similar to the actual unemployment rates prevailing in the observation period. Furthermore, inserting the average empirical transition rates from Table 2 in section 3 into the formula given above would yield a value of U*=15%, which is also quite close to the levels of U* estimated for the male and female reference groups.

The somewhat higher level of U* for males is due to the definition of the reference groups which refers to singles; for married females the unemployment rate is almost twice the male level. As to the effect of age, the implied 'equilibrium' unemployment rates for the youngest age group are very high for both males and females, for males

---

[12] This assumption is made here because in the estimation of the transition models the explanatory variables are treated as exogenous, of course.

27

U* is also quite high for the oldest age group and for the disabled. Very large differences also exist with respect to educational attainment; for those males and females with higher general education the unemployment rate is less than half of the respective reference group with only primary education, whereas those with secondary vocational education take a middle position. The 'equilibrium' unemployment rate for males living in modern regions is somewhat lower than for those living in 'heavily industrialized' regions, for females it is identical in both regions. In agricultural regions the male unemployment rate is considerably higher than in the reference region, wheras for females U* is almost identical in these two regions.

Some of the differences in unemployment rates in Table 9 are directly related to differences in transition rates from and into unemployment, as discussed in the previous sections. For other groups, however, unemployment rate differentials are mainly related to transitions not directly affecting the unemployment state. In particular, for youth the very high transition rate from employment into non–participation and the relatively low transition rate from non–participation into employment contribute substantially to their high 'equilibrium' unemployment rate.

Of course, not too much weight should be ascribed to this kind of calculations since the observation period on which they can currently be based is much too short and the Polish labour market has certainly not reached an equilibrium position, however defined, yet. Furthermore, only the partial effects of changes in particular variables will be evaluated holding all other characteristics constant. Nevertheless, these calculations convey some useful information on the expected unemployment situation of particular groups given estimated transition rates prevail in the future. This may be especially useful for the efficient targetting of labour market and social policies.

7   Concluding Remarks

The Polish labour market between 1990 and 1993 was characterized by a large increase in open unemployment, only part of which has been associated with employment adjustments and the reduction of hidden unemployment inherited from the former socialist system. A strong increase in labour supply of people previously not attached to the labour market has also contributed to the increase in unemployment to a large extent. In terms of labour force transitions, the Polish situation is, as in other Central and Eastern European countries, characterized by relatively low inflows into and outflows from unemployment, especially outflows to employment, and large flows from and into non-participation.

We have shown how transition rates between employment, unemployment and non-participation in the labour force are related to certain demographic and socio-economic characteristics, labour market indicators and other structural variables. As

described in some detail in section 5, the effects of most of these variables on transition rates differ by state of origin, state of destination, and also by gender. Several factors have been found to affect the various transition rates in systematic and quantitatively important ways; aside from gender they include marital status, age, disability, the level of education, and the type of region.

The overall effect of a particular variable on the 'equilibrium' unemployment rate, which could be of some importance for labour market policy analysis, works through the various transition rates between the three labour force states. We find large differences in the level of the 'equlibrium' unemployment rates between males and females and the various demographic and socio-economic groups in the labour force. These differentials are not only related to differences in transition rates from and into unemployment, but indirectly also to transitions between employment and non-participation since they affect the size of the labour force.

Although these calculations are admittedly based on somewhat questionable assumptions they, in our opinon, convey some useful information for labour market policy. First, they can assist in the identification of particular groups in the labour force for whom high unemployment rates will result if their present labour force behaviour prevails in the future. Second, their unemployment rates can be related to certain factors affecting the various transition rates, which allows for a more efficient targetting of labour market policy measures. Finally, changes in these factors can readily be translated in a group's unemployment expected to prevail in the future.

8   Appendix: Detailed Estimation Results

As described in the text, the specifications of the various transition models in the following tables are the result of some statistical testing, on the basis of which completely insignificant variables were excluded from more general model specifications and the number of necessary and sufficient mass points in each model was selected.

Table A1   Determinants of transition rates from employment, males
    Three–state multinominal logit model with non–parametric unobserved
    population heterogeneity; ML estimates

Variable	Means	Unemployment Coeff.	|t|	Non–Participation Coeff.	|t|
Constant	—	–6.0672	9.95	–6.6999	10.25
Age ≤ 20 years *(25 < Age ≤ 45)*	0.04	0.6297	2.82	2.4736	10.37
20 years < Age ≤ 25 years	0.10	0.4450	2.91	0.5456	2.28
45 years < Age ≤ 55 years	0.17	–0.3512	2.16	1.1426	7.01
Age > 55 years	0.06	—	—	2.8574	14.81
Married	0.78	–0.7197	5.93	–0.4482	2.70
Disabled	0.03	—	—	1.7926	6.10
Higher education *(primary)*	0.11	–1.2417	3.53	–1.0380	2.72
Post–secondary education	0.02	–1.2088	2.05	–2.2439	2.57
Secondary general education	0.03	–0.9532	2.35	—	—
Secondary vocational education	0.22	–0.5458	3.28	–0.5100	2.63
Basic vocational education	0.43	–0.4541	3.75	–0.6349	4.47
Management *(blue–collar)*	0.09	–0.9170	2.86	–0.8076	2.50
Professionalist	0.14	–0.8516	3.18	–0.7410	2.47
White–collar worker	0.07	–0.5850	2.77	—	—
Private sector *(state sector)*	0.29	0.7831	6.93	0.6419	5.01
Construction *(manufacturing)*	0.13	1.3412	9.73	0.6124	3.16
Agriculture / forestry	0.08	0.8128	4.63	0.8287	4.65
Transport	0.08	–0.3655	1.44	—	—
Communication	0.01	—	—	—	—
Trade	0.06	1.1213	5.61	—	—
Other industries	0.01	0.8889	2.07	—	—
Community services	0.06	0.4274	1.97	—	—
Science, education and art	0.05	0.7222	2.22	1.010	3.26
Health care and social aid	0.03	0.7256	2.04	—	—
Other services	0.08	0.8808	3.85	0.5525	2.40

continued...

30

Table A1 continued

Variable	Means	Transition into			
		Unemployment		Non–Participation	
		Coeff.	|t|	Coeff.	|t|
Voivodship unemployment rate	0.13	7.0705	4.76	7.5813	3.99
20 000 ≤ Population < 100 000 *(rural areas)*	0.21	0.2322	1.97	—	—
Modern region *(heavily industrialized)*	0.24	—	—	–0.5633	3.64
Agricultural region	0.21	0.2601	2.10	–0.2668	1.63
August 1992 *(May 1992)*	0.33	0.0434	0.35	–0.1530	1.10
November 1992	0.34	0.1863	1.50	–0.5287	3.27

Random effect	*Estimate*	|t|
ε_1	–2.1092	2.47
ε_2	2.2157	4.45
ε_3	8.2713	0.27
$\psi(\varepsilon_1)$	0.53	7.06
$\psi(\varepsilon_2)$	0.46	6.21
$\psi(\varepsilon_3)$	0.01	3.83

# Observations = 9952	– ln likelihood = 4759.49

Note: For dummy variables base categories are given in parantheses. (—) refers to coefficients which have been restricted to zero in the estimation.

Source: The Polish Labour Force Survey (PLFS), waves 1–4.

31

Table A2   Determinants of transition rates from employment, females
Three–state multinominal logit model with non–parametric unobserved
population heterogeneity; ML estimates

Variable	Means	Transition into			
		Unemployment		Non–Participation	
		Coeff.	$\lvert t \rvert$	Coeff.	$\lvert t \rvert$
Constant	—	–5.1507	9.95	–4.6001	11.96
Age ≤ 20 years *(25 < Age ≤ 45)*	0.03	1.2246	3.29	1.9719	5.77
20 years < Age ≤ 25 years	0.10	0.6455	2.52	1.4388	6.74
45 years < Age ≤ 55 years	0.17	—	—	0.8614	5.97
Age > 55 years	0.03	–0.4725	0.95	2.1473	8.44
Married	0.73	—	—	0.5792	4.02
Children 11 – 18 years	0.38	—	—	0.4662	1.71
Married with children 3 – 10 y.	0.25	—	—	–0.1131	0.79
Married with children 11 – 18 y.	0.33	—	—	–0.6571	2.52
Disabled	0.02	—	—	0.8805	3.02
Higher education *(primary)*	0.13	–0.8208	2.37	–0.7364	3.09
Secondary general education	0.11	—	—	–0.5956	3.15
Secondary vocational education	0.28	—	—	–0.4727	2.34 .
Basic vocational education	0.22	—	—	–0.2872	2.01
Management *(blue–collar)*	0.07	–2.3035	4.91	—	—
Professionalist	0.35	–1.0299	5.19	—	—
White collar workers	0.29	–0.4950	2.77	—	—
Private sector *(state sector)*	0.27	0.9274	6.38	0.5007	3.70
Construction *(manufacturing)*	0.02	0.8520	2.44	0.7280	2.35
Agriculture / forestry	0.03	1.2320	3.63	0.9585	2.77
Transport / communication	0.05	–1.3843	2.58	—	—
Trade	0.15	0.4164	2.45	—	—
Health care and social aid	0.15	—	—	–0.3161	1.61
Voivodship unemployment rate	0.13	6.7134	4.13	—	—
Population<20 000 *(rural areas)*	0.14	—	—	0.2598	1.74
Population≥100 000	0.36	–0.2726	2.15	—	—
Agricultural region *(heavily industrialized)*	0.21	—	—	–0.2598	1.73
Other regions	0.06	–0.6151	2.04	—	—

Table A2 continued

Variable	Means	Transition into			
		Unemployment		Non–Participation	
		Coeff.	$\|t\|$	Coeff.	$\|t\|$
August 1992 *(May 1992)*	0.33	−0.0133	0.08	−0.3618	2.76
November 1992	0.34	0.1972	1.37	−0.4216	3.30
Random effect		*Estimate*		$\|t\|$	
ε_1		3.5190		2.06	
ε_2		−0.1986		2.17	
$\psi(\varepsilon_1)$		0.05		0.64	
$\psi(\varepsilon_2)$		0.95		11.29	
# Observations = 8513		− ln likelihood = 4346.33			

Note: For dummy variables base categories are given in parantheses. (——) refers to coefficients which have been restricted to zero in the estimation.

Source: The Polish Labour Force Survey (PLFS), waves 1–4.

33

Table A3 **Determinants of transition rates from unemployment, males**
Three–state multinominal logit model; ML estimates

Variable	Means	Transition into			
		Employment		Non–Participation	
		Coeff.	|t|	Coeff.	|t|
Constant	—	–0.6402	3.27	–3.0045	9.70
45 years < Age ≤ 55 years *(25 < Age ≤ 45)*	0.09	–0.6056	3.85	0.3815	1.71
Age > 55 years	0.05	–1.0658	4.12	1.2775	6.44
Married	0.53	0.3081	3.77	—	—
Disabled	0.06	–0.5423	2.67	0.6186	3.11
Higher / post–secondary / secondary general education *(primary)*	0.07	0.3772	2.58	0.3808	1.71
Secondary vocational education	0.18	0.1694	1.71	—	—
Layoff	0.46	—	—	–0.5496	3.25
Unemployment benefits	0.51	–0.2682	3.21	–0.6471	3.76
Voivodship unemployment rate	0.14	–3.2819	2.68	4.5409	2.27
Population < 20 000 *(rural area)*	0.16	–0.2273	1.93	0.3080	1.66
Population ≥ 100 000	0.28	–0.1584	1.68	—	—
Modern region *(heavily industrialized)*	0.22	0.2763	2.77	0.3422	2.23
Agricultural region	0.27	–0.3030	2.98	–0.7513	3.41
Other regions	0.08	–0.4039	2.30	—	—
August 1992 *(May 1992)*	0.33	–0.3869	4.24	–0.4785	2.85
November 1992	0.35	–0.8019	8.06	–0.5726	3.46

Observations = 2614   – ln likelihood = 3005.49

Note: For dummy variables base categories are given in parantheses. (—) refers to coefficients which have been restricted to zero in the estimation.

Source: The Polish Labour Force Survey (PLFS), waves 1–4.

34

Table A4 Determinants of transition rates from unemployment, females Three–state multinominal logit model; ML estimates

Variable	Means	Transition into			
		Employment		Non–Participation	
		Coeff.	$\lvert t \rvert$	Coeff.	$\lvert t \rvert$
Constant	—	–4.2759	4.45	–4.8919	5.03
20 years < Age ≤ 25 years *(25 < Age ≤ 45)*	0.16	—	—	0.2041	1.15
45 years < Age ≤ 55 years	0.10	–0.3990	1.77	0.5967	2.99
Age > 55 years	0.03	–1.3278	2.27	1.1162	3.48
Married	0.68	–0.3695	3.23	0.2157	1.38
Married with children 3 – 10 years	0.36	—	—	–0.2645	1.89
Disabled	0.05	–0.4470	1.35	—	—
Higher / post–secondary / secondary general education *(primary)*	0.19	0.6907	4.12	—	—
Secondary vocational education	0.26	0.5676	3.46	—	—
Basic vocational education	0.32	0.3057	1.88	–0.3498	2.27
Layoff	0.43	—	—	–0.5769	3.59
Unemployment benefits	0.51	–0.3045	2.64	–0.9717	6,00
Voivodship unemployment rate	0.14	–2.4562	1.44	5.0312	2.60
Population < 20 000 *(rural area)*	0.16	0.2127	1.59	—	—
Population < 100 000	0.22	—	—	–0.3127	1.94
Agricultural region *(heavily industrialized)*	0.22	—	—	–0.1816	1.08
Other regions	0.06	—	—	–0.9549	2.99
August 1992 *(May 1992)*	0.34	0.1335	1.11	–0.4488	2.97
November 1992	0.35	0.0419	0.30	–0.3912	2.27
Random effect		*Estimate*		$\lvert t \rvert$	
ε_1		–5.5587		5.52	
ε_2		3.3147		5.56	
$\psi(\varepsilon_1)$		0.37		8.19	
$\psi(\varepsilon_2)$		0.63		13.73	
# Observations = 2569		– ln likelihood = 3001.53			

Note: For dummy variables base categories are given in parantheses. (—) refers to coefficients which have been restricted to zero in the estimation.

Source: The Polish Labour Force Survey (PLFS), waves 1–4.

Table A5 **Determinants of transition rates from non–participation, males**
Three–state multinominal logit model with non–parametric unobserved
population heterogeneity; ML estimates

Variable	Means	Transition into			
		Employment		Unemployment	
		Coeff.	|t|	Coeff.	|t|
Constant	—	−1.0406	6.17	−2.3545	7.87
Age ≤ 20 years *(25 < Age ≤ 45)*	0.34	−1.0626	6.19	−1.3811	7.30
20 years < Age ≤ 25 years	0.05	—	—	−0.7265	3.34
45 years < Age ≤ 55 years	0.13	−1.1193	4.92	−1.3751	5.59
Age > 55 years	0.36	−2.7362	11.45	−3.2774	12.54
Married	0.50	0.8638	5.07	—	—
Disabled	0.37	−1.6729	9.70	−2.0252	10.71
Secondary vocational education *(primary)*	0.11	—	—	0.8189	4.34
Basic vocational education	0.20	0.4064	2.74	1.0433	6.28
Voivodship unemployment rate	0.14	—	—	7.5811	4.53
Population < 20 000 *(rural area)*	0.16	−0.8937	5.02	—	—
Population < 100 000	0.21	−0.9335	5.97	—	—
Population ≥ 100 000	0.31	−0.9442	6.71	—	—
August 1992 *(May 1992)*	0.32	−0.5860	4.67	−0.9278	6.48
November 1992	0.34	−1.2943	8.67	−1.2986	8.60

Random effect	*Estimate*	|t|
ε_1	−0.3771	9.48
ε_2	5.1877	8.07
$\psi(\varepsilon_1)$	0.93	111.68
$\psi(\varepsilon_2)$	0.07	8.12

# Observations = 5157	− ln likelihood = 3545.8

Note: For dummy variables base categories are given in parantheses. (—) refers to coefficients which have been restricted to zero in the estimation.

Source: The Polish Labour Force Survey (PLFS), waves 1–4.

Table A6 Determinants of transition rates from non–participation, females
Three–state multinominal logit model with non–parametric unobserved
population heterogeneity; ML estimates

Variable	Means	Transition into			
		Employment		Unemployment	
		Coeff.	|t|	Coeff.	|t|
Constant	—	–1.6415	6.35	–3.0346	11.72
Age ≤ 20 years *(25 < Age ≤ 45*	0.22	–0.6923	4.49	–0.5969	3.34
45 years < Age ≤ 55 years	0.14	–1.0010	4.17	–1.3795	5.68
Age> 55 years	0.33	–1.7524	7.61	–3.1357	12.09
Married	0.60	—	—	–0.3844	2.79
Children < 10 years	0.24	–0.2242	2.36	—	—
Children 11 – 18 years	0.13	0.8890	2.54	—	—
Married with children 11 – 18 years	0.11	–0.8813	2.42	—	—
Disabled	0.25	–1.0830	5.32	–1.3319	–6.50
Higher / post–secondary / secondary general education *(primary)*	0.16	0.5380	4.15	0.8482	5.70
Secondary vocational education	0.13	0.5638	4.13	1.0357	6.20
Basic vocational education	0.16	—	—	0.8941	5.66
Voivodship unemployment rate	0.14	–2.6859	1.62	5.2752	3.75
Population < 20 000 *(rural area)*	0.13	–0.4615	3.02	—	—
Population < 100 000	0.21	–0.8551	5.93	—	—
Population ≥ 100 000	0.32	–0.9386	7.08	—	—
Agricultural region *(heavily industrialized)*	0.21	0.2365	2.07	—	—
August 1992 *(May 1992)*	0.33	–0.5332	4.79	–0.9734	–8.55
November 1992	0.34	–1.3061	9.83	–1.1080	9.57
Random effect	*Estimate*			|t|	
ε_1	5.1599			12.38	
ε_2	–0.2457			12.48	
$\psi(\varepsilon_1)$	0.05			6.80	
$\psi(\varepsilon_2)$	0.95			142.74	
# Observations = 8303	– ln likelihood = 5159.06				

Note: For dummy variables base categories are given in parantheses. (—) refers to coefficients which have been restricted to zero in the estimation.

Source: The Polish Labour Force Survey (PLFS), waves 1–4.

References

Amemiya, T. (1985), Advanced Econometrics; Blackwell, Oxford.

Blanchard, O./ Commander, S./Coricelli, F. (1994), Unemployment and the labour market in Eastern Europe; in OECD (1994), Unemployment in Transition Countries: Transient or Persistent?, Paris.

Boeri, T. (1994a), Labour market flows and the persistence of unemployment; in OECD (ed.), Unemployment in Transition Countries: Transient or Persistent?; Paris 1994.

Boeri, T. (1994b), 'Transitional' unemployment; The Economics of Transition, 2, 1-25.

Boeri, T./Keese, M. (1992), Labour markets and the transition in Central and Eastern Europe; OECD Economic Studies, 18, 133–163.

Burda, M. (1993), Unemployment, labor markets and structural change in Eastern Europe, Economic Policy, 16, 107–37.

Clark, K.B./Summers, L.H. (1979), Labor market dynamics and unemployment: a reconsideration; Brookings Papers on Economic Activity, 1, 13 –72.

Commander, S./Coricelli, F. (1995), Unemployment in the Transition in East Europe; A World Bank Publication, Oxford University Press.

Franz, W. (1994), Central and East European labor markets in transition: developments, causes, and cures; CILE Diskussionspapier 19–1994; University Konstanz, FRG.

Góra, M. (1991), Shock therapy for the Polish labour market; International Labour Review, 130, 145–163.

Góra, M. (1994), Labour Market Policies in Poland; in OECD (ed.), Unemployment in Transition Countries: Transient or Persistent?; Paris 1994.

Góra, M. / Lehmann, H. (1992), Flow and stock analysis of Polish unemployment: January 1990 – June 1991; Labour, 6, 87–119.

Góra, M. / Lehmann, H. (1995), How divergent is regional labour market adjustment in Poland?; in OECD (ed.), Regional Unemployment in Central and Eastern Europe; Paris, forthcoming.

Góra, M./Kotowska, I./Panek, T./Podgorski, J. (1994), Labour market trends and policies: Poland; in: G. Fischer/G. Standing (eds.), Structural Change in Central and Eastern Europe: Labour Market and Social Policy Implications; OECD, Paris.

GUS (1992), Aktywnosc zawodowa i bezrobocie w Polsce, Central Statistical Office, Warsaw.

GUS (1993), Biuletyn Statystyczny (1991 i 1992), Central Statistical Office, Warsaw.

GUS (1994), Registered Unemployment in Poland, I – IV Quarter 1993; Central Statistical Office, Warsaw.

Hall, R.E. (1972), Turnover in the labor force; Brookings Papers on Economic Activity, 3, 709–756.

Kiefer, N.M. (1990), Econometric methods for grouped duration data; in: J. Hartog/G. Ridder/J. Theeuwes (eds.), Panel Data and Labor Market Studies, North Holland, Amsterdam etc.

Kotowska, I. (1993), Labour market discrimination under the transition to a market economy in Poland; Paper presented at the ESPE Congress 1993, Budapest.

38

Kwiatkowski E. (1993a), Public sector adjustment through employment: Retrenchment policies and practicies in Poland, ILO, Occasional Paper, No. 20, Geneva.

Kwiatkowski E. (1993b), Labor market; in: Instytut Rozwoju i Studiów Strategicznych, IRISS, (ed.), Transforming Polish Economy 1993, chapter 6, Warsaw.

Kwiatkowski E. (1994), Variation in regional unemployment and the regional employment structure in Poland; Mimeo, Institute of Economics, University of Lodz.

Lehmann H./Kwiatkowski E./ Schaffer M. (1991), Polish regional u/v ratios and pre–reform employment structure, LSE, Centre for Economic Performance, Working Paper, No. 109.

Marston, S.T. (1976), Employment instability and high unemployment rates; Brookings Papers on Economic Activity, 1, 169–210.

OECD (1993), The Labour Market in Poland; Paris.

OECD (1994), Unemployment in Transition Countries: Transient or Persistent?, Paris.

OECD (1995), Regional Unemployment in Central and Eastern Europe; Paris, forthcoming.

Rutkowski M. (1990), Labour hoarding and future unemployment in Eastern Europe: the case of Polish industry, Discussion Paper No.6, Centre for Economic Performance, London School of Economics.

Scarpetta, S. (19995), Spatial variations in unemployment in Central and Eastern Europe: underlying reasons and labour market policy options; in OECD (ed.), Regional Unemployment in Central and Eastern Europe; Paris, forthcoming.

Scarpetta, S./Reutersward, A. (1994), Unemployment benefit systems and active labour market policy in Central and Eastern Europe: an overview; in OECD (ed.), Unemployment in Transition Countries: Transient or Persistent?; Paris 1994.

Steiner, V. (1994), Labour market transitions and the persistence of unemployment – West Germany 1983 – 1992; ZEW Discussion Paper No. 94–20, Mannheim, FRG.

Szarkowski, A./Witkowski, J. (1994), The Polish Labour Force Survey; Statistics in Transition, Journal of the Polish Statistical Association, 1, 467–484.

Toikka, R.S. (1976), A Markovian model of labor market decisions by workers, American Economic Review, 66, 821–834.

Witkowski, J. (1993), Long–term unemployment in Poland; Mimeo, Central Statistical Office, Warsaw.

Witkowski, J. (1994), Unemployment in Poland in the period of transition 1990 – 1993; Mimeo, Central Statistical Office, Warsaw.