THE WILLIAM DAVIDSON INSTITUTE
AT THE UNIVERSITY OF MICHIGAN BUSINESS SCHOOL

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by Hartmut Lehmann, John O'Flaherty, and Patrick P. Walsh

Working Paper Number 158
June 1997

Comments Welcome

Centre for Economic Policy Research

THE WILLIAM DAVIDSON INSTITUTE

International Workshop in Transition Economics

A CEPR/WDI Workshop

Hosted by CERGE-EI

Prague, 9/12 July 1998

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We would like to thank CERGE-EI for their generosity in hosting this meeting. Additional funding from the Ford Foundation is gratefully acknowledged.

Abstract

On aspect of transition economics is the fact that large scale inter and intra sector adjustments in employment will have to take place in the transition period to a market economy. The required decline of agriculture and manufacturing and the rise in services induce large inter-sectoral employment adjustment. The restructuring of state and previously state owned firms will induce large intra-sectoral employment adjustment. This process has to be facilitated by a large re-allocation of workers from their initial state. Restructuring of this kind can be expected to create a lot of frictional unemployment, due to congestion in the labour market, and structural unemployment, due to individuals with redundant human capital been separated from pre-transitional job security. In this paper we write down a structural and frictional model of unemployment resulting from structural adjustment in employment in the spirit of Aghion and Howitt (1998). The relationship between regional development and unemployment rates is not monotonic in Poland. Using Polish county level unemployment register data this papers shows that the dynamics of regional labour demand in Poland have determined unemployment in a systematic way by changing the magnitude and composition of the inflows and the regional probabilities of exit conditional on duration, gender, age, education and previous tenure. Restructuring in employment can be facilitated by the social security system by allowing workers to use unemployment as a temporary pit stop in periods of congestion created by the transition process. Restructuring can also act as a cleansing process that sheds inefficient and redundant human capital from employment with compounds in unemployment creating a long term structural component of unemployment. We show the stage of regional restructuring and development determines the levels and composition of individuals in short term and long term spells. Restructuring induces both larger throughputs and deeper structural problems in unemployment. In the most advanced regions where congestion is lower unemployment is mainly structural in nature resulting from individuals having undertaken long spells in employment in the planned system .

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June 1997

[1] The authors are grateful to Marek Góra, Klara Fori, Jonathan Wadsworth and participants of the PHARE-ACE workshop entitled "The Extent and Causes of Regional Labour Market Diversification in Hungary and Poland" for valuable comments. Financial support from the European Commission (Phare-Ace project No. 94-0578-R) is also gratefully acknowledged. The usual caveat applies.

Introduction

There have been few studies on the issue of regional labour market performance in Poland. However some recent work has been done on this topic and studies include Góra and Lehmann (1995), Huber and Scarpetta (1994) and Lehmann et al (1991). This analysis uses unemployment count data at the county level to explore the possibility that heterogeneous structural changes in the level and composition of employment across regions, due to the reforms in 1990, created heterogeneity in the levels, composition and cyclicality of the unemployment flows and the stocks that these flows generated, in particular the stock of Long Term Unemployment (LTU).

We use the taxonomy of regional economic development developed by Góra and Lehmann (1995) to classify regions rather than the geographic aggregation of ten macro-regions developed by the Polish Central Statistical Office (GUS). This taxonomy bundles voivodships (the highest regional administrative units) into six groups which represent a continuum of economic development and restructuring from Group I (least developed) to Group VI (most developed). The classification scheme used by Góra and Lehmann (1995) assigns weights to the elements of a vector of regional characteristics which includes elements that proxy for the stage of development and employment structure at the starting date in January 1990; these include the relative employment shares of agriculture, services and industry. Other elements of the vector try to capture the adjustment processes that has taken place since the beginning of the reforms; the degree with which changes in the employment structure of services and industry occurred are understood as proxies for the extent of reallocation and "dis-hoarding" of labour. The final element in this vector of regional

classifiers is average income of municipalities per capita which, in the absence of regional GDP, proxies historically grown regional wealth.

In the regions classified as less developed by the taxonomy employed in this paper, the presence of industry and services is sparse and agricultural employment dominant. Even though separations from employment are limited, when a separation does occur the possibility of re-employment is low due to the lack of job creation in other sectors of the region. This produces low outflow rates from unemployment and increases the average duration of unemployment spells. For the above reasons less developed regions are characterised by high participation rates, low unemployment rates and a greater share of LTU in the unemployment pool.

In the more developed regions the task of restructuring employment led, amongst other things, to the "dis-hoarding" of labour alongside the creation of private sector employment. This in turn led to changes in both the level and composition of employment in the more developed regions. More advanced regions are characterised by low participation rates, increased labour market turnover driven by increased turnover between the states of employment and unemployment and/or increased job to job flows, higher unemployment rates, and a lower incidence of LTU compared to less developed regions. The increased labour market turnover during restructuring can lead to increased Short Term Unemployment (STU) and an observed reduction in the incidence of LTU. Yet, if restructuring is undertaken with increased job to job flows the unemployment to employment turnover may decline and the incidence of LTU could increase in a developed region.

In this paper we explore whether the stage of development and the restructuring stance of a region, captured by the initial conditions at the beginning of

transition and employment adjustments during the initial phase of transition can determine the regional composition of unemployment by gender, age, education and previous employment tenure and the regional duration specific hazard rates of individuals with certain human capital characteristics. We investigate this question using county level unemployment register data.

In section I of the paper a thesis is outlined and some background literature discussed. In section II, using the taxonomy developed by Góra and Lehmann (1995) to classify Polish regional administrative units (voivodships), some of the basic characteristics of regional unemployment turnover and LTU are documented. Section III presents an examination of the regional human capital characteristics of individuals in duration categories of less than and greater than one year. Hazard rates for individuals with different characteristics in the regional unemployment pool are constructed in section IV. An explanation for the differences in regional unemployment experiences is put forward in the conclusion.

I The Thesis

What are the factors that lead to persistence in unemployment? One popular explanation is based on the unemployment state dependence hypothesis, aptly argued by Layard, Nickell, and Jackman (1991). According to this theory, a downturn in the business cycle increases the flow of workers into the unemployment state. As the spell of unemployment increases an individual's human capital, or his/her perceived human capital, can depreciate. A pro-longed recession can lead to the disenfranchising of individuals with long unemployment spells from the labour force. This creates an ineffective portion of the labour supply which in turn creates upward wage pressure in a recovery period and causes unemployment to persist.

A competing theory is based on the heterogeneity of the unemployed. Specifically, those that remain in the unemployment pool for long durations are inherently different from those experiencing short spells. One possible cause of heterogeneity in the characteristics of individuals who flow into unemployment is changes in the structure of employment. In western economies the globalisation of trade and technology advancement can induce important structural changes in the sectoral composition and the occupational structure of employment. The changing skill structure of employment has been documented for the US manufacturing sector by Berman, Machin and Bound (1995), for France and Germany by Sneessens (1995), and for the UK by Machin, Ryan and Van Reenan (1996) and Nickell (1996).

Until the reforms in 1990 virtually all sectors of the Polish economy were protected from competition and the human capital of workers in many occupations could be employed "profitably" only within the trade structures of the CMEA area. Any exposure to world markets would have made apparent that human capital in many occupations was of the wrong kind or hopelessly out-dated. With the introduction of the reforms the environment changed and a *degree* of restructuring took place in each region as all sectors of the economy became increasingly exposed to the market system leading to changes in the sectoral and occupational structures of employment. Structural change was more pronounced in the more developed regions. Inefficient human capital had to be shed and the market had little incentive, from either the demand or supply side, to re-build the human capital of older and unskilled workers shed by public enterprises.

Could a relative wage adjustment not move this human capital to alternative employment? New skill levels were required in all sectors of the economy. The sunk

costs associated with the training or re-building of older human capital and the limited duration of any return on such an investment may have led firms to exclude these individuals from the effective labour force. Thus, human capital is not unemployment state dependent but employment state dependent. In other words it is not the duration of the unemployment spell but the nature and length of the prior employment spell in sheltered, non-competitive establishments that create an ineffective labour supply.

In the face of skill mismatch a natural response for government, as a social planner, is to attempt to retrain the LTU in order to reintegrate them in to the effective labour force. This stance seems to have driven many of the policies pursued as a remedy to the LTU problem, such as a number of training and employment schemes. If however, as argued above, the human capital deficiencies of those shed are extensive, then one must ask whether wage adjustment or manpower policies can be expected to work. In later sections we explore the possibility that in the more developed regions restructuring has generated LTU that cannot be easily re-employed.

We will also see that the less developed regions have a higher incidence of LTU. The nature of employment adjustment in these regions is characterised not by traditional sectors declining and new sectors expanding but rather by a lack of restructuring in existing jobs and a lack of growth in private sector jobs. The taxonomy of Góra and Lehmann (1995) captures these structural differences in employment composition and adjustment during transition. This should explain the longer unemployment spells of those who do become separated. While in general less developed regions are not creating jobs, the nature of job creation in the more developed regions may be leading to severe mismatch in the traditional sense; out-

dated human capital of workers shed from State-Owned Enterprises (SOE's) and skill requirements for new jobs in the expanding private sector diverge dramatically.

Some may accept that business cycles and structural change increase the flows of workers into unemployment but suggest that the generosity of a welfare system can trap some individuals in an unemployment culture. Individuals, given their employment options, choose to remain in LTU. It has been argued that the fact that unemployment persists in Europe, but not in the US, is due to labour market rigidities. In particular, European countries tend to be characterised by more extensive employment protection legislation, greater union power, higher minimum wages, and more generous unemployment compensation (Heylen et al, 1996). These factors, in particular factors lowering flows from unemployment to employment, may be relevant in Poland (Góra and Schmidt (1997)); however, we will argue that the heterogeneity in the regional unemployment inflow and outflow rates induced by different degrees of employment restructuring in both levels and in occupational composition is the key to understanding the different regional LTU experiences.

This paper attempts to exploit a natural experiment. The degree of employment restructuring ranges from low to high as we move from the least developed region to the most developed region. We hope to capture differences in the characteristics of flows and stocks across these regions and produce empirical support for the thesis that structural change in labour demand or, in the case of less developed regions, lack of job creation, is the main reason for the occurrence of LTU.

We examine the regional duration specific unemployment hazard rates by age, gender, education and previous years of tenure in employment to investigate the evolutionary path and characteristics of individuals who enter LTU. Our results should

show that the different scenarios across regions at different stages of development are driven by both the initial structure of employment in 1990 and the changing composition of employment since 1990. For example, the incidence of LTU in less developed regions may be more homogenous by age, gender, education and tenure due to the lack of employment creation in the region. In developed regions the build up in the LTU may be primarily driven by flows of older, unskilled workers entering unemployment from public enterprises who due to severe mismatch are prevented from flowing into new jobs created in the private sector. Our thesis basically argues that the fundamental cause of divergent regional LTU developments has to be sought in the nature of employment and employment adjustment since the beginning of the reforms in 1990.

II Regional Unemployment Flows and LTU Shares

The taxonomy of Góra and Lehmann (1995) is here used to classify regions with different levels of restructuring. This taxonomy, presented in Table 1, categorises voivodships into six groups which represent a continuum of economic development and restructuring from Group I (least developed) to Group VI (most developed).

We define the annual inflow rate and outflow rate by region as follows:

(1) The Inflow rate = $(I_{L,t+1} / (S_t + S_{t+1})/2)$

(2) The Outflow rate = $(O_{L,t+1} / (S_t + S_{t+1})/2)$

where $I_{L,t+1}$ and $O_{L,t+1}$ are, respectively, the gross regional flows of individuals into and out of unemployment over the period t to t+1, S_t is the regional stock of unemployment at time t, and S_{t+1} is the regional stock of unemployment at time t+1. The stock of those unemployed for less than one month is used as a proxy for the number of new registrations. Since we have only quarterly count data, we average the quarterly stock figures for <1 month duration and multiply by twelve to estimate the annual inflow at the county level; we then aggregate up to the regional level. Table 2 presents the regional inflow rates, outflow rates and shares of LTU in the regional stocks for the years 1995 and 1996. We observe that turnover increases as we move from Group I to Group V but is lower in Group VI. The share of LTU declines as we move from Group I to Group V and then increases in the most developed region, Group VI. This suggests that the higher turnover was generating greater pools of individuals in unemployment for under one year.

Table 1. Taxonomy of Polish regions

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

Table 2. Inflow and outflow rates

		1995			1996		
	Group	Inflow rate	Outflow rate	LTU share	Inflow rate	Outflow rate	LTU share
Total	I	0.86	0.78	44.1%	0.80	0.71	42.8%
	II	0.90	0.88	40.0%	0.81	0.73	40.1%
	III	0.87	0.81	41.9%	0.82	0.72	40.6%
	IV	0.98	0.87	37.7%	0.94	0.84	35.2%
	V	0.98	0.87	37.6%	0.94	0.84	37.5%
	VI	0.87	0.75	39.4%	0.87	0.71	38.5%
Women	I	0.83	0.79	49.9%	0.71	0.68	49.5%
	II	0.86	0.88	45.7%	0.72	0.69	46.1%
	III	0.82	0.80	48.3%	0.72	0.68	47.1%
	IV	0.88	0.82	43.3%	0.80	0.75	41.2%
	V	0.87	0.83	43.2%	0.80	0.74	43.5%
	VI	0.79	0.74	43.8%	0.75	0.65	43.6%
Men	I	0.89	0.78	38.0%	0.89	0.74	35.3%
	II	0.94	0.88	34.0%	0.92	0.77	33.1%
	III	0.93	0.82	34.8%	0.93	0.76	32.7%
	IV	1.12	0.94	29.0%	1.17	0.99	25.0%
	V	1.05	0.90	30.6%	1.10	0.89	29.0%
	VI	0.95	0.77	33.8%	1.03	0.79	31.1%

This is consistent with the idea that restructuring can generate increased flows between employment and unemployment. The most developed region may have progressed to a situation of increased job to job flows that avoid unemployment spells, thus decreasing unemployment turnover but leaving only inefficient human capital, shed from the restructuring process, to flow into the unemployment pool with prospects of long durations. The regions with high unemployment turnover and large stocks of less than one year duration may have a dual structure in their inflows. There may be workers in the inflows using unemployment insurance to help the process of reallocating their human capital to new jobs which arise in the wake of to the restructuring of employment. Other workers in the inflow may, due to their poor human capital, have little hope of being matched to the new vacancies and have high

probabilities of flowing into LTU. In the least developed region it may be the case that any worker separated from employment has a high probability of flowing into LTU due to the lack of job creation.

The remainder of this paper builds on this thesis by documenting the characteristics of the workers in regional unemployment pools by gender, age, duration, education and previous employment tenure. It also presents six and twelve month survival probabilities for different cohorts of individuals by gender, age, education and previous employment tenure. This allows us to trace the dynamics behind LTU and make tentative links between the regional evolution of LTU and the degree of employment restructuring in each region.

III Regional Stock Compositions.

Tables 3 (a), (b) and (c) document the regional age compositions by duration and gender averaged over four quarters for 1995 and 1996. There is a greater share of under 24 in the under a year stock compared to the over a year stock for all degrees of regional development. We note that the share of under 24 in both under and over one year durations is greater in regions with lower degrees of development and restructuring. This is true for both women and men. The share of males and females in the under a year stock by region is not very different for the 25-34 age group but we see that the regions undertaking more restructuring have bigger shares of males and females in the 35-44 age group. In the over a year stock the share of under 34 declines and over 34 increases in the regions undertaking more restructuring. We observe the above trends in both 1995 and 1996.

Table 3a. Composition of total unemployment by age

1995

Group	15-24		25-34		35-44		>44	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	47.4%	33.8%	25.6%	31.5%	19.5%	24.3%	7.5%	10.3%
II	42.1%	30.5%	26.1%	30.7%	21.8%	25.2%	9.9%	13.6%
III	43.1%	30.3%	25.8%	30.1%	21.7%	26.1%	9.5%	13.4%
IV	39.3%	25.3%	24.6%	28.1%	24.6%	29.3%	11.5%	17.3%
V	39.7%	26.5%	25.6%	28.8%	24.5%	29.1%	10.1%	15.6%
VI	34.4%	21.6%	23.5%	24.7%	26.4%	29.7%	15.7%	24.0%

1996

Group	15-24		25-34		35-44		>44	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	42.4%	31.8%	28.0%	31.1%	20.9%	10.1%	8.7%	12.0%
II	37.5%	28.0%	28.0%	30.2%	23.1%	12.8%	11.4%	16.0%
III	39.1%	28.0%	27.3%	29.7%	22.7%	12.9%	11.0%	15.6%
IV	35.4%	23.9%	25.8%	26.4%	25.6%	16.7%	13.3%	20.8%
V	35.8%	24.4%	26.5%	28.0%	25.4%	15.1%	12.3%	18.5%
VI	29.9%	19.4%	24.4%	23.3%	26.9%	22.3%	18.7%	29.0%

Table 3b. Composition of female unemployment by age

1995

Group	15-24		25-34		35-44		>44	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	49.8%	34.7%	25.9%	33.4%	18.7%	24.2%	5.6%	7.6%
II	44.3%	31.5%	26.7%	32.8%	21.1%	25.4%	7.9%	10.3%
III	44.8%	30.3%	26.6%	32.5%	21.1%	26.7%	7.5%	10.5%
IV	39.6%	25.6%	26.5%	30.9%	24.4%	29.9%	9.5%	13.6%
V	39.9%	26.5%	27.4%	31.1%	24.4%	29.7%	8.3%	12.7%
VI	34.7%	22.0%	25.2%	27.5%	26.5%	31.1%	13.6%	19.4%

1996

Group	15-24		25-34		35-44		>44	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	44.0%	32.5%	29.1%	33.3%	20.3%	25.0%	6.5%	9.1%
II	38.5%	29.1%	29.4%	32.6%	22.8%	26.2%	9.3%	12.1%
III	39.6%	28.2%	28.8%	32.2%	22.6%	27.4%	8.9%	12.2%
IV	35.0%	24.4%	28.1%	29.2%	25.7%	30.1%	11.2%	16.2%
V	35.5%	24.5%	28.7%	30.5%	25.5%	30.0%	10.3%	15.0%
VI	29.9%	20.1%	26.6%	26.1%	27.3%	30.1%	16.2%	23.8%

Table 3c. Composition of male unemployment by age

1995

Group	15-24		25-34		35-44		>44	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	45.4%	32.6%	25.3%	28.8%	20.2%	24.5%	9.1%	14.0%
II	40.2%	29.0%	25.7%	27.8%	22.4%	24.9%	11.7%	18.3%
III	41.7%	30.2%	25.0%	26.5%	22.1%	25.4%	11.2%	17.9%
IV	38.9%	24.7%	22.3%	21.4%	24.9%	27.7%	13.9%	26.2%
V	39.5%	26.4%	23.8%	24.7%	24.7%	28.0%	12.0%	20.8%
VI	34.0%	21.0%	21.7%	20.1%	26.3%	27.4%	18.0%	31.5%

1996

Group	15-24		25-34		35-44		>44	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	41.0%	30.6%	27.0%	27.6%	21.4%	25.1%	10.6%	16.7%
II	36.6%	26.3%	26.6%	26.3%	23.3%	25.1%	13.4%	22.3%
III	38.6%	27.5%	25.8%	25.2%	22.7%	25.6%	12.9%	21.6%
IV	35.9%	22.3%	22.7%	18.5%	25.4%	25.4%	16.1%	33.9%
V	36.1%	24.0%	24.0%	22.5%	25.2%	27.4%	14.7%	26.1%
VI	29.9%	18.0%	22.0%	17.7%	26.5%	24.7%	21.6%	39.6%

Tables 4 (a), (b) and (c) present the average regional education compositions of the unemployed by duration and gender for 1995 and 1996. There is a tendency across all regions for the stock under a year to have, on average, individuals with higher education standards. The percentage of LTU with primary or less education

grows with the degree of regional employment restructuring, as we move form Group I to Group IV. There is not much differences in the inter-regional education levels of the under a year stock.

Table 4a. Composition of total unemployment by education

1995

Group	Primary or less		Secondary/Vocational		University	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	25.1%	29.7%	73.5%	69.4%	1.4%	0.8%
II	27.4%	32.2%	71.2%	66.8%	1.3%	0.9%
III	28.5%	33.1%	69.6%	65.6%	1.9%	1.3%
IV	31.6%	37.6%	67.1%	61.4%	1.3%	1.0%
V	30.3%	36.2%	68.1%	62.6%	1.6%	1.2%
VI	33.7%	38.6%	63.8%	58.8%	2.5%	2.6%

1996

Group	Primary or less		Secondary/Vocational		University	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	27.3%	30.1%	71.4%	69.1%	1.3%	0.8%
II	29.5%	32.8%	69.3%	66.4%	1.2%	0.8%
III	30.6%	34.4%	67.7%	64.5%	1.7%	1.1%
IV	33.3%	37.7%	65.5%	61.4%	1.2%	0.9%
V	32.0%	36.9%	66.6%	62.1%	1.5%	1.0%
VI	35.4%	39.3%	62.2%	58.5%	2.4%	2.2%

Table 4b. Composition of female unemployment by education

1995

Group	Primary or less		Secondary/Vocational		University	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	19.1%	25.2%	79.2%	74.0%	1.8%	0.9%
II	22.4%	28.2%	76.0%	70.9%	1.6%	0.9%
III	23.5%	29.8%	74.1%	68.9%	2.4%	1.4%
IV	27.9%	34.7%	70.7%	64.4%	1.3%	0.9%
V	27.1%	34.3%	71.0%	64.6%	1.9%	1.1%
VI	29.2%	34.7%	67.9%	62.7%	2.9%	2.7%

1996

Group	Primary or less		Secondary/Vocational		University	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	21.1%	25.9%	77.2%	73.2%	1.7%	0.8%
II	24.7%	28.8%	73.8%	70.4%	1.5%	0.8%
III	25.8%	31.0%	72.1%	67.8%	2.2%	1.2%
IV	30.2%	34.9%	68.5%	64.4%	1.2%	0.8%
V	28.8%	34.9%	69.5%	64.2%	1.7%	1.0%
VI	31.0%	35.6%	66.3%	62.2%	2.8%	2.2%

Table 4c. Composition of male unemployment by education

1995

Group	Primary or less		Secondary/Vocational		University	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	30.2%	36.0%	68.7%	63.2%	1.0%	0.8%
II	31.8%	37.9%	67.1%	61.1%	1.1%	1.0%
III	32.8%	38.2%	65.8%	60.6%	1.4%	1.2%
IV	36.2%	44.3%	62.6%	54.4%	1.2%	1.3%
V	33.6%	39.6%	65.1%	59.1%	1.3%	1.3%
VI	38.5%	45.0%	59.4%	52.4%	2.0%	2.5%

1996

Group	Primary or less		Secondary/Vocational		University	
	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	32.8%	36.8%	66.2%	62.5%	0.9%	0.7%
II	33.9%	39.1%	65.1%	60.1%	1.0%	0.8%
III	35.2%	40.3%	63.6%	58.6%	1.2%	1.0%
IV	37.5%	45.7%	61.4%	53.1%	1.1%	1.2%
V	35.6%	41.1%	63.3%	57.7%	1.2%	1.2%
VI	40.6%	46.7%	57.4%	51.0%	2.0%	2.3%

The average regional tenure (of previous employment) compositions of the unemployed by duration and gender are shown in tables 5 (a), (b) and (c). There is a tendency across all regions for the stock under a year to have, on average, individuals with none or less than five years previous employment experience. The percentage of LTU with greater than five years work experience dominates the stock of LTU and this share tends to be greater in regions undertaking more employment restructuring. We observe little difference in the regional tenure compositions of the under a year stock.

Table 5a. Composition of total unemployment by tenure

	1995					
	None		0-5 years		>5 years	
Group	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	29.0%	25.7%	30.8%	27.8%	40.2%	46.4%
II	26.8%	26.2%	29.8%	25.5%	43.4%	48.3%
III	25.2%	25.0%	28.4%	23.4%	46.4%	51.6%
IV	22.3%	17.5%	27.8%	22.8%	49.8%	59.7%
V	22.1%	19.9%	29.2%	25.4%	48.7%	54.7%
VI	20.9%	19.1%	23.4%	18.9%	55.7%	61.9%

	1996					
	None		0-5 years		>5 years	
Group	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	21.4%	24.7%	38.2%	28.7%	40.5%	46.5%
II	19.6%	24.3%	39.5%	28.4%	40.9%	47.3%
III	18.4%	22.6%	35.4%	24.8%	46.2%	52.7%
IV	15.8%	16.9%	34.3%	24.0%	49.9%	59.1%
V	16.0%	18.8%	34.4%	26.6%	49.6%	54.7%
VI	16.1%	16.5%	27.3%	19.7%	56.6%	63.8%

Table 5b. Composition of female unemployment by tenure

	1995					
	None		0-5 years		>5 years	
Group	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	32.4%	26.8%	30.9%	27.8%	36.7%	45.4%
II	30.0%	27.9%	30.2%	26.4%	39.7%	45.7%
III	29.3%	26.6%	28.0%	23.6%	42.8%	49.8%
IV	25.0%	18.9%	28.5%	23.7%	46.5%	57.4%
V	25.4%	21.3%	28.7%	24.6%	45.9%	54.2%
VI	23.2%	19.9%	23.5%	19.8%	53.4%	60.3%

	1996					
	None		0-5 years		>5 years	
Group	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	22.9%	26.0%	39.5%	29.0%	37.6%	45.0%
II	21.5%	26.1%	40.5%	29.2%	38.1%	44.7%
III	20.7%	24.5%	35.9%	25.0%	43.5%	50.5%
IV	17.8%	18.3%	35.4%	25.5%	46.8%	56.2%
V	18.1%	20.0%	34.5%	26.1%	47.4%	53.9%
VI	17.6%	17.8%	27.9%	21.0%	54.4%	61.2%

Table 5c. Composition of male unemployment by tenure

	1995					
	None		0-5 years		>5 years	
Group	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	26.1%	24.1%	30.7%	27.9%	43.2%	48.0%
II	23.9%	23.8%	29.5%	24.2%	46.6%	52.1%
III	21.6%	22.5%	28.8%	23.1%	49.6%	54.4%
IV	18.9%	14.0%	27.1%	20.7%	54.0%	65.2%
V	18.6%	17.4%	29.8%	27.0%	51.5%	55.6%
VI	18.5%	17.9%	23.3%	17.5%	58.2%	64.7%

	1996					
	None		0-5 years		>5 years	
Group	<1 Year	>1 Year	<1 Year	>1 Year	<1 Year	>1 Year
I	20.0%	22.7%	37.1%	28.3%	43.0%	49.0%
II	18.0%	21.4%	38.6%	27.2%	43.4%	51.3%
III	16.2%	19.2%	35.0%	24.3%	48.8%	56.4%
IV	13.1%	12.8%	32.8%	19.8%	54.1%	67.4%
V	13.7%	16.2%	34.3%	27.4%	52.1%	56.3%
VI	14.3%	13.9%	26.5%	17.1%	59.2%	69.1%

In summary, we do observe differences in regional composition by duration, age, education and previous job tenure. The LTU stock in the more developed regions of Poland has greater shares of older, less educated individuals with longer previous employment spells. The regional differences in the composition of the under a year pool are not so marked compared to the stock of LTU but it is important to note that there is also a tendency for the less developed regions to have individuals with better human capital characteristics by age, education and job tenure in the stock under a year. This is consistent with the thesis of section I which would imply a more homogenous pool for regions with a lack of new vacancies coming on stream and a pool of very disadvantaged workers in regions where a lot of restructuring is taking place.

In the next section we compute under a year regional hazard rates for individuals conditional on the above mentioned human capital characteristics. The interesting question is whether the under a year hazard rates for similar types of

unemployed individuals diverge across regions with different degrees of restructuring and development. This will give us further insight into the dynamics of the regional evolution of LTU.

IV Regional Hazard Rates.

We calculate regional hazard rates using duration specific stocks of the Polish count data by age, gender, education and previous job tenure. For ease of exposition we set out to calculate the probability of exit for cohorts in under 6 months duration category, STU_t, the short-term unemployed. To do this we make use of the between 6 and 12 months duration category six months later, MTU_{t+1}, the medium-term unemployed. We also work with the under 12 months duration category in 1995 and the between 12 and 24 months duration category, L_t, a subset of the long-term unemployed in 1996 to calculate under one year regional hazard rates for different cohorts.

We calculate the fraction of those leaving unemployment conditional upon being short-term unemployed over a six month interval as the following:

(3) $$a_{t,t+1} = (STU_t - MTU_{t+1})/STU_t$$

and the fraction of those leaving unemployment conditional upon being under a year over a twelve month interval as:

(4) $$b_{t,t+1} = ((STU_t + MTU_t) - (LTU_{t+1}))/(STU_t + MTU_t)$$

In tables 6 (a), (b) and (c) we report the conditional under 6 month and under 12 month hazard rates by age, education and previous tenure for the overall count, women and men, respectively.

First we examine the overall under 6 and 12 month regional hazards by age (young 15-24, prime age 25-44, and older > 44). We observe in table 6 (a) that in all regions the exit rates from unemployment during the first six months decrease with age. In the last section we noted that the less developed regions had, on average, greater shares of younger people in the under a year pool. Table 6 (a) shows that the exit rates for all three age groups increase as we move from Group I to Group VI. It is more difficult for all age groups to exit in the first six months of unemployment in the less developed compared to the more developed regions.

Table 6a. Hazard rates for all unemployed

Six Month Hazard Rates

Group	Age 15-24	Age 25-44	Age >44	Education Primary	Education Secondary	Education University	Duration None	Duration 0-5years	Duration >5 years
I	32.9%	25.0%	20.6%	28.7%	27.9%	47.5%	36.6%	23.9%	26.4%
II	36.7%	28.1%	20.6%	30.0%	31.2%	47.5%	40.8%	26.4%	28.3%
III	35.0%	26.6%	21.0%	29.0%	29.6%	47.2%	39.8%	25.7%	27.0%
IV	39.6%	28.4%	19.7%	32.1%	31.6%	45.6%	45.9%	28.4%	27.8%
V	39.7%	29.8%	20.9%	34.1%	32.1%	48.5%	42.7%	28.1%	31.6%
VI	41.9%	33.5%	22.8%	35.5%	34.1%	45.1%	45.3%	32.4%	32.0%

12 Month Hazard Rates

Group	Age 15-24	Age 25-44	Age >44	Education Primary	Education Secondary	Education University	Duration None	Duration 0-5years	Duration >5 years
I	69.0%	60.2%	49.7%	60.1%	64.5%	77.3%	66.6%	63.5%	61.6%
II	71.8%	63.4%	51.6%	62.1%	66.9%	76.9%	68.7%	64.1%	65.3%
III	71.8%	63.4%	52.3%	62.3%	67.2%	77.4%	69.3%	66.3%	64.1%
IV	76.9%	68.5%	53.9%	67.4%	71.2%	78.5%	76.3%	70.7%	67.1%
V	77.4%	68.7%	54.3%	67.0%	72.0%	80.5%	75.5%	70.5%	68.6%
VI	77.8%	68.7%	49.1%	66.3%	69.9%	73.3%	75.3%	70.9%	65.4%

The regional hazard rates under a year tell a slightly different story. It still holds that exit rates in all regions decrease with age. We also see significant improvements in the exit rates over the longer period of time. Of course this could be related to the fact that unemployment insurance in Poland has a duration of one year. This creates incentives to move into MTU but to avoid LTU. We should note that the exit rates for young and prime age do increase in a significant way as we move from

Group I to Group VI but this trend is less obvious for older people. The results imply that younger and prime age people have a lower probability of flowing into LTU in the more developed regions while older groups have the same low probability of exit even in the presence of new job opportunities for the workforce at large. The above confirms that not only are there larger numbers of young people in the unemployment pool under a year duration in less developed regions but also that they have a greater probability of flowing into LTU. This explains the larger presence of young people in the LTU pool as we move from Group VI to Group I.

Next we examine in table 6 (a) the overall under 6 and 12 month regional hazards by education (primary, secondary and university). We observe that within all regions the exit rates from unemployment during the first six months are similar for those with primary or secondary education but increase in the presence of a university degree. Table 6 (a) shows that the exit rates for primary and secondary increase as we move from Group I to Group VI but is similar for cohorts with university degrees.

The regional hazard rates under a year again tell us a slightly different story. We observe over the longer duration that in all regions the exit rates from unemployment during the first year actually increase with education levels. Those with secondary qualifications do better than those with primary qualifications when given an additional six months to exit. We also see significant improvements in the exit rates over the longer period of time in all education groups within each region. This again could result from the fact that unemployment insurance in Poland has a duration of one year. We should note that the exit rates for primary and secondary do increase in a significant way as we move from Group I to Group VI but this trend is less obvious for people with university degrees. It is also worth noting that the stock

of people with university degrees in unemployment in Group IV is very low and their exit rates are lower compared to the other regions. An explanation for this could be that graduates in developed regions move from university to employment and avoid the unemployment pool thus leaving the poorest quality graduates to enter the unemployment pool with lower probabilities of exit.

The results imply that higher levels of education levels decrease one's probability of flowing into LTU in all regions. Yet the above again confirms that larger numbers of individuals with higher education levels are flowing into LTU in the less developed regions. This explains the larger presence of more educated people in the LTU pool as we move from Group VI to Group I.

Finally we examine the overall under 6 and 12 month regional hazards by duration of previous tenure (none, < 5, and > 5 years of work experience). In all regions the exit rates from unemployment during the first six months are highest among the individuals with no work experience. There is little difference between those with less or greater than five years work experience. Table 6 (a) shows that the exit rates for all three tenure groups increases as we move from Group I to Group VI. It is more difficult for all tenure, age and education groups to exit in the first six months of unemployment in the less developed compared to the more developed regions.

The under a year regional hazard rates show that paradoxically in all regions the exit rates from unemployment during the first year decrease with previous job tenure. This result is, however, in line with our thesis: for many individuals the human capital acquired on the job in the planned system has become largely redundant, particularly for the older less educated workers. We again see significant

improvements in the exit rates over the longer period of time for all tenure groups in all regions and we note that the exit rates for all tenure groups do increase as we move from Group I to Group VI.

The above confirms that not only are there larger numbers of younger more educated people with no tenure in the unemployment pool under a year duration in less developed regions but that in addition they have a greater probability of flowing into LTU. This reflects the lack of job creation and restructuring in these regions. The flows into LTU in the more developed regions are composed of more negative forms of human capital characteristics and hence we see the build up of older, less educated individuals who came from employment spells of long durations. Restructuring seems to be responsible for the compounding of older, less educated individuals with long previous employment tenure in LTU in the more developed regions.

Table 6b. Hazard rates for unemployed females

Six Month Hazard Rates

Group	Age 15-24	Age 25-44	Age >44	Education Primary	Education Secondary	Education University	Education None	Duration 0-5years	Duration >5 years
I	29.4%	15.4%	9.3%	20.6%	21.9%	43.7%	34.1%	17.3%	16.3%
II	33.2%	18.7%	10.8%	22.2%	24.9%	43.5%	38.2%	19.5%	18.4%
III	31.0%	16.9%	10.5%	20.9%	22.9%	42.5%	36.8%	18.1%	16.9%
IV	33.6%	19.4%	10.2%	24.4%	23.8%	40.3%	40.8%	20.1%	18.1%
V	33.9%	18.9%	11.4%	23.9%	24.1%	44.6%	36.7%	19.0%	21.0%
VI	37.0%	24.6%	12.9%	27.4%	27.0%	39.4%	41.0%	24.0%	23.0%

12 Month Hazard Rates

Group	Age 15-24	Age 25-44	Age >44	Education Primary	Education Secondary	Education University	Education None	Duration 0-5years	Duration >5 years
I	63.1%	50.9%	40.1%	49.1%	57.6%	74.7%	60.9%	55.7%	53.0%
II	65.4%	54.0%	42.9%	52.1%	59.7%	73.8%	62.5%	55.9%	57.0%
III	65.6%	54.0%	43.4%	52.2%	59.8%	74.5%	63.2%	57.9%	55.5%
IV	70.5%	59.8%	45.3%	58.1%	64.1%	76.1%	70.7%	62.1%	58.7%
V	71.1%	60.3%	43.9%	57.5%	65.0%	78.9%	70.6%	62.3%	59.8%
VI	72.0%	60.6%	38.4%	57.7%	62.8%	70.6%	69.9%	62.6%	57.5%

Table 6c. Hazard rates for unemployed males

Six Month Hazard Rates

Group	Age 15-24	Age 25-44	Age >44	Education Primary	Education Secondary	Education University	Education None	Duration 0-5years	Duration >5 years
I	35.6%	32.4%	26.1%	32.7%	33.2%	53.0%	38.8%	29.2%	33.0%
II	39.8%	35.5%	26.0%	34.5%	36.7%	52.5%	43.3%	32.2%	35.1%
III	38.3%	34.4%	26.9%	33.9%	35.6%	53.9%	43.1%	31.7%	34.0%
IV	46.5%	39.5%	27.3%	39.2%	41.5%	52.9%	53.6%	38.5%	37.3%
V	45.2%	40.7%	27.4%	42.1%	40.3%	54.1%	50.2%	36.7%	40.4%
VI	47.1%	43.1%	30.3%	41.7%	42.3%	53.2%	50.8%	40.9%	40.2%

12 Month Hazard Rates

Group	Age 15-24	Age 25-44	Age >44	Education Primary	Education Secondary	Education University	Education None	Duration 0-5years	Duration >5 years
I	74.6%	68.0%	54.7%	66.1%	71.2%	81.1%	72.5%	70.2%	67.9%
II	77.8%	71.4%	56.7%	68.3%	73.9%	80.7%	75.4%	71.3%	71.4%
III	77.7%	71.8%	57.6%	68.6%	74.4%	81.8%	76.5%	73.5%	70.6%
IV	85.2%	80.3%	61.3%	76.4%	81.3%	82.1%	85.5%	82.2%	76.2%
V	84.0%	78.0%	61.8%	75.0%	80.0%	83.0%	82.5%	78.6%	76.8%
VI	84.2%	78.2%	57.9%	73.3%	78.6%	77.4%	82.7%	80.0%	73.3%

In tables 6 (b) and (c) we analyse whether the experience of men and women was different. The analysis of the trends in regional hazard rates within and between groups is very similar for women and men when compared to the above analysis. One point of interest is that the hazard rates by age, education and work experience are in every case much lower for women. In addition we see that the return to education, in terms of increasing the probability of exiting unemployment, is higher for women even though the level of benefit of a university degree, on our measure, is still substantially lower when compared to the benefit accruing to men. This may reflect discrimination of women in the hiring process or a "second worker" effect at the household level. Women who register as unemployed are entitled to health benefits for themselves and their children for an unlimited period of time.

Conclusion

The sectoral composition of employment was different across regions before 1990 as was the degree of employment restructuring since that date. The regional taxonomy proposed by Góra and Lehmann (1995) captures the different initial state and the diverging evolution of regional employment. We analyse regional

unemployment by aggregating county unemployment count data up to the regional groupings in an effort to explore whether unemployment outcomes reflect regional employment compositions and employment restructuring. This paper shows that the dynamics of regional labour demand in Poland have pushed unemployment inflows in a systematic way by changing the magnitude and composition of the flows which in turn change the regional composition of the under one year and over one year unemployment stocks and the probabilities of exit conditional on duration, gender, age, education and previous employment tenure. The key factor behind the dynamics of regional LTU is heterogeneity in regional employment experience, taking account of initial structural conditions before the reforms in 1990 and the changes in regional employment structure due to restructuring over time. This indicates the need to design regional labour demand policies in conjunction with supply policies to tackle the build-up and presence of long term unemployment.

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