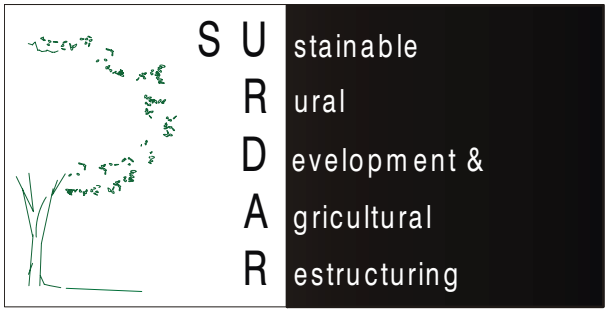


AN ANALYSIS OF POLISH UNEMPLOYMENT PROBLEMS AT THE POWIAT LEVEL

Working Paper No. 3

Adam Czyżewski, Mike Ingham & Hilary Ingham

March 2004

Address for correspondence:

Department of Economics
Lancaster University
Lancaster LA1 4YX

e-mail: h.ingham@lancaster.ac.uk

1. Introduction

Poland's headline unemployment rate has been consistently amongst the highest of the eight transition economies from Central and Eastern Europe about to accede to membership of the EU. Furthermore, six of the seven NUTS 2 regions with the highest unemployment rates within all ten acceding countries in 2002 were to be found within the country (Mladý, 2003). In the new EU-25, the raw statistics will in all likelihood show Poland vying with Slovakia as the member state with the highest proportion of its workforce without jobs. There is, of course, nothing particularly novel about these observations and there have been quite a large number of studies of the country's national and voivodship unemployment problems (Newell and Pastore, 2000; Ingham *et al*., 1998; Kwiatkowski and Kubiak, 1998; Lehmann *et al*., 1997; Gora and Lehmann, 1995; Czyz, 1993; Lehmann *et al*., 1991). However, much less has been written about the unemployment problems faced by more finely disaggregated spatial areas within Poland and detailed analysis of them has been rarer still.

The purpose of this report is to examine Poland's spatial unemployment problem at the NUTS 4 level of disaggregation; that is, at the level of the powiat. It is also the intention to extend the study beyond just the unemployment rate to embrace other facets of the unemployment problem, as this is more widely understood. In particular, concern is often expressed about the composition of prevailing stocks of unemployment and of course about the significance of long-term unemployment. In the case of the transition economies, some unemployment was always expected to emerge; indeed, it was seen by some to be a welcome sign that restructuring was underway. Nonetheless, it was also recognised that this near pre-requisite for economic modernisation must not force workers into prolonged periods of idleness, if the twin risks of social upheaval and wasted human capital were not to become issues of concern. In view of these considerations, this paper will analyse data on the overall unemployment rate, female unemployment, youth unemployment and long-term unemployment at the level of the powiat.

The next section outlines briefly the basic administrative structure of Poland, placing the powiats in comparative, historical and statistical context. This is followed by a precise specification of the unemployment variables to be analysed and a statistical description of their properties. After that, there is a discussion of the more usual theoretical approaches to the explanation of spatial unemployment differences. The basic empirical model to be analysed as a source of explanation for the observations on unemployment occupies the next section. Next, the results obtained from undertaking a regression analysis of the chosen model are presented and some interpretations placed upon them. This is followed by an examination of the spatial implications of the findings. A concluding section completes the paper.

2. The territorial delineation of Poland

The new 1992 Polish constitution declared local self-rule to be the basic organizational form of public life in the community and provided for directly elected gmina councils whose members in turn elected delegates to the self-governing regional council. Although central government retained control over much local

finance, these developments were in accord with the democratic thrust of the 1989 agreement that accompanied the demise of the old communist apparatus. Democracy, whilst obviously necessary, was not, however, a sufficient condition in the eyes of many. The Polish elite, if not always the population at large, was also determined to pursue membership of the European Union as the next step in the country's 'return to Europe'.[1] In order to achieve this goal, the country needed to comply with the EU's *acquis communautaire* and one requirement of these is that new members be in a position to participate in the Structural Funds programmes and Cohesion Fund actions from the date of entry. This mandatory requirement is obviously central for poorer applicant countries and its fulfilment dictates that a NUTS consistent classification of their territorial organization be established, which the prevailing local government structure in Poland was not. In particular, the country did not possess a NUTS 2 division of its space and it is at this level that dealings with the Commission for Structural Fund Objective 1 purposes are conducted. While other factors were also at work, this prompted the need for a thoroughgoing and domestically highly controversial local government reform (Gorzelak and Jałowiecki, 2000).

The ultimate result was the Local Government Reform Act that came into effect on 1 January 1999. This created sixteen NUTS 2 regions by reducing the number of voivodships from the previous 49, re-introduced the powiat tier of government that had been abolished in 1974 - these are NUTS 4 units, of which there are 373, including 65 cities with powiat status - and retained 2489 NUTS 5 level gminas. As a point of reference, the powiats, with an average population size of approximately 103,000, are about three-quarters of the size of districts in the United Kingdom, which represent that country's NUTS 4 regions.

3. Dimensions of Unemployment

Unemployment was first officially recognised as a labour market state in Poland in 1990. While there exist alternative definitions of the concept, notably that based on the ILO self-certification indicator, this paper uses information on jobless individuals who register their position at the local labour office - the so-called registration count. Indeed, this is the only measure that can be made available on a comprehensive and reliable basis at fine levels of spatial disaggregation. Fortunately, since their initial release, the published data on registered unemployment have become progressively more detailed, most notably for current purposes in terms of their geographic detail. From June 2000, quarterly information on various dimensions of the unemployment problem by powiats has been released and this first cross-section will be the data explored here. Unfortunately, no information was published for the city of Elblag in that enumeration and so the analysis is conducted on the data for the remaining 372 powiats. Four aspects of the unemployment problem prevailing at that time will be explored below.

The first is the unemployment rate (PCU0600), which stood at 13.5 per cent nationally in June 2000 (GUS, 2001). Certain issues need to be brought to the fore, however, in using this measure at the level of the powiat. The first is that Travel-to-Work Areas (TTWAs) have not been defined for Poland. In theoretical terms a TTWA is a self-contained labour market area in which all commuting occurs within its boundaries. In practice, it is normally not possible to divide countries into an

exhaustive set of TTWAs and the UK, for example, adopts a criterion of 75 per cent self-containment. That is, the number of people who both work and live within the boundaries of an area should account for at least three-quarters of both the number who work in the area of the number of workers living there. Additionally, the statistical authorities in the UK impose a minimum size restriction of 3,500 on the working population for a TTWA. In general, the boundaries of TTWAs are not co-terminus with those of administratively defined districts. Using local authority areas that are not TTWAs can therefore render the calculation of unemployment rates problematic whenever, as here, the data on unemployment and employment come from different sources: local labour offices in the case of the former and establishment surveys in the case of the latter. Nevertheless, the correlation of powiat unemployment rates with psuedo-unemployment rates, defined as the unemployed stock divided by the working age population, was 0.81 in June 2000. This coefficient is highly significant and, as the pseudo-unemployment rates are very close to the residence based measure of local unemployment rates that many argue to be the ideal (Webster, 2001), it provides some confidence in the published figures. Furthermore, local authority areas tend to have powers of policy intervention that abstractly constructed TTWAs typically do not have and the approximations and agglomerations of heterogeneous groups of workers inherent in the definition of the latter can render them quite unreliable and unhelpful constructs. As shown in Table 1, powiat unemployment rates in the current data set varied from a low of three per cent to over thirty-one percent. The coefficient of variation was almost thirty-five per cent, which confirms that there is a good deal of explanation required.

One of the key indicators monitored in the development literature is the existence or otherwise of equal opportunities between the sexes (e.g. IFAD, 2001) and this issue has been a prominent concern in the study of the economies in transition (UNDP, 1999). The fortunes of women on the labour market are always a major focus in such work (Ingham *et al*, 2001) and this has often manifested itself in an examination of their unemployment experiences (Ingham and Ingham, 2002, 1998). Here, an attempt will be made to account for the variation in the proportion of the registered unemployment stock accounted for by females across powiats (PUF0600). The variable ranges from almost forty-four through to seventy per cent, although the coefficient of variation is only eight per cent. Youth unemployment (PUY0600), the third variable to be modelled here, has reached alarming proportions in Poland (Ingham and Ingham, 2003, 2000) and, as shown in Table 1, is as high as fifty per cent of the total jobless pool in some powiats. Many commentators predicted the emergence of open unemployment in the transition economies as restructuring got underway and some even stressed its desirability. The danger, however, was always that once out of work, many would find it difficult to find fresh alternatives. When this is the case, its corollary is long-term unemployment, the final indicator examined here, which is defined as being without work for a continuous spell of twelve months or more (PULT0600). In some powiats in June 2000, such individuals accounted for around sixty per cent of all those out of work. This is clearly very high, although Poland's national figure of 43.6 per cent in 2000 was approximately equivalent to the EU average.

Table 1
Dimensions of Powiat Unemployment June 2000: Descriptive Statistics

	National	Minimum	Maximum	Mean	St. Deviation	n
PLU0600	13.5	3.0	31.3	15.69	5.77	372
PUF0600	0.56	0.44	0.70	0.56	0.04	372
PUY0600	0.30	0.15	0.50	0.31	0.05	372
PULT0600	0.44	0.16	0.59	0.43	0.08	372

Source: GUS (2000)

4. Theoretical Approaches to Spatial Unemployment Disparities

Numerous theoretical approaches to the explanation of regional unemployment differentials exist within the literature, not all of which are mutually exclusive. In particular, all view unemployment as an outcome of the interaction between labour demand, labour supply and some measure of the real wage. This underlying frame of reference underpins the choice of the empirical specification described below. The only approach that can reasonably be dismissed on casual inspection is the effectively aspatial perfectly competitive paradigm under which flexible wages coupled with perfect capital and labour mobility combine to ensure that there is no unemployment other than that which is purely frictional. In reality, rates of regional unemployment frequently exceed levels that could reasonably be described as merely frictional and the usual finding is that, in most European countries at least, differences across spatial units often persist over very long periods of time (e.g. Elhorst, 2003; Badinger and Url, 2002). Nevertheless, the tendencies inherent in the competitive model underpin the attempts to construct frameworks that yield more palatable outcomes, with those to which later reference is made now outlined very briefly.

One approach looks to compensating differentials to explain persistent differences in unemployment rates across regions (Harris and Todaro, 1970). In such models, a zero migration equilibrium comes about as a result of some compensation (relatively high wages, social benefits, transaction costs or good regional amenities) offsetting a high risk of unemployment. In other words, utility is equalised across space and high wages (or non-wage benefits) are associated with high unemployment rates and the relationship persists over time. More latterly, this approach has been labelled the amenity model (Marston, 1985).

Search models, on the other hand, predict a negative relationship between unemployment and the real wage. The central idea is that the individual maximises expected wages net of search costs, which underpins that person's reservation wage. The optimal search strategy is then to accept the first wage offer in excess of the reservation wage. Migration and commuting expenses are transaction costs to be added to search costs, while the regional distribution of job vacancies is seen as part of the opportunity set. Unemployment benefits raise the reservation wage, thereby prolonging search and raising the level of unemployment. Within this framework, the size and dynamics of the local labour market matter, with large or growing labour markets affording higher vacancy rates and better job access, which speed up the job matching process.

Sector based models are also quite common explanations of spatial unemployment disparities, with areas in which declining industries are concentrated predicted to suffer relatively high unemployment rates. The malaise persists through the depreciation of existing human capital stocks and deficiencies in the adaptation of skill portfolios to the needs of growing sectors (Gripaios and Wiseman, 1996). A related hypothesis is that the level of unemployment within an area is likely to depend negatively on the degree of industrial diversity, insofar as the latter promotes greater opportunities for labour redeployment in the face of discriminatory demand shocks (Neumann and Topel, 1991). It is also useful to recall here that Schumpeter (1942) saw regional dynamism as being directly related to the number of new firm start-ups.

Most empirical treatments see the different theoretical approaches as complementary and include variables designed to capture a number of them. This practice will be followed here, although it is recognised that some of the empirical analogues introduced into the models that follow could be capturing more than one theoretical influence and hence may not attract *a priori* unambiguous expectations. The standard framework for examining unemployment rates would normally be held to represent an adequate framework for modelling long-term unemployment differentials with only minor modifications. Its extension to the unemployment of particular groups of labour market participants - here women and young people - would usually be deemed to involve, at the very least, some attempt to control for their relative wages.

5. An Empirical Model of Powiat Unemployment

As noted in the introduction, numerous analyses of the spatial distribution of Polish unemployment are now available, although invariably these have been conducted at the level of the voivodship and the focus of attention is normally on the unemployment rate alone. With the number of regions reduced from 49 to 16, such exercises are now much less informative and the current focus on powiats is warranted. However, the availability of data with which to test hypotheses regarding the determinants of unemployment is less rich at this more disaggregated level and underlies the relative simplicity of the models to be examined below. This paucity of information regarding potential explanatory variables also means that, with one exception, the structure of the estimating equations for each of the four unemployment indicators studied will be the same. One might note, for example, that no relative wage data is available for the study of female and youth unemployment and, in consequence, much reliance is placed on abstract regional controls. Notwithstanding the limitations, however, the measurable influences described below do have theoretical underpinnings and will help to throw a good deal more light on local unemployment problems than is currently available.

In the ideal case, a model of the local unemployment rate would recognise that it is but one element in a more complex system of inter-related phenomena. In an accounting framework, unemployment is the difference between total labour supply and labour demand. The former, however, is determined by flows into and out of the labour market, both to and from inactivity and as a result of commuting and migration decisions. Both of these flows are normally conjectured to depend on *inter alia* the prevailing tightness of the labour market. Labour demand will also depend on the unemployment rate to the extent that the labour market is imperfect and the wage

setting process depends upon it. What is more, the level of investment within a region could be hypothesised to depend upon the rate of unemployment, if this is taken as an indicator of the size of the pool of labour from which firms may choose. Such considerations lead naturally to a simultaneous multi-equation model approach, with Blanchard and Katz (1992) representing a well-known example. However, the data requirements for the examination of such system models can be formidable, which represents the reason why most regional unemployment studies employ a single equation methodology and this practice will be adopted here.[2] The influences to be incorporated within the model are now discussed in turn.

Rurality

Central to this study is the question of the extent to which rural localities in Poland suffer labour market disadvantage as manifested by their unemployment rates. Unfortunately, however, there is no one unambiguous definition of what the term rural actually means. The simplest approach is that adopted by the OECD, which defines NUTS 5 level communities as rural if they possess population densities of less than 150 people per square kilometre. At higher levels of spatial aggregation, OECD defines predominantly rural regions as those with over 50% of their population living in rural communities, significantly rural regions as those with 15 to 50% of their population in rural communities and predominantly urban regions as those having less than 15% of their population in rural communities (European Commission, 1997).

The approach to area classification adopted by Eurostat is somewhat more complex. It is based on a three-tier hierarchy of the degree of urbanisation. Densely populated zones comprise groups of contiguous municipalities, each with a population density greater than 500 inhabitants per square kilometre and a minimum zonal population of 50,000. Intermediate zones comprise groups of municipalities, each with a population density in excess of 100 inhabitants per square kilometre and not belonging to a densely populated zone. The zone's total population must number at least 50,000 or it must be adjacent to a densely populated zone. Sparsely populated zones are those groups of municipalities not classified as either densely populated or intermediate. Provided that the area concerned is less than 100 square kilometres, a municipality or continuous group of municipalities not reaching the required density threshold, but wholly contained in either a densely populated or intermediate zone is considered to be part of that zone. If it is located between a densely populated and an intermediate zone, it is considered to be intermediate (*ibid.*).[3]

In Poland, rural areas are actually defined as 'territory situated outside town administrative boundaries' (MARD, 2002). Using this definition, the Polish Ministry of Agriculture calculated that 38.1% of the country's population and 93.4% of its land would be classified as rural whereas under the OECD definition the corresponding figures are 35% and 91.7%, respectively (*ibid.*). The basic unit of enumeration for such calculations is the gmina, although in the Polish case the division is not simply into urban and rural communities. Thus, while such are defined, there is an additional category of mixed urban and rural gminas. The practice in official Polish publications is to classify these sub-populations separately in computing urban and rural population totals. One possible objection to this procedure is that these mixed gminas often have quite densely populated urban cores and their rural elements may therefore in reality be suburban in character. Such reasoning brings the focus back to whether

peripherality should be a component element of definitions of rurality. However, consistency would require that the issue be addressed in the case of all gminas, irrespective of their urban or rural designation. This line of enquiry is not pursued at this juncture.

For current purposes, four alternative measures of rural are defined in order that the purely administrative Polish definition of rural can be compared with the outcome from defining the same concept in a seemingly more objective, but in fact equally arbitrary, manner. In each case, the basic unit of enumeration is the gmina, with aggregations to larger units made as appropriate. The first (POPDENS) is simply the population density of the powiat. The inclusion of population density in unemployment regression models has also been justified on grounds other than its role as an inverse measure of rurality and, as such, it will be discussed further below. The second (PCRUR1) is defined as the percentage of the powiat's population resident in wholly rural gminas or in the rural part of mixed gminas. This, in effect, is the Polish administrative definition. The third (PCOECD1RUR) is the percentage of the powiat's population living in whole or part gminas with population densities below 150 persons per square kilometre. This is continuous variant of the OECD classification for aggregations of NUTS 5 units.[4] It might be noted that, under this definition, some 1.4 million fewer people would be classified as rural than under the standard Polish criterion, a difference that has been considered to be 'insignificant' (MARD, 2002). The final measure examined here is a dummy variable taking the value one if more than half of a powiat's total population live in whole or part gminas that are classified by the Polish authorities as being rural. If this threshold is not exceeded, the variable takes the value zero.

There are certain reasons for expecting that Polish rural areas might have higher levels of unemployment than their urban counterparts. Thus, it is widely acknowledged that the rural population is poorly educated (*ibid.*; Ingham *et al*., 1998a; Ciechocińska, 1989) and low levels of human capital are inimical to the conduct of modern economic activity. With no measure of the stock, as opposed to flow, of educational attainment available, it is certainly the case that any measure of rurality will, at least partly, pick up this measure. Also, many of Poland's rural areas are connected but poorly to the more dynamic centres of the country's economy as a result of inferior physical communications networks (MARD, *op cit*). While noting that economic distance rather than simple physical distance is the core concern when examining the impact of isolation and peripherality, it is clear that measures of rurality will, in the absence of more direct indicators, be capturing at least part of this influence. Both low educational attainment and remoteness would be expected to raise observed levels of unemployment. However, there is one important reason to expect that this relationship may not prevail and attention now turns to this influence.

Industry Mix

Empirical models of unemployment measure the industry mix of an area in a large number of ways, with the choice often dictated by the availability of data. The usual approach is to argue that areas with heavy concentrations of employment in declining sectors should experience high unemployment, while those housing expanding sectors are likely to witness the opposite. Polish agriculture is certainly declining insofar as its share of GDP fell from 12.9 per cent in 1989 to 3.3% in 2000 (GUS, 1994, 2001).

However, its employment total has not adjusted accordingly and, in 2000, it still accounted for over 27% of all in work. In short, the evidence suggests that the sector's more than four million workers includes many that are disguised unemployed and, what is more, it has frequently been regarded as a 'buffer-zone' in which some of those displaced by the economic upheavals of recent years have sought refuge. As such, it is natural to hypothesise that the more agricultural is an area; the lower would be its unemployment rate. Deflating agricultural employment by the working age population of the powiat yields the industrial structure variable to be used in the ensuing analysis (PCAG). It might be noted that numerous other studies (e.g. Partridge and Rickman, 1997; Taylor and Bradley, 1997; Elhorst, 1995) also utilise some measure of the importance of agriculture as a measure of industry mix.

A potential complication arises in the context of the current model insofar as it could be argued that the notion of rurality is in fact more appropriately measured by the types of activity undertaken within an area than by simple population density counts or by administrative conventions. Certainly in more advanced economies, with their evident suburbanisation, this might be a potent consideration. As such, it could be that it is not generally possible to identify one simple measure of rurality and that a variety of indicators should be employed to capture the desired concept. At least in the case of Poland, however, it is necessary to recognise that there is a strong correlation between continuous measures of rurality and the importance of agriculture, whether using either OECD or Polish administrative conventions, as demonstrated in Table 2. This suggests the need for caution in a regression framework and alternative specifications of the model will both exclude and include the rural variables.

Table 2
Correlations with PCAG

RURAL1	**RUR1OECD**	**POPDENS**
0.82	0.81	-0.51

Economic Activity

Ideally, one would like some measure of local labour demand to assist in the attempt to explain unemployment and the natural candidate for this is some measure of regional product. Unfortunately, no tolerably accurate measure of gross regional product (GRP) is available at the powiat level and proxy indicators must be employed.[5] The first is the level of investment per capita, which is itself an important component of GRP. Furthermore, it might also be argued to be one measure of the extent of modernisation being undertaken within a local economy. In the case of the former consideration, the natural expectation would be for there to exist a negative relationship between investment and unemployment, although matters are more ambiguous when the second possibility is taken into account. Thus, while modernisation could take the form of more progressive and more competitive enterprises that create new work opportunities, it could also take place through the rationalisation of existing operations and, at least in the first instance, the destruction of jobs. The net outcome of investment on unemployment is therefore taken to be an empirical matter.

A second possible measure of local economic activity is the number of enterprises per head of population. In Poland, an approximation to this can be achieved using official REGON enterprise registration data. It might be hypothesised that the larger is the number of enterprises within an area, the greater would be the prevailing demand for labour and thus the lower would be the unemployment rate. At the very least, one might argue that the greater the number of enterprises, the more diversified the employment base should be and therefore the greater the chance that the local labour market will not be subject to only uni-directional shocks. For current purposes, however, it can be noted that it is possible to sub-divide the number of REGON units registered in a powiat in various ways and here they are apportioned into three categories: purely domestic commercial law companies, commercial law companies with foreign participation and other units on the REGON register. This sub-division will be employed in the model examined below, with each sub-component of the total deflated by gmina population. On the reasoning just outlined, the expectation is that the more entities there are in the first and third categories, the lower will be the local unemployment rate. Further discussion of the second category of enterprise follows in the next subsection.

Foreign Investment

Attitudes towards foreign inward investment are divided. On the one hand, it is held that it can support transition by transferring technologies, managerial and labour skills, marketing channels and a market-based business culture, while at the same time supplementing domestic savings in the process of catching up with western living standards (Lankes and Venables, 1997). Such developments might be expected to reduce unemployment. On the other hand, it is seen as a threat to democratic workplace organisation and as a force acting to marginalize local economic strengths through its focus on low wage cost advantages and large scale worker flexibility (Smith and Pavlinek, 2000). However, it is not immediately apparent that such negative developments would impact deleteriously on the prevailing level of unemployment. Higher unemployment could come about if worker flexibility is equated to greater employee turnover. Likewise, joblessness might increase if the inward investment for some reason crowded out domestic activity. Furthermore, it is possible that foreign enterprises employ more capital-intensive technologies and hence *ceteris paribus* less labour than domestic undertakings, thereby leading to higher unemployment rates.

Once again, measurement of the relevant concept is potentially an issue. Probably the most obvious variable to capture the impact of foreign investment would be its monetary volume, but this is not available, whether as a stock or a flow, at the level of the powiat. As noted above, however, what can be measured is the number of commercial law companies with foreign capital participation, which will here be analysed on a per capita basis. Even absent a monetary dimension, this could be useful as an indicator of the spread of foreign capital influence throughout a local economy and it will serve as at least one test of its role in the labour market. In the face of the contrary arguments advanced earlier, its impact on the local unemployment rate must be taken to be an empirical matter.

Labour Supply and Migration

Unemployment is a residual: that part of the prevailing labour supply that is not matched by an equivalent demand. Important influences on the demand for labour were discussed above, so here attention will focus on supply. Empirically, labour supply is approximated by the population of working age multiplied by the participation rate.[6] The participation rate is not available at the level of the powiat, although data are available for the population of working age. The basic supply pressure measure used here is therefore the proportion of the local population that is of working age. This particular stock is of course the outcome of a number of flows, of which migration often receives emphasis in the literature on local unemployment. Some, such as Marston (1985), see this as a powerful and rapid equilibrating mechanism when unemployment rates diverge across space. If his theoretical perspective is the correct one, there arises an endogeneity problem when migration is introduced into an unemployment equation. However, the evidence for countries other than the U.S. does not support the causal link from unemployment through to migration so strongly (Elhorst, 2003). Also, the ongoing housing shortage in Poland (Ingham and Węclawowicz, 2001) is a notorious constraint on mobility. In the present instance therefore the migration rate enters the model and the question of endogeneity is left as an empirical issue.

Population Density

Population density enters many models of local and regional unemployment, although the underlying justification differs widely across studies. Thus, following Krugman (1991), Fagerberg *et al* (1997) consider the possibility that more densely populated areas generate greater agglomeration and scale economies and thereby exhibit stronger growth and create more jobs than other localities. Higher population densities are also often associated in the literature with lower job search costs and a quicker matching process between workers and job vacancies (e.g. Badinger and Url, 2002). On a rather different note, population density has also sometimes been introduced as a variable attempting to capture the amenities/disamenities workers associate with different areas (Partridge and Rickman, 1997). However, there is little agreement about the underlying causal mechanism. On the one hand, there are those such as Barro and Sala-i-Martin (1991) who see densely populated areas as a repellent on account of their congestion problems while, on the other hand, the cultural assets of densely populated areas might be regarded as an attraction. The overall impact of population density on local unemployment rates must therefore be treated as an empirical matter.

Regional Controls

It would obviously have been desirable to account for a richer range of explanatory variables than the current data set allows. In particular, the absence of a measure of wages and of the different levels of development across the country might be noted. Although clearly rather a blunt instrument in this regard, all specifications tested therefore included a set of dummy variables for the sixteen regions of the country, with the voivodship of Mazowieckie being taken as the base in all cases. The inclusion of these shifts also goes some way towards controlling for the spatial autocorrelation that one might expect to occur in local area unemployment models.

Labour Market Tightness

The prevailing rate of unemployment is probably the most frequently used measure of labour market tightness in many areas of the literature and it is an obvious consideration when examining variations in the composition of the jobless stock, as is the case in this paper. Therefore, in those variants of the model seeking to explain the proportion of registered unemployed who are female, young or long-term workless, respectively, the unemployment rate will be entered in order to examine the sensitivity of these variables to the state of the local market. At this juncture, it should be stressed that there is no tautological relationship between the three ratios and the unemployment rate. In particular, the ratios can change because of movements in either their numerators or their denominators. If it is the case, as some would argue, that women and young people are released first by employers as market conditions deteriorate, then one might expect the prevailing unemployment rate to be negatively signed, as employers must eventually extend their lay-offs to include prime-aged males. The position with the long-term unemployed is not so clear cut: all else equal, a recent increase in unemployment total should act to decrease the weight of those out of work for more than twelve months. On the other hand, a persistently high unemployment rate, indicating a stagnant labour market, might be expected to house a large share of long-term unemployed. With no information on powiat unemployment rates prior to the observations used in the following analysis, this issue must be left for the data to decide.

6. Results

This section presents the results obtained from estimating the empirical model described above on each of the four highlighted dimensions of unemployment by means of ordinary least squares for the 372 powiats for which data was available in June 2000. All of the specifications contain a series of fifteen dummy voivodship variables, but discussion of the coefficients attaching to these will be reserved for the following section of the paper.

The Unemployment Rate

In June 2000, there were over 2.4 million people registered as unemployed at Poland's labour offices, which, as shown above, amounted to 13.5 per cent of the country's working population. This figure reflected a slow, but steady increase from the lows - although these still covered over 1.6 million people - achieved in 1998. However, subsequent increases were more dramatic, with the registration roll increasing by 37.2 per cent in the months to March 2003.

The results of estimating five variants of the empirical model outlined above, with the powiat unemployment rate as the dependent variable, by means of ordinary least squares are presented in Table 3. In the context of a static cross-section, the equations fit the data well and account for over sixty per cent of the variance in the dependent variable. Equation (1) omits all rurality measures, including population density, but includes agricultural intensity. All of the substantive regressors are significant at the five per cent level or better and their signs are generally in line with expectations. Thus, the more important is agriculture in the local labour market, the lower is the

registered unemployment rate. This no doubt is a reflection of the oft-remarked hidden unemployment in Polish farming. It is noteworthy, however, that this result is the opposite found by Faberberg *et al.* (1997) for regions within the EU. Lower recorded joblessness is also associated with higher per capita investment and with greater numbers of REGON registered entities of all kinds, including it might be noted those with foreign capital participation. Perhaps surprisingly, the coefficient on net migration is negative, indicating that population inflows are not associated with higher unemployment. Likewise, the greater the share of the population that is of working age, the lower is the unemployment rate. These findings regarding the labour supply proxies are in line with the contention that 'people cause jobs' (Layard, 1997).

Columns (2)-(5) of Table 3 contain the estimates when each of the chosen four controls for rurality are added to the model: in turn, population density, the proportion of the powiat located in rural gminas or the rural part of mixed gminas, the proportion of the population living in whole or part gminas with population densities in excess of 150 persons per square kilometre and, finally, a dummy variable taking the value unity for those powiats in which more than half of the population live in whole or part gminas designated by the Polish authorities as rural. Notwithstanding the earlier discussion of the possible multicollinearity problems caused by the correlation between these variables and the percent of employment located in agriculture, the results are remarkably stable in the face of the introduction of each of them into the model. At the same time, it is apparent that none of them, with the possible exception of the third, adds anything of note to the explanation. In the case of PCOECD1RUR, there is some evidence that the higher the proportion of the population living in relatively less densely populated gminas, the higher is the rate of unemployment.

Table 3
Powiat Unemployment Rates: June 2000

	(1)	(2)	(3)	(4)	(5)
Constant	58.473**	58.923**	52.686**	53.045**	60.448**
	(5.78)	(5.72)	(4.86)	(5.13)	(5.91)
PCAGEMP	-0.18**	-0.179**	-0.204**	-0.218**	-0.168**
	(7.58)	(7.51)	(7.05)	(7.47)	(6.63)
INVPERCAP	-0.0004**	-0.0004**	-0.0004**	-0.0004**	-0.0004**
	(2.87)	(2.85)	(2.82)	(2.85)	(2.82)
PCFCLCO	-1272.018*	-1253.917*	-1443.500**	-1485.296**	-1225.094*
	(2.39)	(2.33)	(2.66)	(2.77)	(2.30)
PCDCLCO	-1059.348**	-1088.085**	-910.253**	-866.102**	-1089.352**
	(4.63)	(4.22)	(3.64)	(3.56)	(4.74)
PCOTHCO	-20.534**	-20.439**	-19.295**	-18.383*	-20.578**
	(2.87)	(2.85)	(2.68)	(2.56)	(2.88)
PCNETMIG	-0.406**	-0.403**	-0.457**	-0.437**	-0.390**
	(6.25)	(6.04)	(6.21)	(6.61)	(5.89)
POPDENS		0.0001			
		(0.24)			
PCRUR1			2.724		
			(1.46)		
PCOECD1RUR				3.854*	
				(2.22)	
RURALDUM					-0.735
					(1.29)
PCWKAGE	-0.587**	-0.595**	-0.503**	-0.511**	-0.620**
	(3.56)	(3.57)	(2.91)	(3.08)	(3.75)
Dolnoslaskie	2.687**	2.726**	2.348*	2.169*	2.772**
	(2.91)	(2.90)	(2.47)	(2.29)	(2.99)
Kujawsko-pomorskie	2.858**	2.875**	2.510**	2.351*	3.148**
	(3.11)	(3.11)	(2.64)	(2.49)	(3.33)
Lubelskie	-1.959*	-1.973*	-1.806*	-1.746	-1.990*
	(2.18)	(2.19)	(2.00)	(1.94)	(2.21)
Lubuskie	3.443**	3.469**	3.174*	3.017*	3.572**
	(2.64)	(2.65)	(2.42)	(2.30)	(2.74)
Lodzkie	-1.364	-1.357	-1.385	-1.362	-1.334
	(1.50)	(1.488)	(1.52)	(1.51)	(1.47)
Malopolskie	-4.048**	-4.060**	-4.153**	-3.616**	-3.988**
	(4.47)	(4.47)	(4.58)	(3.93)	(4.40)
Opolskie	-3.185**	-3.138**	-3.716**	-3.838**	-3.041*
	(2.66)	(2.58)	(2.97)	(3.13)	(2.53)
Podkarpackie	-0.863	-0.872	-0.899	-0.571	-0.782
	(0.98)	(0.98)	(1.02)	(0.64)	(0.88)
Podlaskie	-3.952**	-3.980**	-3.572**	-3.501**	-4.088**
	(3.91)	(-3.91)	(3.43)	(3.42)	(4.03)
Pomorskie	2.602*	2.654*	2.073	1.777	2.755**
	(2.56)	(2.55)	(1.93)	(1.65)	(2.69)
Slaskie	-4.878**	-4.890**	-5.164**	-4.809**	-4.707**
	(5.38)	(5.37)	(5.57)	(5.33)	(5.14)
Swietokrzyskie	-0.066	-0.064	0.024	0.122	-0.119
	(0.60)	(0.06)	(0.02)	(0.13)	(0.11)
Warminsko-mazurskie	5.244**	5.288**	4.810**	4.653**	5.305**
	(4.97)	(4.93)	(4.39)	(4.30)	(5.02)
Wielkopolskie	-3.446**	-3.42**	-3.733**	-3.912**	-3.268**
	(4.21)	(4.14)	(4.44)	(4.65)	(3.94)
Zachodniopomorskie	4.987**	5.037**	4.562**	4.365**	5.148**
	(4.49)	(4.45)	(3.98)	(3.83)	(4.61)
R BAR SQ	0.651	0.651	0.653	0.655	0.652
N	372	372	372	372	372

Female Unemployment

On average, females accounted for 56.3 per cent of powiat unemployment stocks at June 2000, a figure that is considerably in excess of their share of the national labour force, which was 45.7 per cent in that year (GUS, 2001). However, the range across powiats was from forty four per cent to in excess of seventy per cent, indicating the absence of any universal mechanism dictating that women must always and evrywhere bear a disproportionate share of the unemployment burden.

The first five columns in Table 4 report the results obtained when the basic model proposed above is applied to the proportion of females in the powiat unemployment stock. Overall, the substantive results are not unduly sensitive to the way in which rurality is captured and the major findings can be summarised as follows. There is reasonably strong statistical evidence that women weigh less heavily in the pool of unemployed the higher is the importance of agriculture and the more numerous are firms with foreign capital participation. The first of these findings is in line with what might be expected, given that women represent around half of the total agricultural workforce (GUS, 2001a). The second lends some weight to the argument that firms with foreign involvement are likely to be more progressive and more likely to operate gender blind recruitment policies. On the other hand, the results point consistently to an independent rural area effect that increases the proportion of females in the jobless total. This is consistent with the suggestion that women have more restricted travel-to-work areas than men and, as such, higher population densities should be associated with lower pecuniary and time costs of job search for them. Rather surprisingly, the results suggest that the plight of women also increases the greater is the prevailing level of investment per capita, although it should be noted that the associated coefficient does not always cross the threshold of conventional statistical acceptability. At the same time, the findings indicate that women are disproportionately and negatively affected by greater labour supply pressure, as measured by the proportion of the population that is of working age. None of the other included, readily definable influences achieve satisfactory levels of statistical performance. Discussion of the regional dummy variables is once again deferred to the next section.

As discussed above, a natural extension to the simple model is to examine whether the importance of female joblessness is sensitive to the prevailing degree of labour market slack, which in this case is captured by the overall registered unemployment rate. The results of estimating the above specifications embellished in this way are presented in columns (6)-(10) of Table 4. Quite simply, these provide strong evidence that the share of the unemployment burden borne by women falls as the prevailing local unemployment rate rises. One interpretation of this finding is that women are harmed disproportionately in the initial phase of deteriorating labour market conditions, as was suggested might be the case in the earlier discussion of the specification of the model. With the exception that investment per capita is rendered insignificant, the other substantive regressors are left qualitatively unchanged by the introduction of the unemployment variable, although there are certain quantitative developments that that deserve to merit be highlighted. Thus, in all cases, the modification increases the absolute size of the coefficient on agricultural employment and renders it significant in all variants of the model. It does not, however, influence the previous conclusions

Table 4
Proportion of Females in Powiat Unemployment Stock: June 2000

	(1)	(2)	(3)	(4)	(5)
Constant	0.281**	0.227*	0.098	0.229*	0.240*
	(2.88)	(2.31)	(0.96)	(2.29)	(2.45)
PCAGEMP	-0.0004	-0.0005*	-0.001**	-0.0008**	-0.001**
	(1.71)	(2.04)	(4.29)	(2.68)	(2.62)
INVPERCAP	0.000003*	0.000002	0.000003*	0.000003*	0.000002
	(2.05)	(1.92)	(2.31)	(2.10)	(1.95)
PCFCLCO	-8.557	-10.744*	-13.985**	-10.592*	-9.537
	(1.67)	(2.10)	(2.75)	(2.04)	(1.87)
PCDCLCO	-2.328	1.144	2.391	-0.485	-1.702
	(1.05)	(0.47)	(1.02)	(0.21)	(0.77)
PCOTHCO	-0.015	0.003	0.054	0.046	0.016
	(0.22)	(0.05)	(0.80)	(0.51)	(0.23)
PCNETMIG	0.0006	0.0002	-0.001	0.0003	0.0002
	(0.94)	(0.26)	(1.48)	(0.47)	(0.39)
POPDENS		-0.00001**			
		(3.09)			
PCRUR1			0.086**		
			(4.95)		
PCOECD1RUR				0.037*	
				(2.20)	
RURALDUM					0.015**
					(2.81)
PCWKAGE	0.005**	0.006**	0.007**	0.005**	0.005**
	(3.02)	(3.60)	(4.59)	(3.42)	(3.44)
Dolnoslaskie	0.007	0.002	-0.004	0.002	0.005
	(0.78)	(0.27)	(0.42)	(0.22)	(0.59)
Kujawsko-pomorskie	0.022*	0.020*	0.011	0.017	0.016
	(2.46)	(2.25)	(1.22)	(1.87)	(1.74)
Lubelskie	-0.009	-0.008	-0.004	-0.007	-0.009
	(1.05)	(0.88)	(0.51)	(0.82)	(0.99)
Lubuskie	-0.001	-0.004	-0.009	-0.005	-0.004
	(0.07)	(0.32)	(0.76)	(0.39)	(0.29)
Lodzkie	-0.023**	-0.024**	-0.024**	-0.023**	-0.024**
	(2.65)	(2.78)	(2.82)	(2.66)	(2.75)
Malopolskie	0.024**	0.025**	0.020*	0.028**	0.022**
	(2.70)	(2.90)	(2.39)	(3.12)	(2.58)
Opolskie	0.048**	0.043**	0.032**	0.042**	0.045**
	(4.17)	(3.67)	(2.69)	(3.55)	(3.93)
Podkarpackie	0.005	0.006	0.004	0.008	0.004
	(0.62)	(0.74)	(0.50)	(0.94)	(0.42)
Podlaskie	0.007	0.010	0.019	0.011	0.009
	(0.68)	(1.03)	(1.91)	(1.10)	(0.97)
Pomorskie	0.036**	0.030**	0.020	0.029**	0.033**
	(3.71)	(3.04)	(1.96)	(2.75)	(3.40)
Slaskie	0.025**	0.026**	0.015	0.025**	0.021*
	(2.80)	(2.99)	(1.78)	(2.89)	(2.39)
Swietokrzyskie	-0.008	-0.008	-0.005	-0.006	-0.007
	(0.75)	(0.78)	(0.50)	(0.58)	(0.65)
Warminsko-mazurskie	0.016	0.011	0.002	0.010	0.015
	(1.58)	(1.06)	(0.23)	(1.00)	(1.47)
Wielkopolskie	0.053**	0.050**	0.044**	0.048**	0.049**
	(6.66)	(6.31)	(5.53)	(5.94)	(6.16)
Zachodniopomorskie	0.016	0.010	0.027	0.010	0.013
	(1.51)	(0.94)	(0.80)	(0.93)	(1.20)
R BAR SQ	0.451	0.465	0.486	0.457	0.462
N	372	372	372	372	372

Table 4 Cont.
Proportion of Females in Powiat Unemployment Stock: June 2000

	(6)	(7)	(8)	(9)	(10)
Constant	0.403**	0.348**	0.218*	0.348**	0.360**
	(4.02)	(3.47)	(2.14)	(3.45)	(3.58)
PCAGEMP	-0.001**	-0.001**	-0.002**	-0.001**	-0.001**
	(3.17)	(3.47)	(5.79)	(4.21)	(3.84)
INVPERCAP	0.000002	0.000002	0.000002	0.000002	0.000002
	(1.45)	(1.32)	(1.65)	(1.46)	(1.38)
PCFCLCO	-11.198*	-13.322**	-17.282**	-13.921**	-11.971*
	(2.21)	(2.64)	(3.46)	(2.72)	(2.38)
PCDCLCO	-4.528*	-1.093	0.313	-2.426	-3.866
	(2.03)	(0.44)	(0.14)	(1.04)	(1.74)
PCOTHCO	-0.028	-0.039	0.010	-0.006	-0.025
	(0.40)	(0.57)	(0.15)	(0.08)	(0.37)
PCNETMIG	-0.0003	-0.0007	-0.002**	-0.001	-0.001
	(0.39)	(1.01)	(2.93)	(1.03)	(0.81)
POPDENS		-0.00001**			
		(3.10)			
PCRUR1			0.092**		
			(5.45)		
PCOECD1RUR				0.045**	
				(2.77)	
RURALDUM					0.014**
					(2.59)
PCWKAGE	0.004*	0.005**	0.006**	0.004**	0.004**
	(2.25)	(2.85)	(3.95)	(2.74)	(2.66)
PCUO600	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**
	(4.10)	(4.12)	(4.68)	(4.44)	(3.95)
Dolnoslaskie	0.013	0.008	0.002	0.007	0.011
	(1.42)	(0.90)	(0.19)	(0.77)	(1.22)
Kujawsko-pomorskie	0.028**	0.026**	0.017	0.022*	0.022*
	(3.15)	(2.94)	(1.90)	(2.49)	(2.45)
Lubelskie	-0.013	-0.012	-0.008	-0.011	-0.012
	(1.55)	(1.37)	(1.02)	(1.30)	(1.47)
Lubuskie	0.006	0.003	-0.002	0.002	0.004
	(0.50)	(0.25)	(0.18)	(0.15)	(0.28)
Lodzkie	-0.026**	-0.027**	-0.028**	-0.026**	-0.027**
	(3.03)	(3.16)	(3.27)	(3.08)	(3.10)
Malopolskie	0.015	0.017	0.011	0.020*	0.014
	(1.73)	(1.92)	(1.28)	(2.22)	(1.66)
Opolskie	0.042**	0.036**	0.023*	0.033**	0.039**
	(3.65)	(3.15)	(2.00)	(2.86)	(3.45)
Podkarpackie	0.004	0.004	0.002	0.007	0.002
	(0.42)	(0.54)	(0.26)	(0.81)	(0.25)
Podlaskie	-0.002	0.002	0.010	0.003	0.001
	(0.17)	(0.19)	(1.09)	(0.31)	(0.14)
Pomorskie	0.042**	0.036**	0.024*	0.033**	0.039**
	(4.32)	(3.64)	(2.49)	(3.20)	(4.00)
Slaskie	0.014	0.016	0.004	0.014	0.012
	(1.61)	(1.80)	(0.42)	(1.63)	(1.30)
Swietokrzyskie	-0.008	-0.008	-0.005	-0.006	-0.007
	(0.78)	(0.81)	(0.51)	(0.57)	(0.69)
Warminsko-mazurskie	0.027**	0.022*	0.013	0.021*	0.025*
	(2.62)	(2.10)	(1.31)	(2.00)	(2.47)
Wielkopolskie	0.046**	0.043**	0.035**	0.039**	0.042**
	(5.74)	(5.41)	(4.46)	(4.84)	(5.34)
Zachodniopomorskie	0.027*	0.020	0.013	0.020	0.023*
	(2.46)	(1.89)	(1.23)	(1.83)	(2.13)
R BAR SQ	0.475	0.488	0.515	0.485	0.484
N	372	372	372	372	372

regarding the rurality measures. Accounting for the unemployment rate also increases the absolute size and statistical significance of the foreign capital presence measure.

Youth Unemployment

The results of estimating the basic variants of the model to explain the proportion of youths in powiat unemployment stocks are presented in columns (1)-(5) of Table 5. Once again, the results are reasonably stable in the face of alternate specifications of the rurality variable. The notable findings are that young people appear to be disadvantaged in more agricultural areas, although it is not entirely evident what is driving this result. It could be that the farms themselves offer few opportunities for young people, although this seems an unlikely explanation, at least for those with farm attachments, given the prevalence of unpaid family workers in the sector (Ingham and Ingham, 2004). On the other hand, it could be that youths spurn work in agriculture, thereby increasing the competition for the limited number of opportunities outside farming. In a similar vein, there is significant evidence that young people face more severe labour market difficulties in areas where potential labour supply, in the form of the proportion of the population of working age, is greater.

On the other hand, the results indicate that the greater the per capita number of local firms with foreign participation, the better young people fare; and this effect is large. Likewise, the more domestic commercial law firms that exist, the more favourable the prospects of youths appear to be. This second result is most probably picking up a tendency for smaller firms to be more willing employers of young workers. Both findings, however, seem to have clear implications for policy in areas that have the most severe youth unemployment problems. Another potentially useful finding is that youths have better fortunes in more densely populated areas, which could point to the importance of lowering search costs and improving information networks for young people in less urbanised locations.

Columns (6)-(10) of Table 5 report the results of estimating the previous specifications with the addition of the prevailing powiat unemployment rate. This variable itself is consistently and significantly negative, which mirrors the earlier finding for females and again suggests that as labour markets weaken the less discriminating becomes the unemployment problem. In addition to its own impact in the models, the introduction of the jobless rate has two further notable effects on other parameters in the equations. The first is on the coefficients attaching to the foreign investment and domestic commercial law company variables, both of which are increased in absolute value by substantial proportions. On the one hand, this serves merely to reinforce the significance of stimulating these magnitudes in order to counter youth unemployment problems. At the same time, however, the quantitative change in the coefficient values is indicative of a negative relationship between the variables and the unemployment rate: that is, depressed labour markets attract less foreign investment and are home to smaller stocks of domestic companies. The other change of note brought about by the inclusion of the unemployment rate is that the migration rate assumes statistical significance and prompts the conclusion that, all else equal, youths face lower relative unemployment in areas that attract more net in-migration. All other conclusions from the earlier analysis remain substantially unchanged.

Table 5
Proportion of Youths in Powiat Unemployment Stock: June 2000

	(1)	(2)	(3)	(4)	(5)
Constant	-0.015	-0.063	-0.032	0.003	-0.021
	(0.16)	(0.65)	(0.31)	(0.03)	(0.22)
PCAGEMP	0.002**	0.002**	0.002**	0.002**	0.002**
	(7.37)	(7.12)	(5.76)	(6.43)	(6.73)
INVPERCAP	0.000002	0.000002	0.000002	0.000002	0.000002
	(1.41)	(1.29)	(1.43)	(1.40)	(1.39)
PCFCLCO	-10.220*	-12.119*	-10.718*	-9.491	-10.357*
	(2.04)	(2.42)	(2.09)	(1.86)	(2.06)
PCDCLCO	-6.371**	-3.357	-5.938*	-7.031**	-6.283**
	(2.95)	(1.40)	(2.51)	(3.04)	(2.90)
PCOTHCO	0.015	0.005	0.019	0.008	0.015
	(0.22)	(0.07)	(0.27)	(0.11)	(0.22)
PCNETMIG	-0.004	-0.001	-0.0006	-0.0003	-0.0005
	(0.70)	(1.28)	(0.83)	(0.52)	(0.76)
POPDENS		-0.00001*			
		(2.74)			
PCRUR1			0.008		
			(0.45)		
PCOECD1RUR				-0.013	
				(0.80)	
RURALDUM					0.002
					(0.40)
PCWKAGE	0.005**	0.005**	0.005**	0.004**	0.005**
	(2.98)	(3.49)	(2.96)	(2.75)	(3.00)
Dolnoslaskie	0.007	0.003	0.006	0.008	0.006
	(0.75)	(0.29)	(0.62)	(0.93)	(0.72)
Kujawsko-pomorskie	0.028**	0.026**	0.027**	0.030**	0.027**
	(3.24)	(3.05)	(3.02)	(3.33)	(3.05)
Lubelskie	0.035**	0.036**	0.035**	0.034**	0.035**
	(4.07)	(4.26)	(4.09)	(3.96)	(4.07)
Lubuskie	0.033**	0.031*	0.033**	0.035**	0.033**
	(2.71)	(2.50)	(2.62)	(2.80)	(2.67)
Lodzkie	0.018*	0.018*	0.018*	0.018*	0.018*
	(2.14)	(2.08)	(2.13)	(2.14)	(2.13)
Malopolskie	0.065**	0.066	0.065**	0.064**	0.065**
	(7.61)	(7.82)**	(7.54)	(7.27)	(7.57)
Opolskie	-0.001	-0.006	-0.024	0.001	-0.001
	(0.08)	(0.52)	(0.20)	(0.12)	(0.11)
Podkarpackie	0.020*	0.020*	0.019*	0.019*	0.019*
	(2.34)	(2.46)	(2.32)	(2.19)	(2.30)
Podlaskie	0.0002	0.003	0.001	-0.001	0.0006
	(0.02)	(0.33)	(0.13)	(0.14)	(0.06)
Pomorskie	0.024*	0.019	0.023*	0.027**	0.024*
	(2.51)	(1.91)	(2.21)	(2.63)	(2.44)
Slaskie	0.050**	0.052**	0.050**	0.050**	0.050**
	(5.89)	(6.08)	(5.66)	(5.85)	(5.76)
Swietokrzyskie	0.001	0.001	0.002	0.0007	0.002
	(0.13)	(0.12)	(0.16)	(0.07)	(0.15)
Warminsko-mazurskie	0.001	-0.004	-0.022	0.003	0.001
	(0.10)	(0.36)	(0.02)	(0.30)	(0.09)
Wielkopolskie	0.071**	0.069**	0.070**	0.073**	0.071**
	(9.21)	(8.89)	(8.84)	(9.12)	(9.01)
Zachodniopomorskie	-0.027	-0.008	-0.004	-0.0006	-0.003
	(0.26)	(0.75)	(0.36)	(0.05)	(0.30)
R BAR SQ	0.605	0.612	0.604	0.605	0.604
N	372	371	372	372	372

Table 5 Cont
Proportion of Youths in Powiat Unemployment Stock: June 2000

	(6)	(7)	(8)	(9)	(10)
Constant	0.223*	0.176	0.185	0.220*	0.225*
	(2.47)	(1.94)	(1.93)	(2.39)	(2.46)
PCAGEMP	0.001**	0.001**	0.0007**	0.001**	0.001**
	(4.20)	(3.97)	(2.79)	(3.30)	(4.04)
INVPERCAP	0.0000002	0.0000001	0.0000002	0.0000002	0.0000002
	(0.19)	(0.05)	(0.22)	(0.19)	(0.19)
PCFCLCO	-15.397**	-17.201**	-16.655**	-15.550**	-15.350**
	(3.37)	(3.77)	(3.56)	(3.34)	(3.35)
PCDCLCO	-10.682**	-7.766**	-9.681**	-10.564**	-10.723**
	(5.32)	(3.49)	(4.46)	(4.97)	(5.30)
PCOTHCO	-0.069	-0.078	-0.061	-0.067	-0.069
	(1.11)	(1.27)	(0.98)	(1.08)	(1.11)
PCNETMIG	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**
	(3.57)	(4.12)	(3.71)	(3.50)	(3.49)
POPDENS		-0.00001			
		(2.92)**			
PCRUR1			0.019		
			(1.20)		
PCOECD1RUR				0.003	
				(0.17)	
RURALDUM					-0.0009
					(0.18)
PCWKAGE	0.002	0.003*	0.003	0.002	0.002
	(1.55)	(2.12)	(1.86)	(1.56)	(1.50)
PCUO600	-0.004**	-0.004**	-0.004**	-0.004**	-0.004**
	(8.93)	(8.98)	(9.00)	(8.87)	(8.90)
Dolnoslaskie	0.017*	0.014	0.015	0.017*	0.018*
	(2.20)	(1.70)	(1.86)	(2.10)	(2.20)
Kujawsko-pomorskie	0.040**	0.038**	0.037**	0.039**	0.040**
	(5.00)	(4.82)	(4.58)	(4.83)	(4.88)
Lubelskie	0.027**	0.028**	0.028**	0.027**	0.026**
	(3.44)	(3.65)	(3.55)	(3.44)	(3.43)
Lubuskie	0.047**	0.045**	0.046**	0.047**	0.047**
	(4.22)	(4.01)	(4.03)	(4.16)	(4.21)
Lodzkie	0.013	0.012	0.013	0.013	0.013
	(1.65)	(1.58)	(1.63)	(1.65)	(1.65)
Malopolskie	0.049**	0.050**	0.048**	0.049**	0.049**
	(6.12)	(6.34)	(5.98)	(6.04)	(6.11)
Opolskie	-0.014	-0.019	-0.018	-0.014	-0.014
	(1.34)	(1.80)	(1.64)	(1.34)	(1.32)
Podkarpackie	0.016*	0.017*	0.016*	0.016*	0.016*
	(2.12)	(2.25)	(2.08)	(2.12)	(2.12)
Podlaskie	-0.016	-0.013	-0.013	-0.016	-0.016
	(1.81)	(1.49)	(1.49)	(1.75)	(1.82)
Pomorskie	0.035**	0.029**	0.031**	0.034**	0.035**
	(3.97)	(3.32)	(3.36)	(3.68)	(3.95)
Slaskie	0.031**	0.032**	0.028**	0.031**	0.031**
	(3.80)	(3.99)	(3.43)	(3.79)	(3.78)
Swietokrzyskie	0.001	0.0009	0.002	0.001	0.001
	(0.12)	(0.10)	(0.19)	(0.132)	(0.11)
Warminsko-mazurskie	0.022*	0.018	0.020*	0.022*	0.022*
	(2.40)	(1.91)	(2.04)	(2.31)	(2.41)
Wielkopolskie	0.057**	0.055**	0.055**	0.057**	0.057**
	(7.99)	(7.68)	(7.46)	(7.64)	(7.92)
Zachodniopomorskie	0.018	0.012	0.015	0.017	0.018
	(1.81)	(1.28)	(1.49)	(1.73)	(1.82)
R BAR SQ	0.678	0.685	0.678	0.677	0.677
N	372	372	372	372	372

Long-Term Unemployment

As discussed earlier, long-term unemployment is defined as a continuous period without work lasting over 12 months, with this measure deflated by the total unemployment pool representing the variable to be modelled. In line with the practice adopted above, the first five columns of Table 6 report the estimates obtained using simple variants of the basic model in use here. Each of these explains over 58 per cent of the variance in the dependent variable and, with the exception of the two non-foreign REGON company variables, which slip in and out of significance although they do not vary in sign, the results are largely stable in the face of different representations of rurality.

The more heavily agriculture weighs in the local labour market, the greater is the prevalence of long-term unemployment. This would appear to be a reflection of the more limited opportunities open to workers without farming connections in such areas. Once again, a more widespread foreign presence in the company stock exerts a strongly benign influence on the labour market. As noted above, the number of companies of other types is not always truly significant, but there is at least a suggestion that a proliferation of employers is associated with shorter relative durations out of work. Somewhat more surprisingly, higher net immigration is associated with less long-term unemployment, but this result needs to be treated with care as it could simply reflect a situation, at least in the short-term, in which the newcomers enter the unemployment pool and thereby dilute the variable under examination. Population density has a positive affect on the relative prevalence of long-term joblessness once the importance of agriculture has been accounted for, which is perhaps a rather surprising finding. However, the other variables attempting to capture rurality fail to achieve statistical significance. Finally, the labour supply measure is insignificant in all five variants of the model.

Introducing the prevailing unemployment rate into the estimating equation has a number of effects, not least of which is a marked increase in the overall explanatory power of the model, with the unemployment rate variable itself being positive and highly significant. As the short-run accounting effect of an increase in unemployment is most likely to decrease the importance of long-term unemployment, the simplest interpretation of this finding in a cross-section study is that the areas with high unemployment at June 2000 had been depressed for long periods of time. Under the revised formulation, the positive impact of agriculture on long duration unemployment is increased in both size and significance. Somewhat more surprisingly, the rate of investment per capita is rendered a significant positive influence on long-term unemployment, while the ameliorating impact of foreign capital involvement is reduced in size, although it remains large. Also, the numerical preponderance of other forms of company is no longer significant in any of the specifications. Furthermore, the migration and labour supply variables now conform much more closely to expectations. Finally, the population density measure remains unchanged when the unemployment rate is included, but two of the three direct rural variables are now not only negative but also significant.

Table 6
Proportion of Long-Term Jobless in Powiat Unemployment Stock: June 2000

	(1)	(2)	(3)	(4)	(5)
Constant	0.453**	0.534**	0.556**	0.494**	0.482**
	(2.94)	(3.44)	(3.37)	(3.12)	(3.09)
PCAGEMP	0.001*	0.001*	0.001**	0.001*	0.001*
	(2.25)	(2.55)	(2.82)	(2.47)	(2.54)
INVPERCAP	0.000001	0.000001	0.0004	0.000001	0.000001
	(0.27)	(0.42)	(0.21)	(0.26)	(0.32)
PCFCLCO	-32.493**	-29.242**	-29.451**	-30.871**	-31.806**
	(4.01)	(3.62)	(3.56)	(3.75)	(3.92)
PCDCLCO	-5.630	-10.792**	-8.276*	-7.100	-6.070
	(1.62)	(2.78)	(2.18)	(1.91)	(1.74)
PCOTHCO	-0.213	-0.196	-0.235*	-0.229*	-0.213
	(1.95)	(1.81)	(2.14)	(2.08)	(1.96)
PCNETMIG	-0.006**	-0.005**	-0.005**	-0.006**	-0.006**
	(5.94)	(5.24)	(4.45)	(5.58)	(5.60)
POPDENS		0.00002**			
		(2.90)			
PCRUR1			-0.048		
			(1.71)		
PCOECD1RUR				-0.029	
				(1.11)	
RURALDUM					-0.011
					(1.24)
PCWKAGE	0.0002	-0.001	-0.001	-0.0004	-0.030
	(0.70)	(0.51)	(0.50)	(0.16)	(0.12)
Dolnoslaskie	-0.010	-0.003	-0.004	-0.006	-0.008
	(0.09)	(0.20)	(0.26)	(0.40)	(0.60)
Kujawsko-pomorskie	-0.012	-0.008	-0.005	-0.008	-0.007
	(0.82)	(0.61)	(0.37)	(0.53)	(0.51)
Lubelskie	-0.010	-0.13	-0.013	-0.012	-0.011
	(0.74)	(0.92)	(0.93)	(0.85)	(0.77)
Lubuskie	-0.016	-0.011	-0.011	-0.012	-0.014
	(0.79)	(0.56)	(0.55)	(0.62)	(0.70)
Lodzkie	-0.033*	-0.031*	-0.032*	-0.033*	-0.032*
	(2.36)	(2.29)	(2.34)	(2.36)	(2.33)
Malopolskie	-0.041**	-0.043**	-0.039**	-0.044**	-0.040**
	(2.97)	(3.16)	(2.84)	(3.14)	(2.91)
Opolskie	-0.063**	-0.054**	-0.053**	-0.058**	-0.060**
	(3.43)	(2.95)	(2.79)	(3.06)	(3.30)
Podkarpackie	0.011	0.009	0.011	0.008	0.012
	(0.79)	(0.69)	(0.84)	(0.62)	(0.88)
Podlaskie	-0.038*	-0.043**	-0.045**	-0.042**	-0.040**
	(2.50)	(2.84)	(2.85)	(2.67)	(2.62)
Pomorskie	-0.038*	-0.029	-0.029	-0.032	-0.036*
	(2.46)	(1.83)	(1.75)	(1.93)	(2.30)
Slaskie	-0.090**	-0.092**	-0.085**	-0.091**	-0.088**
	(6.53)	(6.74)	(6.04)	(6.56)	(6.28)
Swietokrzyskie	-0.019	-0.019	-0.020	-0.020	-0.020
	(1.14)	(1.13)	(1.23)	(1.22)	(1.18)
Warminsko-mazurskie	0.012	0.020	0.019	0.016	0.013
	(0.73)	(1.22)	(1.17)	(0.98)	(0.79)
Wielkopolskie	-0.058**	-0.053**	-0.052**	-0.054**	-0.055**
	(4.61)	(4.27)	(4.10)	(4.19)	(4.35)
Zachodniopomorskie	-0.003	0.006	0.004	0.002	-0.001
	(0.18)	(0.35)	(0.26)	(0.10)	(0.04)
R BAR SQ	0.582	0.591	0.584	0.582	0.583
N	372	372	372	372	372

Table 6 Cont
Proportion of Long-Term Jobless in Powiat Unemployment Stock: June 2000

	(6)	(7)	(8)	(9)	(10)
Constant	-0.090	-0.011	0.058	-0.011	-0.078
	(0.70)	(0.09)	(0.43)	(0.08)	(0.60)
PCAGEMP	0.002**	0.003**	0.003**	0.003**	0.003**
	(8.01)	(8.42)	(8.58)	(8.42)	(7.78)
INVPERCAP	0.000004*	0.000004**	0.000004*	0.000004*	0.000004*
	(2.52)	(2.72)	(2.47)	(2.56)	(2.53)
PCFCLCO	-20.689**	-17.64**	-15.814*	-16.731*	-20.468**
	(3.19)	(2.74)	(2.41)	(2.57)	(3.15)
PCDCLCO	4.201	-0.726	0.323	1.145	4.012
	(1.47)	(0.23)	(0.11)	(0.39)	(1.40)
PCOTHCO	-0.022	-0.007	-0.052	-0.054	-0.023
	(0.25)	(0.08)	(0.60)	(0.62)	(0.26)
PCNETMIG	-0.002*	-0.002	-0.001	-0.001	-0.002*
	(2.55)	(1.84)	(0.72)	(1.77)	(2.42)
POPDENS		0.00002**			
		(3.49)			
PCRUR1			-0.074**		
			(3.32)		
PCOECD1RUR				-0.066**	
				(3.15)	
RURALDUM					-0.004
					(0.57)
PCWKAGE	0.006**	0.004*	0.003	0.004*	0.005**
	(2.80)	(2.10)	(1.64)	(2.21)	(2.66)
PCUO600	0.009**	0.009**	0.009**	0.010**	0.009**
	(14.33)	(14.52)	(14.75)	(14.79)	(14.25)
Dolnoslaskie	-0.035**	-0.028*	-0.026*	-0.026*	-0.034**
	(3.06)	(2.49)	(2.26)	(2.30)	(3.01)
Kujawsko-pomorskie	-0.038**	-0.035**	-0.029*	-0.030**	-0.036**
	(3.37)	(3.15)	(2.54)	(2.63)	(3.13)
Lubelskie	0.008	0.006	0.004	0.005	0.008
	(0.74)	(0.53)	(0.39)	(0.45)	(0.72)
Lubuskie	-0.048**	-0.043**	-0.041**	-0.041**	-0.047**
	(2.99)	(2.74)	(2.59)	(2.60)	(2.93)
Lodzkie	-0.020	-0.019	-0.019	-0.020	-0.020
	(1.81)	(1.74)	(1.77)	(1.81)	(1.80)
Malopolskie	-0.003	-0.006	0.0001	-0.010	-0.003
	(0.30)	(0.50)	(0.01)	(0.87)	(0.28)
Opolskie	-0.033*	-0.25	-0.018	-0.021	-0.032*
	(2.25)	(1.71)	(1.19)	(1.41)	(2.20)
Podkarpackie	0.019	0.017	0.020	0.014	0.019
	(1.74)	(1.64)	(1.87)	(1.30)	(1.77)
Podlaskie	-0.002	-0.007	-0.011	-0.009	-0.003
	(0.14)	(0.54)	(0.91)	(0.68)	(0.21)
Pomorskie	-0.062**	-0.053**	-0.048**	-0.049**	-0.061**
	(5.01)	(4.26)	(3.73)	(3.75)	(4.90)
Slaskie	-0.045**	-0.047**	-0.036**	-0.045**	-0.044**
	(3.93)	(4.18)	(3.15)	(3.99)	(3.83)
Swietokrzyskie	-0.018	-0.018	-0.021	-0.021	-0.019
	(1.39)	(1.39)	(1.59)	(1.64)	(1.40)
Warminsko-mazurskie	-0.037**	-0.029*	-0.026	-0.028*	-0.036**
	(2.79)	(2.22)	(1.93)	(2.10)	(2.75)
Wielkopolskie	-0.026*	-0.021*	-0.017	-0.017	-0.025*
	(2.52)	(2.13)	(1.66)	(1.61)	(2.40)
Zachodniopomorskie	-0.049**	-0.041**	-0.039**	-0.040**	-0.048*
	(3.57)	(2.94)	(2.76)	(2.86)	(3.47)
R BAR SQ	0.736	0.745	0.744	0.743	0.736
N	372	372	372	372	372

7. Regional Effects

Each of the preceding regressions contains within it a set of fifteen dummy variables designed to indicate whether, after having taking account of all other influences included in the model, powiats in particular regions fare better or worse than the base voivodship - Mazowieckie, the most populace and largest in the country - on the particular unemployment measure under study. This section brings together the important conclusions to be derived from the coefficients attaching to those shift variables in each case. It is acknowledged at the outset that while the results can help to identify spatial patterns in the particular phenomenon being examined, they do not explain in themselves why the patterns exist. In the absence of a richer data set, they can therefore only attract speculation. Nevertheless, they do help to start drawing a picture of regional labour market advantage and disadvantage and they represent a useful prelude to forthcoming work on the clustering of powiats by the four indicators modelled in this paper.

The findings regarding the voivodship dummy variables are presented below under four sub-headings, one for each of the indicators studied above. In each case, the results are summarised in map form, with further detail available from Tables 3-6 presented earlier. Regions are highlighted if the coefficient attached to their associated shift term is significant in a majority of cases at the five per cent level or better. Because the addition of the unemployment term increased the overall explanatory power of the regressions in all cases when female, youth and long-term unemployment were the dependent variables in the model, this decision rule is applied to those augmented specifications.

The Unemployment Rate

In the case of the overall rate of unemployment, twelve of the fifteen shift terms were significant, with their pattern being depicted in Map 1. While the overall picture may appear familiar from previous accounts of the Polish unemployment problem, it must be recalled that, in this instance, it is the powiat and not the region itself that is the basic unit of analysis. Furthermore, to the extent that they do reflect past patterns, their persistence is of some note during a period when Poland registered some of the highest growth rates in Europe.

The areas of high unemployment all lie to the north and/or west of the capital city region. One of the underlying reasons for the persistent unemployment problems they face is often held to lie in the past concentration of state farming within their borders. Without denying that this is important, it must be stressed that most state farms had disappeared by 1992 - although they were not necessarily left idle - and also that the state has placed a good deal of emphasis on directing assistance towards such regions. In the case of Pomorskie, reference is also usually made to the collapse of the shipping industry, although very similar caveats to those cited in the case of farming areas attach and at least raise the question of whether the nature of the government assistance provided to these areas has in fact merely served to subsidise unemployment rather than providing the necessary incentives and support for those without work to re-enter employment (see Layard, 1997). Furthermore, given their proximity to Germany, the presence of high unemployment in western border regions might seem surprising. However, it should be recalled that the Länder of eastern

Germany still lag far behind those in the west of the country. On the other hand, given the increase in cross-border traffic during the 1990s (Kołodziejczak, 2000), one might conjecture that the registered unemployment totals conceal an unknown level of activity in the black economy.

Powiats in six voivodships tend to have low unemployment rates when compared with those in Mazowieckie. Two of these - Podlaskie and Lubelskie - lie on the country's eastern border. The usual reason advanced for low unemployment in this part of Poland is the heavy concentration of private farming to be found in the area. In the present case, however, it must be recalled that independent account is taken of this influence and what is observed here is an additional shift. A group of three voivodships on the southern boundary of the country - Opolskie, Slaskie and Malopolskie - also house low unemployment powiats. Their heavy industrial backgrounds may make this seem surprising, but it is still possible to point delays in the privatisation process as partial explanations for their apparent good fortune. However, it should also be noted both that they are integral elements of the Silesia Euroregion and that Katowice is home to one of the country's fourteen Special Economic Zones, where tax treatment and investment incentives have been favourable. The remaining low unemployment area - Wielkopolskie - is centred around Poznan and this on most accounts (Zienkowski, 1997) and according to most statistical indicators (GUS, 2001) is one of the country's most successful transition localities.

Female Unemployment

Unexplained regional differentiation is rather less pronounced in the case of the proportion of females in the unemployment pool, as Map 2 reveals. There is a mid-western belt running from Pomorskie and Warminsko-Mazurskie in the north to Opolskie in the south with rather high concentrations of unemployed women and just one voivodship - Lodskie - in which the figure is low and statistically significant. It is not immediately apparent what the causes of the former concentration might be, although the situation in Lodskie could once again have its roots in historical factors. In particular, its industry has traditionally been much more female intensive than the average, in part due to the area's specialisation in textiles. When attempting to interpret these findings, however, the form of the dependent variable should always be borne in mind. Thus, the proportion of women in the stock of jobless workers is influenced both by variations in the numerator and in the denominator of the measure and there need be no connection between this ratio and the rate of female unemployment. The same caveat attaches, of course, to the two following measures.

Youth Unemployment

In terms of the weight of young people amongst the unemployed, Map 3 indicates that voivodships are either similar to Mazowieckie or exhibit rather higher statistics. A total of ten regions fall into the latter category, indicating that youths in the base region are, in relative terms and having taken account of other deterministic influences, in a rather favourable position. Although the geographic distribution of voivodships on this score is rather neat, there seems to be little in common between those in either of the two groupings. For example, an ex-state farming region

(Warminsko-Mazurskie), a mining/industrial area (Slaskie) and one with a great deal of private farming (Lubelskie) all have relatively high residual youth unemployment. On the other hand, young people in the capital region experience residual risks that are similar to those in the eastern border region of Podlaskie.

Long-Term Unemployment

Map 4 draws out the fact that voivodships have either proportions of long-term unemployment that are similar to that experienced in Mazowieckie, once the variables included in the regression model above have been accounted for, or have lower ones. With the exceptions of Lodskie and Opolskie, all voivodships extending to the west of the capital region have relatively low concentrations of residual long-term unemployment. However, it is not immediately evident why the particular spatial configuration that is observed has come about, although it does suggest the need for a re-examination of the policy tools in use in the east of the country, even in areas where the overall unemployment burden does not appear too severe.

Summary

Perhaps the most significant overall finding from the preceding discussion of regional unemployment patterns is that the three northern voivodships of Kujawsko-Pomorskie, Pomorskie and Warminsko-Mazurskie are home to what might be seen as the most troublesome problems in the country. Not only do they have high unemployment rates, they also have heavy concentrations of women and young people out of work. Furthermore, using those registered as jobless for over twelve months as the metric, once out of work, the unemployed appear to face relatively severe difficulties finding new placements. In short, powiats in these regions are confronted with all of the unemployment ills identified in this paper. The western voivodships of Dolnoslaskie and Lubuskie are afflicted in a similar way, except that the proportion of women in their unemployment pools is not abnormally high.

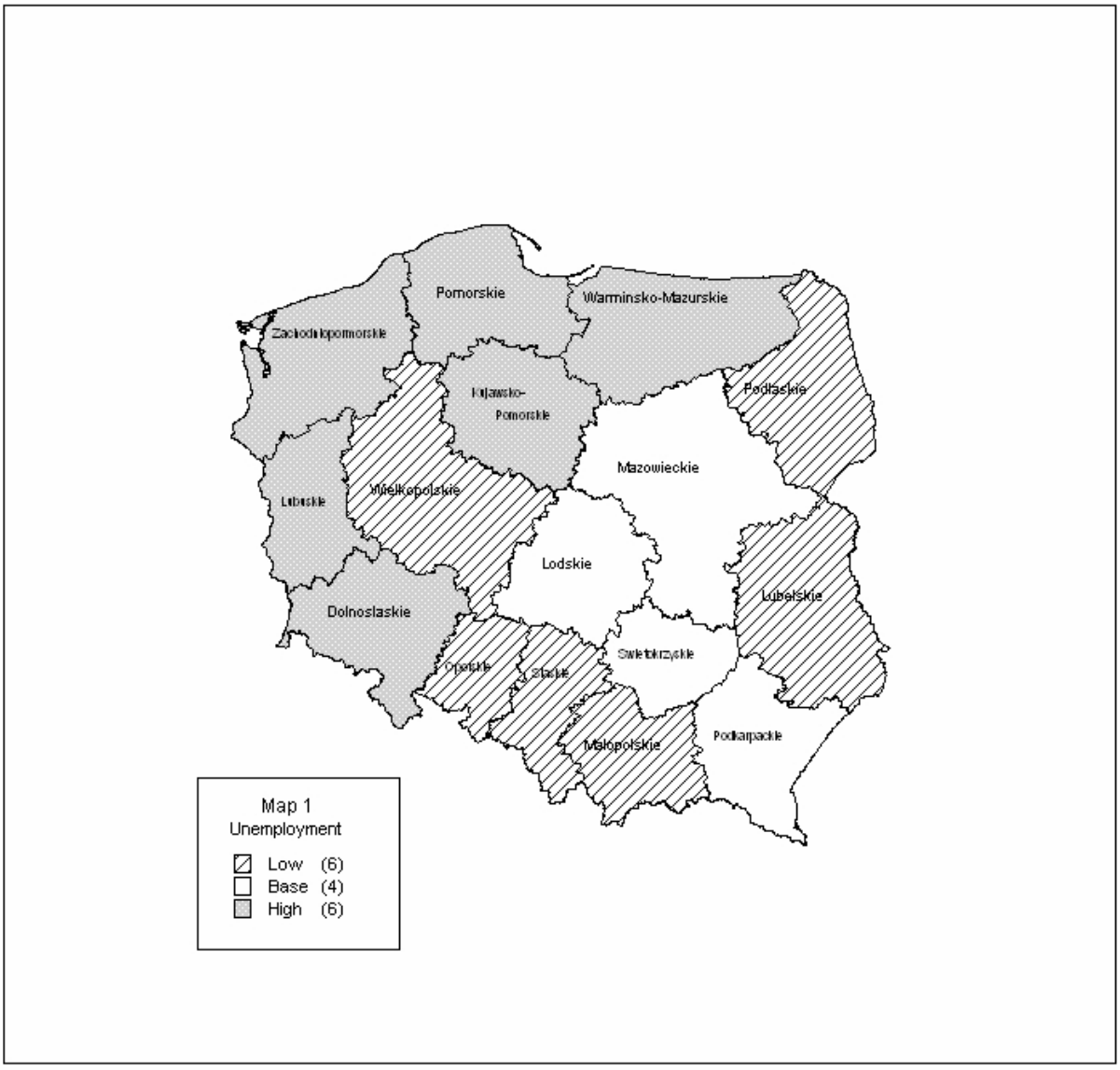
8. Conclusion

Unemployment is neither uni-dimensional nor is it spread evenly across space. This paper has examined the distribution of four dimensions of the phenomenon across Polish NUTS 4 level powiats. The chosen measures of labour market malaise were the rate of unemployment and the importance in registered jobless stocks of unemployed females, young people and those out of work for more than twelve months. On all of these measures other than the last, Poland as a whole compares badly with the current members of the EU. However, the poor performance is not replicated in all parts of the country and an attempt was made to explain, by means of regression analysis, the patterns to be observed in the data. The key findings of the analysis are summarised below.

The more significant is agriculture in the local labour market, the lower tends to be the unemployment rate and relative female unemployment. On the other hand, it is associated with more unemployed young people and long durations without work. While investment is associated with lower unemployment rates, it also appears to extend unemployment durations, which is a rather surprising result. The presence of foreign capital participation is strongly associated with more favourable outcomes on

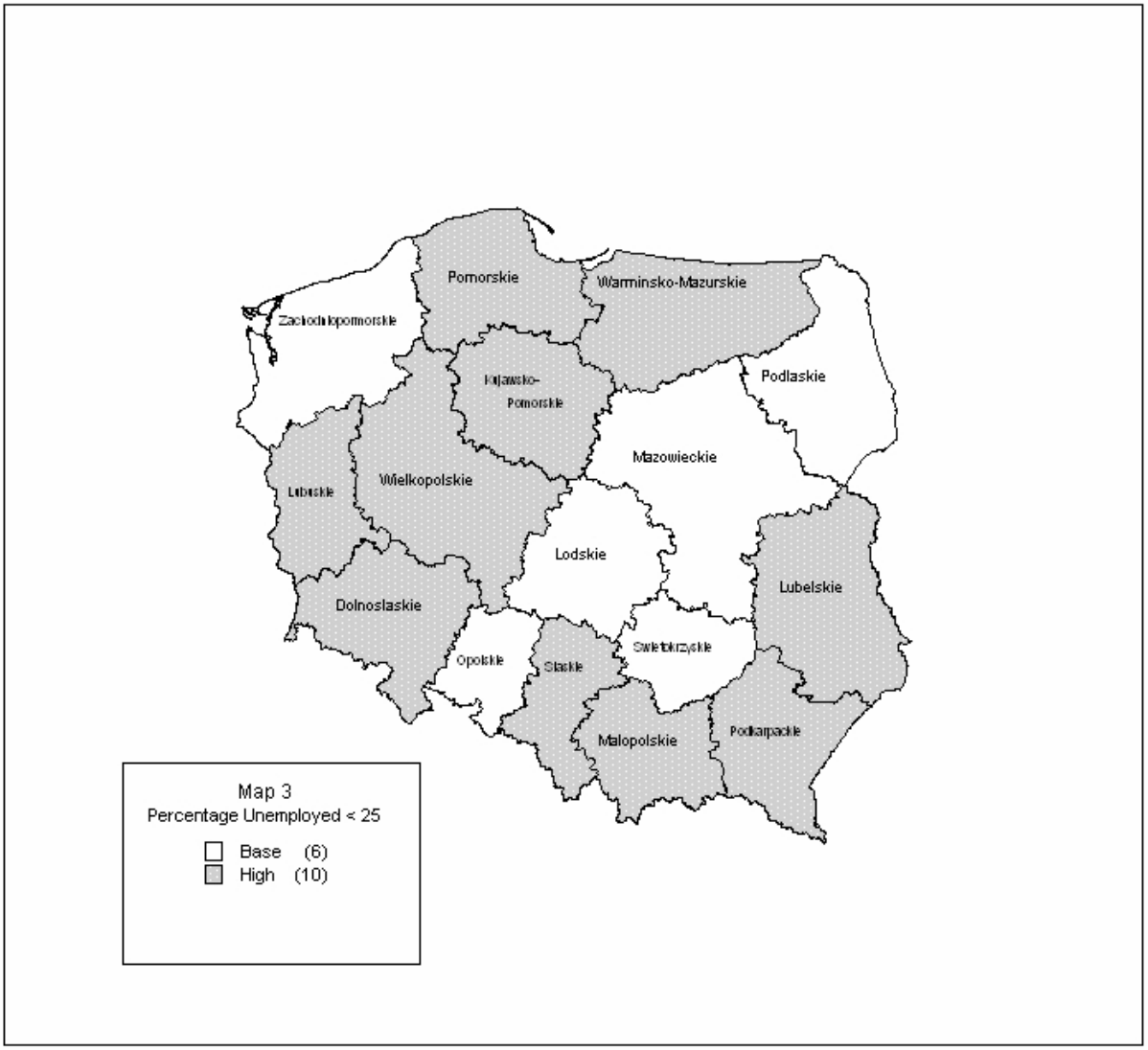
all four of the unemployment measures identified here. Similarly, the greater are the number of domestic commercial law companies, the better are the first three jobless measures. There would, however, appear to be no impact on the number of long-term unemployment. Other REGON entities seem to reduce the unemployment rate, but have no effect on the composition of unemployed workers. Net in-migration appears to act to reduce the jobless rate and to reduce the relative problems faced by those under the age of twenty-five. More densely populated areas witness relatively less female and youth unemployment but experience greater long-term unemployment. Rural regions experience *ceteris paribus* higher numbers of women without work, but lower levels of long-term unemployment. Greater levels of labour supply in the form of the percentage of the working population that are of working age lower the unemployment rate, but increase both female and long-term joblessness. In general, the equations were well determined, particularly in the context of a cross-section data set, although several of the region specific dummy variables were significant and, while interesting and the cause of speculation, indicate the need for further explanation.

The results of the exercise carry certain implications for policy. In particular, they provide strong confirmation that foreign investment is beneficial for the local economies in which it is located. Likewise, investment and a wide company base have mainly positive influences. Evidence was also adduced that women and young people could be disproportionate beneficiaries of improved information flows. Unfortunately, the results also indicate that when progress eventually begins to made with the restructuring and rationalisation of Poland's bloated agricultural sector, there could be significant repercussions in the labour market, unless appropriate ameliorative policy action, perhaps of a type just outlined, is undertaken in a determined and consistent manner.


Pomorskie
Warminsko-Mazurskie
Zachodniopomorskie
Podlaskie
Kujawsko-
Pomorskie
Mazowieckie
Wielkopolskie
Lubuskie
Lodskie
Lubelskie
Dolnoslaskie
Opolskie
Slaskie
Swietokrzyskie
Malopolskie
Podkarpackie
Map 1
Unemployment
Low (6)
Base (4)
High (6)

Map 2
Percentage of Unemployed who are Female

(1)
(10)
(5)


Pomorskie
Warminsko-Mazurskie
Zachodniopomorskie
Podlaskie
Kujawsko-
Pomorskie
Mazowieckie
Wielkopolskie
Lubuskie
Lodskie
Lubelskie
Dolnoslaskie
Opolskie
Slaskie
Swietokrzyskie
Malopolskie
Podkarpackie
Map 3
Percentage Unemployed < 25
Base (6)
High (10)

Map 4
Percentage of Unemployed for > 12 months

(8)
(8)

VARIABLE DEFINITIONS AND SOURCES

Variable	Definition	Source
PCU0600	Rate of registered unemployment, June 2000	GUS (2000)
PUF0600	Proportion of females in unemployment stock, June 2000	GUS (2000)
PUY0600	Proportion of youths in unemployment stock, June 2000	GUS (2000)
PULT0600	Proportion of long term unemployed in unemployment stock, June 2000	GUS (2000)
PCAGEMP	Agricultural employment at 30/9/1999 divided by working age population at 30/6/1999	GUS (2000a,b)
INVPERCAP	Investment per capita at 31/12/1999	GUS (2000b)
PCFCLCO	REGON registered commercial law companies with foreign participation at 31/12/1999 divided by population at 30/6/1999	GUS (2000b)
PCDCLCO	REGON registered commercial law companies without foreign participation at 31/12/1999 divided by population at 30/6/1999	GUS (2000b)
PCOTHCO	Other entities on the REGON register at 31/12/1999 divided by population at 30/6/1999	GUS (2000b)
PCNETMIG	Net internal and international migration (inflows minus outflows) for permanent stay per 1000 population in 1999	GUS (2000b)
POPDENS	Population density at 31/12/1999	GUS (2000c)
PCRUR1	Per cent powiat population living in rural gminas or the rural part of mixed gminas at 31/12/1999	GUS (2000c)
PCOECD1RUR	Per cent powiat population living in whole gminas or part of mixed gminas with population density below 150 people per square kilometre at 31/12/1999	GUS (2000c)
RURALDUM	A dummy variable taking the value 1 if more than 50% of a powiats resided in rural gminas or the rural part of mixed gminas at 31/12/1999 and zero otherwise	GUS (2000c)
PCWKAGE	Per cent population of working age at 30/6/1999	GUS (2000b)
VOIVODSHIP DUMMIES	Dummy variables taking the value 1 for powiats in the particular voivodship and zero otherwise	

References

Badinger, H. and T. Url (2002) 'Determinants of Regional Unemployment: Some Evidence from Austria', *Regional Studies*, vol. 36, no. 9, pp. 977-988.

Barro, R. and X. Sala-i-Martin (1991) 'Convergence Across States and Regions', *Brookings Papers on Economic Activity*, No. 1, pp. 107-182.

Blanchard, O. and L. Katz (1992) 'Regional Evolutions', *Brookings Papers on Economic Activity*, no. 1, pp. 1-75.

Ciechocińska, M. (1989) 'The Level of Educational Achievement in Poland: A Town-Countryside Comparison', *Geographia Polonica*, no. 56, pp. 213-225.

Czyz, T. (1993) 'The Regional Structure of Unemployment in Poland', *Geographia Polonica*, no. 61, pp. 479-496.

Elhorst, J.P. (2003) 'The Mystery of Regional Unemployment Differentials: Theoretical and Empirical Explanations', *Journal of Economic Surveys*, vol. 17, no. 5, pp. 709-748.

European Commission (1997) 'Rural Developments', Director General for Agriculture (DGVI), CAP 2000 Working Document.

Elhorst, J.P. (1995) 'Unemployment Disparities Between Regions in the European Union, in H. Armstrong and R. Vickerman (eds) *Convergence and Divergence Among Regions in the European Union*, London: Pion.

Faberberg, J., B. Verspagen and M. Caniéls (1997) 'Technology, Growth and Unemployment Across European Regions', *Regional Studies*, vol. 31, no. 5, pp. 457-466.

Gora, M. and H. Lehmann (1995) 'How Divergent is Regional Labour Adjustment in Poland?', in S. Scarpetta and A. Woergoetter (eds) *The Regional Dimension of Unemployment in Transition Countries*, Paris: OECD.

Gorzelak, G. and B. Jałowiecki (2000) 'Territorial Government Reform' in L. Kolarska-Bobińska (ed.) *The Second Wave of Polish Reforms*, Institute of Public Affairs: Warsaw.

Gripaios, P. and N. Wiseman (1996) 'The Impact of Industrial Structure on Changes in Unemployment in GB Travel to Work Areas 1989-92', *Applied Economics*, vol. 28, pp. 1263-1267.

GUS (2001) 'Statistical Yearbook 2001', Polish Central Statistical Office, Warsaw.

GUS (2001a) 'Employment in National Economy in 2000', Polish Central Statistical Office, Warsaw.

GUS (2000) 'Registered Unemployment II Quarter 2000', Polish Central Statistical Office, Warsaw.

GUS (2000a) 'Employment in National Economy in 1999, Polish Central Statistical Office, Warsaw.

GUS (2000b) Voivod Y'book 2000

GUS (2000c) 'Area and Population in Territorial Profile in 2000', Polish Central Statistical Office, Warsaw.

GUS (1994) 'Poland Quarterly Statistics, Vol. II, No. 2, Polish Central Statistical Office, Warsaw.

Harris, J. and M. Todaro (1970) 'Migration, Unemployment and Development: A Two Sector Analysis', *American Economic Review*, vol. 60, no. XX, pp. 126-142.

IFAD - International Fund for Agricultural Development - (2001) *Rural Poverty Report 2001: The Challenge of Ending Rural Poverty*, New York: Oxford University Press.

Ingham, H. and M. Ingham (2004) 'State Transitions in Polish Agriculture', SURDAR Working Paper No. 3, The Management School, Lancaster University.

Ingham, M. and H. Ingham (2003) 'Enlargement and the European Employment Strategy', *Industrial relations Journal*, vol. 34, no. 5, pp. 379-396.

Ingham, M. and H. Ingham (2002) 'Gender and Labour Market Restructuring in Central and Eastern Europe' in A. Rainnie, A. Smith and A. Swain *Work, Employment and Transition: Restructuring Livelihoods in Post-Communism*, London: Routledge.

Ingham, M. and H. Ingham (2000) 'Labour Market Reform and the Lost Generation: Youth Unemployment in Poland', *Geographia Polonica*, vol. 73, no. 1, pp. 5-23.

Ingham, M. and H. Ingham (1998) 'Is Unemployment an Equal Opportunity: The Polish Experience', in T. Lange (ed.) *Unemployment in Theory and Practice*, Cheltenham: Edward Elgar.

Ingham, M., H. Ingham and H. Domanski (2001) *Women on the Polish Labor Market*, Budapest: CEU Press.

Ingham, M. and G. Węclawowicz (2001) 'Gender and Earnings: A Regional Approach' in Ingham *et al.* (2001)

Ingham, M., K. Grime and J. Kowalski (1998) 'A Geography of Recent Regional Polish Unemployment Dynamics', *European Urban and Regional Studies*, vol. 3, no. 4, pp. 353-364.

Ingham, M., H. Ingham and G. Weclawowicz (1998a) 'Agricultural Reform in Post-Transition Poland=, *Tidschrift voor Economische en Sociale Geographie*, vol. 89, no. 2, pp. 150-160, 1998.

Kołodziejczak, T. (2000) 'Transport Conditions of Western Borderland Development', in J. Kitowski (ed.) *Eastern Borders of European Integration Process*, Papers and Monographs of the Department of Economy No. 19, Faculty of Economics, The Maria Curie-Skłodowska University, Rzeszów.

Krugman, P. (1991) *Economic Geography and Trade*, Cambridge MA/London: MIT Press.

Kwiatkowski, E. and P. Kubiak (1998) 'On Some Determinants of Regional Unemployment in Poland in Transition', *Statistics in Transition*, vol. 3, no. 4, pp. 705-721.

Lankes, H-P and A.J. Venables (1997) 'Foreign Direct Investment in Eastern Europe and the Former Soviet Union: Results From a Survey of Investors' in S. Zecchini (ed) *Lessons From the Economic Transition: Central and Eastern Europe in the 1990s*, pp. 555-565, Dordrecht: Kluwer Academic Publishers for OECD.

Layard, R. (1997) 'Preventing Long-Term Unemployment: An Economic Analysis', in D. Snower and G. de la Dehesa (eds) *Unemployment Policy*, Cambridge: Cambridge University Press.

Lehmann, H., J. O'Flaherty and P. Walsh (1997) 'Structural Adjustment and Regional Long-Term Unemployment in Poland', Policy Paper No. 4, Trinity Economic Paper Series, Dublin.

Lehmann, H., E. Kwiatkowski and M. Schaffer (1991) 'Regional U/V Ratios and the Pre-reform Structure of Employment in Poland', Centre for Economic Performance Working Paper no. 149, London School of Economics: London.

MARD (Ministry of Agriculture and Rural Development) (2002), 'Coherent Structural Policy for Rural Areas and Agriculture Development', available at http://www.minrol.gov.pl/eng/reports/sponjna.

Marston, S. (1985) 'Two Views of the Geographic Distribution of Unemployment', *Quarterly Journal of Economics*, vol. 100, pp. 57-79.

M. Mładý (2003) 'Regional Unemployment Rates in the Acceding Countries in 2002', *Statistics in Focus*, Theme 1, 10/2003, Luxembourg: Eurostat.

Neumann, G. and R. Topel (1991) 'Employment Risk, Diversification and Unemployment', *Quarterly Journal of Economics*, vol. 106, pp. 1341-1365.

Newell, A. and F. Pastore (2000) 'Regional Unemployment and Industrial Restructuring in Poland', IZA Discussion Paper No. 194, Bonn.

Partridge, M. and D. Rickman (1997) 'The Dispersion of US State Unemployment Rates: The Role of Market and Non-Market Equilibrium Factors' *Regional Studies*, vol. 31, no. 6, pp. 593-606.

Schumpeter, J. (1942) *Capitalism, Socialism and Democracy*, Harper Row: New York.

Smith, A and P. Pavlinek (2000) 'Inward Investment, Cohesion and the 'Wealth of Regions' in East-Central Europe' in J. Bachtler, R. Downes and G. Gorzelak *Transition, Cohesion and Regional Policy in Central and Eastern Europe*, pp. 227-242, Aldershot: Ashgate.

Taylor, J. and S. Bradley (1997) 'Unemployment in Europe: A Comparative Analysis of Regional Disparities in Germany, Italy and the UK', *Kyklos*, vol. 50, pp. 221-245.

UNDP - United Nations Development Programme - (1999) *Human Development Report for Central and Eastern Europe and the CIS 1999*, New York.

Webster, D. (2001) 'Local Authorities as Approximations to Local Labour Market Areas' Glasgow City Housing, Glasgow, available at http://www.jiscmai.../wa.exe?A2=ind0111&L=unemployment-research&F=&S=&P=169.

Zienkowski, L. (1997) 'Why Do Regional Gross Products Differ?', *Research Bulletin*, Vol. 6, No. 4, pp. 7-31, Research Centre for Economic and Statistical Studies, GUS, Warsaw.

[1] The extent to which Poland was historically 'European' in the sense that Hungary and the old Czechoslovakia once were is a moot question.
[2] Elhorst (2003) offers a review of many of the best known regional unemployment studies.
[3] The definition therefore approaches, but does not face head-on, the important issue of peripherality.
[4] It might be noted that under the basic OECD definition some 1.4 million fewer people would be classified as rural than under the standard Polish criterion, a difference that has been considered to be 'insignificant' (MARD, 2002).
[5] Even if a reasonably accurate measure of GRP were available at the powiat level, the relationship between it and unemployment has been found to be complex (Elhorst, 2003: 732).
[6] The measure can only yield an approximation because some people participate even though they are outside the accepted working age limits. Commuting across local area boundaries represents a further distortion. However, other possible measures of labour supply, such as total population multiplied by the overall participation rate, lead to even more serious problems.