

Does unemployment insurance help explain unemployment in transition countries?*

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Abstract

The aim of this paper is to understand better whether the level and persistence of unemployment in Central Europe can be related to labour market institutions, particularly unemployment benefits – as has been shown to be the case for Western European countries. Using both aggregate and individual level data for a number of countries, we find little evidence that institutions can explain differences in aggregate unemployment rates or flows. This is despite the fact that the generosity of unemployment benefits has tended to decline significantly over time. Given the change in aggregate unemployment rates and the increased share of the long-term unemployed with limited benefit entitlements, this suggests that the overall link between institutions and unemployment rates has been weaker than in Western Europe and other OECD countries.

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1. Introduction

It was widely assumed at the start of transition that unemployment would rise – perhaps sharply – but then would follow an inverted U shape with the speed of increase in unemployment being driven primarily by the speed of restructuring and firm closures. Yet, the persistence of unemployment suggests that there have been a variety of factors at work that have stopped an efficient reallocation of workers and jobs occurring. Subsequent data on job destruction and creation showed that in Central Europe and the Baltic States there were bursts of job destructions early in transition followed - with a lag - by increases in job creation¹. By contrast, in much of the CIS job destruction was restrained early on, not least because of the continuation of soft budget constraints. As such, unemployment rose more gradually over time. But common to most countries, irrespective of region, has been the fact that unemployment rates have remained high and persistent.

The available evidence also suggests that there have been patterns in the distribution of unemployment both within and across countries as, in particular, workers with low levels of education having systematically lower employment rates. Skill deficiencies seem to have been a major factor behind the relatively high incidence of unemployment among the low educated². Further, the large disparities in relative region unemployment rates point to major problems of spatial mismatch between workers and jobs. This mismatch has, moreover, persisted and remained a feature of economies irrespective of their overall progress in transition³. It has also been hypothesised that high and persistent unemployment could have been linked to the presence of overly generous benefit systems with results similar to those found in Western Europe. This conjecture might, at first glance, be expected to be relevant given that the transition countries started with relatively generous systems of social benefits at least compared with countries at comparable income levels. Yet despite the acknowledged importance of institutions in explaining unemployment in the OECD countries, there has been actually been rather little attention paid to this dimension regarding the transition countries⁴. Our paper is the first attempt to explore systematically whether institutions – primarily unemployment benefits – can help explain the path of unemployment. In particular, we focus on three Central European countries; Czech Republic, Hungary and Poland.

¹ See, for example, Jurajda and Terrell (2004) and Faggio (2006)

² Kollo (2006)

³ See Bornhorst and Commander (2005); Munich and Svejnar (2006)

⁴ With the exception of Riboud et al (2000)

The structure of this paper is several-fold. In Section 2 we first discuss the way in which unemployment and the labour market institutions have been found to interact in the existing literature. Section 3 then documents the key labour market institutions – particularly unemployment benefits and social assistance - existing in the transition countries, as well as the changes over time. We then move on in Section 4 to explore the hypothesis that labour market institutions, as measured by unemployment benefits and social assistance - can help account for high unemployment. In a manner similar to Western Europe, the conjecture is that benefits may have been too generous with the outcome being a high rate of unemployment. We start by looking at whether labour market institutions matter in a cross-country analysis before shifting in Section 5 to individual level data where specific institutional features are introduced. The relationship between benefits and the reservation wage is also explored. Section 6 concludes.

2. Unemployment and institutions in the literature

Research into the dynamics of unemployment has increasingly emphasised the role that labour market institutions can play. Nickell, Nunziata and Ochel (2005) using data for the OECD have argued that over half of the upward shift in equilibrium unemployment over the period 1960-1995 can be explained by changes in institutions. In particular, they found that (in order of importance) the benefits system; labour taxes, unions and changes in laws for employment protection have been contributory factors. Blanchard and Wolfers (2000) have argued that it has not so much been institutions by themselves but the interaction of institutions and shocks that has been behind the persistence of high unemployment in Western Europe.

In the transition countries, the evidence to date has been less clear cut, in part because of data shortcomings and the relatively short duration, but also because of the different circumstances surrounding transition. Large order reallocation of resources and associated restructuring could have been expected to raise unemployment substantially. Inherited features – such as spatial mismatch in jobs due to immobile labour associated with failures in housing markets and other constraints as well as skills mismatch, due to the structure of the educational system, could also have been expected to play a role in sustaining unemployment. Further, given the initial conditions, identifying a natural or equilibrium rate of unemployment – and hence an appropriate set of benchmark values - would not be feasible. Finally, these factors are likely to have affected countries differently depending on their particular political and economic circumstances.

Despite these limitations, there is a small body of research that has focussed on the dynamics of unemployment looking in particular at the role of institutions. For instance, Boeri and Terrell (2002) have argued that relatively more generous non-employment benefits in Central and Eastern Europe established a wage floor that forced the least productive firms to shed workers and hence implement restructuring. By contrast, in the CIS benefits were less generous, wages more flexible and this – through much of the 1990s – was associated with labour hoarding and downward wage flexibility but also less restructuring. Consequently, unemployment emerged earlier and at higher incidences in Central and Eastern Europe than in countries further east. In addition to looking at any relationship between the level of unemployment and the institutional set-up, research has also gone into trying to understand whether changes to the benefit system have had any impact on unemployment duration across countries. Boeri and Burda (1996) found a small but significant effect of expenditure on active labour market programmes, job creation, and programme intake on outflows from unemployment into employment in the Czech Republic. Ham, Svejnar and Terrell (1998, 1999) also found that the institutional system had only a moderate effect on the duration of unemployment for both women and men in the Czech and Slovak Republics. In addition they found some evidence of country variation - there was a greater responsiveness to the unemployment compensation system in the Czech Republic. For Poland, Puhani (2000) did not find any significant effect on unemployment duration using information on changes in the duration of unemployment benefits in Poland in 1991. Similarly, Micklewright and Nagy (1996) found little effect of changes to the benefit system on duration in Hungary. However, they also found that over time an increasing proportion of the unemployed searching for jobs actually received no financial support from the state while an increasing proportion of those in receipt of benefits did not search.

The research summarised above has mostly been concerned with the earlier years of transition. More recent evidence suggests that benefit systems in particular have become less generous over time. Paradoxically, while labour market institutions and, in particular, unemployment benefits may have contributed to the initially high levels of unemployment in Central Europe by acting as a floor on wages, subsequent changes to benefits systems have not necessarily been associated with moving people back into employment. One possible explanation is that if the least productive workers lost their jobs first, those with low skills have subsequently become locked into unemployment. When the generosity of benefits began to recede in the second half of the 1990s, their

human capital had effectively deteriorated to an extent that they were unable to find work. Empirical substantiation of this hypothesis is, however, restricted by the absence of appropriate longitudinal data covering the early years of transition.

3. Unemployment and its composition: a description

Figure 1 plots the path of aggregate unemployment in six transition countries between 1991 and 2005. There is significant variation in both levels and changes in unemployment across countries. What is common, however, is the absence of an inverted U shape for unemployment. Only in Hungary, did unemployment rise sharply at the start of transition before falling steadily. In Poland the early rise was followed by an equally sharp fall in the mid-1990s before a subsequent and sustained increase. In the Slovak Republic a period of decline also subsequently gave way to a sustained rise. In the Czech Republic unemployment has drifted upwards through most of the period, albeit at a gradual rate of increase. In Romania after a sharp increase at the start, unemployment then retreated and settled since the mid-1990s at around 8%. Finally, in Russia unemployment increased gradually up to 1999 before stabilising at around 9% after 2001.

As unemployment has increased, there have been changes in the composition of unemployment. In particular, there has been a sharp rise in share of long-term unemployment (LTU). In Central Europe and Romania by 2004 LTU rates were around 50% or higher while in Russia the share was under 40%. *Figure 2* plots these developments but also shows that there has been large variation across countries. For example, in both Hungary and Russia the share of long term unemployed has been falling while elsewhere the reverse has been the case. In all countries, there have been very substantial declines in the employment rate. In Central Europe by 2004 the employment rate was below 60% and there has also clearly been a large shift into non-participation.

In terms of educational attainment, unemployment has been characterised by relatively high shares of the unskilled. *Figure 1* also plots the unemployment rates for those with primary and tertiary education respectively. With the exception of the Slovak Republic where unemployment is particularly high among people with secondary education, unemployment rates for those with primary education have lain significantly above the mean rate and the reverse holds for those with tertiary education. For example, in the Czech Republic the unemployment rate for the primary educated has been nearly ten times higher than for those with tertiary education. The gap between primary and

tertiary groups has actually increased over time in the Czech Republic as well as in Poland.

Even more importantly, average unemployment duration has increased disproportionately for those with primary education compared to those with higher degrees (*Figure 3*). This is particularly pronounced in Poland and the Czech Republic but also appears to be the case for Hungary in more recent years when exact monthly information on duration is available. This is consistent with the hypothesis that low skilled individuals that became unemployed in the early years of the transition have become relatively more marginal to the labour market compared to individuals with more education. However, this phenomenon seems to have happened in various waves in different countries over time.

4. Unemployment and institutions

A central feature of the institutional arrangement in all countries has been unemployment benefit and social assistance. In what follows, we measure the level of benefits in terms of net replacement rates⁵. These measures are consistent with those available for the OECD. (The manner of their construction is described in more detail in *Appendix 1*). *Figure 4* and *Figure 5* give net replacement rates for both long-term and short-term unemployed in the six countries. They show the average rate for ten different family types as well as the highest and lowest net replacement rate for each year⁶. It is clear that there are very substantial differences in levels across countries and unemployment types. For long-term rates, for example, Russia has had low and declining replacement rates – between 2-5 percent – and these have been particularly low for individuals without a labour market history. By contrast, the long-term unemployed in the Czech and Slovak Republics and Poland have received mean net replacement rates of between 40-60 percent. For the short run unemployed, the picture has been somewhat different. *Figure 4* shows relatively little variation in generosity across countries – by 2005 mean replacement rates ranged between 40-60% - and with the exception of Romania, all other countries have been marked by a declining trend. The minimum values typically correspond to benefits for individuals without a labour market history. In most countries, their treatment in the long term has not been different from the short term, although there are clear differences in the levels across countries. The maximum values

⁵ Net replacement rate=[Benefit income of the family when unemployed-Tax on benefit income]/[Earned income + Benefit income of the family when employed -Tax on earnings and benefits].

mainly comprise lone parents and couples with children. Again there is variation across countries in the level of both short and long run replacement rates.

While average short term NRRs have generally exceeded long term NRRs, over time the gap has actually tended to narrow. Moreover, there has been a clear tendency for short and long run rates within countries to converge at lower levels of generosity than in the 1990s. In short, over time NRRs have tended to decline for both long and short-term cases (with the exception of Romania). For the period 2000-2005 most countries have reported NRRs in the range of 0.4-0.6. It should be noted that NRRs have tended to be highest for some categories, mainly families with children. In the four Central European countries, these categories have had replacement rates in the region of 0.7.

In comparison, average NRRs for Western countries have experienced relatively little change. The available OECD data for 2001-2004 indicates that the average rate in Germany and France was around 65 and the maximum rate at around 80 percent. In contrast, levels have been significantly lower in the UK where the average has slightly increased from the low 50 to nearly 60 percent while the maximum rate has stayed at around 70 percent. Hence, rates have been slightly higher in Western countries compared to the Eastern European group presented in this paper suggesting that labour markets should have been more flexible *ceteris paribus*.

However, there are some important caveats when discussing these NRRs. Not all the unemployed have actually been eligible for unemployment benefits. Indeed, for those countries where information is available it appears that the share of those eligible has declined to quite low levels. For example, in Hungary and Poland eligibility rates of around 0.6 in the early/mid-1990s had fallen to 0.2 or below by 1996/98. In the Czech Republic eligibility remained at around 0.2 throughout. This can partly be explained by changes in benefit rules but more by the falling share of short term unemployed. For example, the share of long-term unemployed has tripled in the Czech Republic and more than doubled in Hungary and Russia. Further, the impact of an unemployment benefit system depends on the enforcement of the benefit rules. Evidence that is available, however, relates only to the strictness of the rules rather than the strictness of actual enforcement. In terms of rules, there have been differences across countries⁷. For

⁶ The ten family types are: single, couple, couple with two children, lone parent with two children, for people with and without employment history; two earner couple with and without children.

⁷ However, there are clear differences in the underlying factors driving the differences in levels. For example, in Hungary the strictness measure has been mainly driven by sanctions for rule violations rather than requirements on occupational or geographical mobility or proof of job search, while in Russia there

example, Hungary has had relatively strict rules throughout while the index is lowest for Russia. With the exception of the Slovak Republic, there has been a high degree of persistence in strictness over time. Where changes have occurred they have generally been through more stringent requirements to provide evidence of job search activity (Czech and Slovak Republics and Romania) or the requirements for occupational mobility (Poland and Russia). Finally, it should be noted that there have been changes to the benefits system in a number of respects since the early 1990s. While these are picked up in terms of generosity in our NRRs, there are some aspects that are not. For example, in 1997 the Poles started differentiating over the duration of benefits by making it conditional on the level of unemployment in a given region. The Hungarians also made changes to duration in 2000, as did the Czechs in 2004.

5. An aggregate view of unemployment and institutions

We now begin to explore the relationship between unemployment rates and unemployment benefits. Ideally, we would like to see whether institutions can explain time and cross country evolutions, whether institutions can explain time evolutions and whether institutions can explain specific country evolutions beyond common time evolutions and differences in levels. However, given that we have a small number of observations on time, we avoid simple replication of the literature on Western Europe and limit our analysis to some simple correlations between our principal measures of interest, namely unemployment and the NRRs. *Figure 6a* plots the aggregate unemployment rate of each country against the short and long terms NRRs respectively. It also plots the relationship between the shares of short and long term unemployment against the respective NRRs. There is no clear, linear relationship between these indicators and unemployment levels across countries. There is a slight positive but non-linear correlation between long-term net replacement rates and both the overall unemployment rate and the proportion of long-term unemployed. The link for the initial net replacement rates and unemployment is more complex but also non-linear. In order to control for country fixed effects we have redone the same exercise but this time demeaned both unemployment and benefit rates (*Figure 6b*). Again, there are no clear linear relationships and some market differences compared to *Figure 6a*.

In short, at first pass, it looks unlikely that key labour market institutions – unemployment benefits and social assistance – can satisfactorily explain unemployment.

have been higher requirements for job search but lower sanctions and requirements for mobility. Strictness

Indeed, even when including other measures of institutions – such as for employment protection, payroll taxation or the locus of wage bargaining – in a cross country regression with and without country and time dummies, we were unable to identify any robust relationships⁸. To the extent that institutions have mattered for explaining unemployment, it must have been in combination with other factors. This finding stands in sharp contrast to the OECD country literature discussed above which attributes much of the increase in unemployment to institutions.

6. The effect of institutions on labour market flows

Cross-country variations in unemployment and labour market institutions are only one way of analysing whether the latter do indeed play a role in explaining the evolution of unemployment. We now extend the analysis by using Labour Force Survey (LFS) data (described in more detail in *Appendix 2*) providing information on an individual level for three countries - Poland, Hungary and the Czech Republic - to see whether the benefit system has had, in particular, an impact on labour market flows out of unemployment into employment and inactivity over time. The advantage of this approach is that we are able to control more fully for individual circumstances such as unemployment duration, age and education, all of which are likely to be important when analysing the relationship between institutions and unemployment. At the same time, however, cross-country comparisons using LFS data are complicated by differences in data collection, definitions and coverage. We have attempted to minimise these differences by standardising our data as far as possible. In addition to the usual control variables we have merged the NRRs described above into the LFS data. In particular, the matching takes into consideration the number of children, marital status and lengths of unemployment. While this might be considered simplistic - as net replacement rates are based on average wages and not on actual wages - it introduces further variation into the data beyond the usual binary information. This way we are able to link changes in average levels of benefits over time with individual information. In addition, for Hungary and Poland we have information on benefit receipt, information on registration at the labour office (for Poland and the Czech Republic) and whether an individual was in receipt of other benefits, such as disability, child, pension and unemployment assistance, in the case of Hungary.

indicators available from the authors on request.

⁸ See Blanchard, Commander and Heitmueller (2006), results are available on request.

Table 1 provides some descriptive statistics from the respective Labour Force Surveys. It can be seen that in terms of the age distributions of the unemployed, they are very similar across the three countries, with around 80% of the unemployed aged between 25-54 years. With regard to education, over three-quarters have vocational or primary education, with the share of those with vocational education being particularly high in Poland. When broken down by skills, there are significant differences by country. In Hungary there is a far lower share of managerial and professional staff in unemployment. In Hungary and the Czech Republic over 55% of the unemployed are classified as unskilled or skilled manual workers, while in Poland this is only 22%. The large share of skilled non-manual workers in Poland may point to differences in classification. The sectoral distributions are fairly similar across countries with manufacturing being the largest category. As regards the share of long term unemployed, this share ranges between 36-52% with the largest share being in Hungary.

Several interesting trends emerge from the LFS data. In all three countries the share of short-term unemployment has fallen significantly over time (Poland 28-19%; Hungary 60-37%; Czech 35-16%) which is consistent with the aggregate data presented earlier. Yet, with respect to the long term unemployed the trend has varied. In Poland the long term unemployment share has actually fallen (35-26%), as also in Hungary. At the same time, for Poland and Hungary the share of long-term inactive has increased significantly. In the Czech Republic long term unemployment has increased. In all three countries the share of youth (15-24 years) unemployment has fallen. In Poland the share of 45-49 and 50-54 year olds has increased substantially. The latter group has also increased in the Czech Republic. In contrast, changes in region shares and rankings have been quite small.

Before turning to regression analysis, we look at unconditional transition probabilities between different labour market states in the three countries (see *Table 2*). Flows in employment have increased or remained stable over time. By the end of the period, Polish employment-to-employment probabilities were still a bit lower than in Hungary or the Czech Republic. In Poland particularly – but also in Hungary, flows from employment to unemployment have declined. In the Czech Republic they remained constant. Flows from unemployment to employment increased in Hungary but fell quite significantly in the other two countries; as such unemployment to unemployment rose significantly in both the Czech Republic and Poland. Flows from unemployment to inactivity declined or remained stable, while flows from inactivity to employment mostly

fell. When disaggregating by duration and education respectively it appears that flows from unemployment to employment rose for those with short durations in Hungary and Poland but actually decreased in the Czech Republic, albeit slightly. For education, flows to employment and out of unemployment have both increased in education. Making the analysis conditional in terms of individual characteristics – such as location, occupation, education, duration and so on – we also find that there is a negative association with duration in all three countries.

In order to test more formally what the impact of labour market institutions and benefit receipt in particular is on flows out of unemployment into employment and inactivity, we now estimate multinomial logistic regressions separately for the three countries.⁹ These have been done both on a pooled and annual basis in the hope to trace changes in the impact of institutions on flows over time. *Tables 3* and *4* provide the results for flows from unemployment into employment and inactivity respectively. The NRR measures are applied for each country. In addition, for Poland and the Czech Republic we have information on registrations, while for Hungary we also have information on whether they are in receipt of other benefits, such as disability benefits. Marginal effects for the institutional variables are reported but all specifications contain a range of controls including age, education, occupation, region, sex and unemployment duration as well as time and quarter dummies where appropriate¹⁰.

In *Table 3* flows from unemployment to employment are reported. In all three countries, the sign on the net replacement rate varies but is very rarely significant. Thus, when controlling for individual attributes, as well as region and time, there is no evidence that NRRs have any notable impact on flows into employment from unemployment. For registrations, we find that in the Czech Republic there is a negative and significant (at 1%) sign in the pooled specification. For the yearly estimations, the sign is mostly negative but also mostly insignificant. In Poland, by contrast, the sign on the pooled and annual registrations variable is positive and mostly significant. When entering the NRR and registrations variables jointly, we find that in the Czech Republic the coefficient on the NRR becomes positive and significant, while that on registrations is also negative and mostly significant. For Poland the registrations variable remains positively signed and is again mostly significant. However, the information on registration status is self-reported and hence possibly subject to reporting bias. For Hungary where we have more measures

⁹ We follow standard procedures in terms of our estimation methodology and hence do not present the underlying model. The estimations have been implemented in STATA 9.2 and are available on request.

¹⁰ A full set of results is available from the authors on request.

of benefits, it appears that recipients of disability benefits in particular have lower chances of moving back into employment from unemployment. Overall, being on disability benefits in Hungary reduces re-employment probabilities by around 6 percentage points. When using a dummy variable for receipt of unemployment benefit (UI) or social assistance (UA) we find no clear effect or difference with almost all coefficients being insignificant.

Interestingly, the picture looks rather different for flows from unemployment to inactivity (*Table 4*). First, net replacement rates and being in receipt of unemployment benefits, as well as being registered as unemployed, clearly reduce the likelihood of individuals becoming inactive in the pooled model in both the Czech Republic and Poland. In Poland, the registrations variable is significant when entered jointly as well as separately. Second, pension, disability and child benefits significantly increase the chances of becoming inactive in Hungary. By contrast, the NRR variable – whether entered individually or jointly – is, as in the other two countries, mostly negatively signed and significant. When dummy variables for the receipt of benefits or social assistance are included both enter negatively.

These multinomial estimations can also be used to generate predicted flows between particular labour market states. *Figures 7-9* report such predicted values for flows from unemployment to employment, unemployment and inactivity respectively for the three countries. What we observe is that in Hungary there is, on average, a clear increase over time in flows from unemployment to employment (U→E); a clear decline in flows to unemployment (U→U) and – after 1996, stable flows to inactivity (U→I). Being in receipt of benefits or social assistance makes little difference. However, being in receipt of disability allowance is associated with a far higher rate to inactivity throughout the period. In the Czech and Polish case, there are different trends. Flows from unemployment to employment tend to fall significantly over much of the period while flows to unemployment rose substantially. Unlike in Hungary flows to inactivity have also tended to decline, with the exception of 2004 in the Czech Republic. In the latter case, being registered for benefits makes little difference, while in Poland flows to employment and unemployment remain consistently higher than the mean value and consistently lower for flows to inactivity.

7. Conclusion

The aim of this paper has been to understand better whether the level of unemployment in Central Europe has been related to labour market institutions, particularly unemployment benefits – as has been shown to be the case for Western Europe. With cross country analysis, we are able to find little evidence that institutions can explain differences in aggregate unemployment rates across countries. However, using unique micro-data and estimating conditional transition probabilities over time we find that benefits can affect outflow rates from unemployment, albeit mainly with respect to flows from unemployment to inactivity. Our evidence suggests that these effects have stayed constant but small over time despite the fact that benefit generosity declined but vary across countries. Given the change in aggregate unemployment rates and an increased share of long-term unemployed with limited benefits entitlements, this suggests that the overall link between institutions and unemployment rates has been weak. These findings are in sharp contrast to what has been found for OECD countries. . In sum,, taking the wide variety of evidence used in this paper, we conclude that although institutions have some impact on flows they are unlikely to explain the variation in unemployment rates across countries and their persistence. Earlier, we hazarded the conjecture that it has been the less skilled workers that lost their jobs first and may have subsequently been locked into unemployment. If so, our findings suggest that for this to happen, the human capital of the less skilled would have had to deteriorate faster than the decline in the generosity of benefits. However, to explore this conjecture more fully would require longitudinal data that measures effective human capital and this is not available.

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Appendix 1

Data appendix

Unemployment rate: Aggregate unemployment rate from the EBRD database as well as disaggregated unemployment rates by education and where possible by previous earnings. Unemployment rates by educational attainment come from Labour Force Surveys and Statistical Offices.

Annual net replacement rates: $NRR = \frac{\text{Benefit income of the family when unemployed} - \text{Tax on benefit income}}{\text{Earned income} + \text{Benefit income of the family when employed} - \text{Tax on earnings and benefits}}$. Gross earnings in work for an Average Production Worker (APW) defined as an adult full-time production worker in the manufacturing sector whose wage earnings are equal to the average wage earnings of such workers. It is assumed that the worker is fully employed during the year (no sick leave or unemployment). White-collar workers are excluded. Manufacturing is defined as in Division D of the International Standard Industrial Classification of All Economic Activities (ISIC Revision 3, UN). Income includes average amounts of overtime and regular cash supplements (such as Christmas bonuses, thirteenth month payments, vacation month payments). Regular annual bonuses are to be included unless they are dividend payments. Fringe benefits are to be excluded. Where possible annual earnings have been calculated by referring to the average of hourly earnings in the manufacturing sector in each quarter or month, weighted by the hours worked during each period, multiplied by the average number of hours worked during the year, assuming that the worker is neither unemployed nor sick (see OECD Taxing Wages, Table V3, p 438 for various examples for different countries). NRR are available for six different family types (single, couple, lone parent, two-earner couples with and without 2 children). They are also available at 100% and 66.7% of the APW. We also have information on the initial (unemployment insurance or unemployment assistance benefits) and long-term (social assistance) rates. NRRs are based on the OECD definitions where possible. The NRR is calculated for an overall category with a full employment record assumed to qualify for the full amount of benefits and a 'youth' category without any employment record.

Appendix 2

Description of Labour Force Surveys

Hungarian Labour Force Survey (HLFS)

The HLFS has been conducted by the CSO quarterly since January 1992. The survey has a rotated panel structure with each household remaining in the sample for 6 consecutive waves. The individuals can be identified across waves. The panel sample used in this paper contains the records of individuals aged 15-64 excluding those, who were full-time students at the first observation. The sample covers 1993-2003.

The HLFS is based on a multi-stage stratified sample design. The stages of sampling are defined as follows. The sample design strata are defined in terms of geographic units, size categories of settlements and area types such as city centres, outskirts, etc. In settlements with 15,000 or more inhabitants, primary sampling units (PSUs) are enumeration districts (EDs) and secondary sampling units (SSUs) are dwellings. In smaller settlements the PSUs are settlements, and the SSUs are EDs while the ultimate sampling units are dwellings. The sampling frame or address register of the LFS consists of 12,775 sample units (SUs), covers 751 settlements of the country, and contains about 626,000 addresses. The quarterly sample of the LFS is selected from the address register. From each of the 12,775 SU's, three addresses are selected by simple random sampling. The interviewers visit one address in each SU during one month. The main indicators of the labour market are representative for regions. Labour market information is collected from each household and each person aged 15-74 living there.

The sample has a simple rotation pattern: any household entering the sample at some time is expected to provide labour market information for six consecutive quarters, then leaves the sample permanently. The samples of two consecutive periods tend to be less than 5/6, which would be obtained at a 100 per cent response rate.

Polish Labour Force Survey (1994-2004)

The Polish Labour Force Survey started in May 1992 as a quarterly survey, using one reference week per quarter. A rotation scheme was introduced in the second quarter of 1993. A continuous survey design was introduced in the fourth quarter of 1999. The survey covers the whole country. Only non-institutional households are covered. Participation in the survey is voluntary. The target population covers all persons 15 years and older normally resident in Poland. Persons living in institutional households (army, hospital, prison etc.) and students living away from home for a total period exceeding two months are excluded from the survey. The same applies to persons living

permanently or temporarily (for more than two months) in other countries. The data are collected through face-to-face interviews using paper questionnaires. The response rate in 2002 was 80.5%.

The sampling plan for the Polish LFS is a two-stage stratified probability sampling of dwelling units. The sampling frame for both stages of the sample is based on the Domestic Territorial Division Register. The primary sampling units refer with few exceptions to census clusters in towns and enumeration districts in rural areas. The primary sampling units are stratified by urban/rural division of voivodships (provinces), as well as division within voivodships depending on the size of the place, with rural areas included in the smallest ones. PSUs are sampled within strata with sampling probability proportional to the number of dwellings in a PSU. In the second stage a total of 24 700 dwelling units per quarter are sampled from each PSU stratified by size of the municipality. Overall, 0.14% of private households are sampled. The sample is divided into four panels, using the rotation scheme 2-(2)-2.

Weights are computed using a four-step procedure. First the initial design weights are calculated for each dwelling unit, i.e., the reciprocals of the selection probabilities for the final sampling units in each strata. Second, the weighted response rates for each sampling unit are calculated and stratified a posteriori by six categories of place of residence. Third, the initial weights are adjusted by the response rates. The final step consists of modifying the adjusted weights by the population estimates stratified a posteriori by the urban-rural division, sex and 12 age groups.

Czech Labour Force Survey (1993-2003)

Original individual level Labor Force Survey (LFS) data for the Czech Republic have been used. The data are collected quarterly since 1993 by the Czech Statistical Office (CSU). Samples size covers more than 250,000 individuals per year. It is a rotating sample so that each quarter 20% of individuals in the sample are replaced. The number of respondents is proportional to the size of the district. Households are chosen randomly and all members of the household are included in the sample. The population subject to analysis was restricted to individuals 15-64 years old from the period 1994-2004. Students were not included. We trace the same individuals over two consecutive periods and thus identify the change of individual economic status over time. This additional information is added to original data. Variables in the sample were recoded in order to match the given data structure.

Figure 1: Unemployment rates – aggregate and by education level

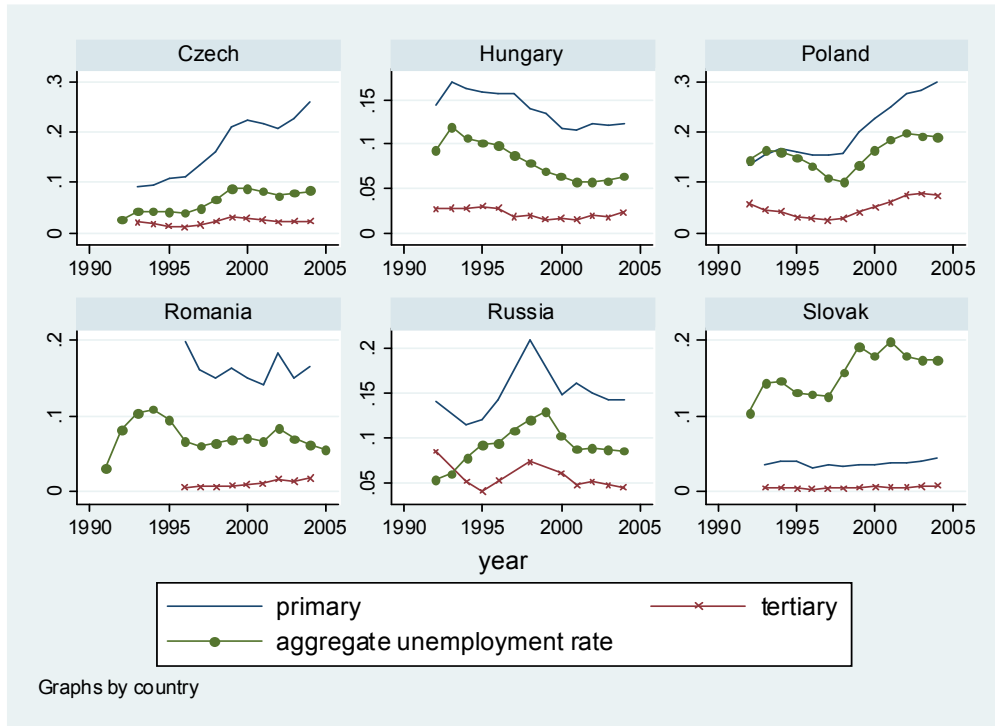


Figure 2: Share of long-term unemployed

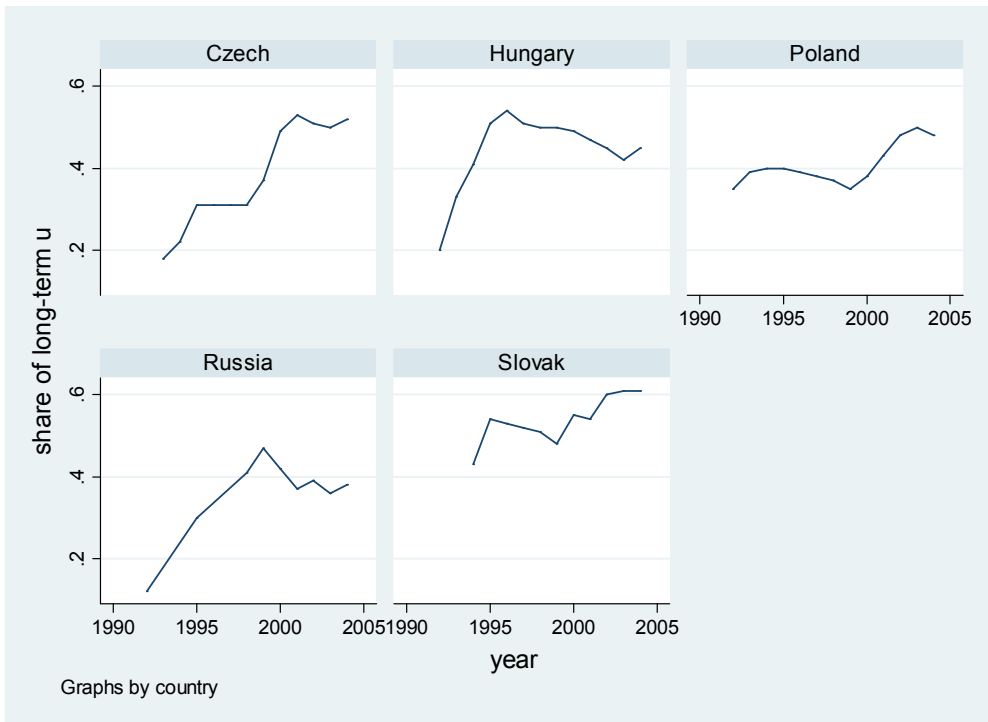


Figure 3: Difference in average unemployment duration between primary and higher education

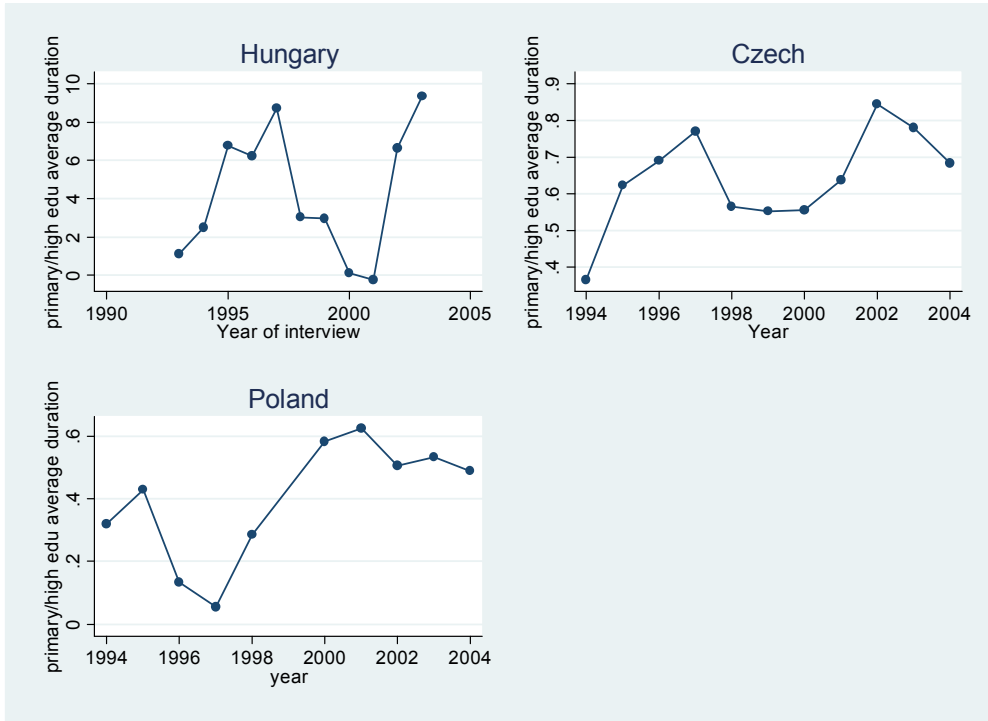


Figure 4: Net replacement rates long term (averages, max and min)

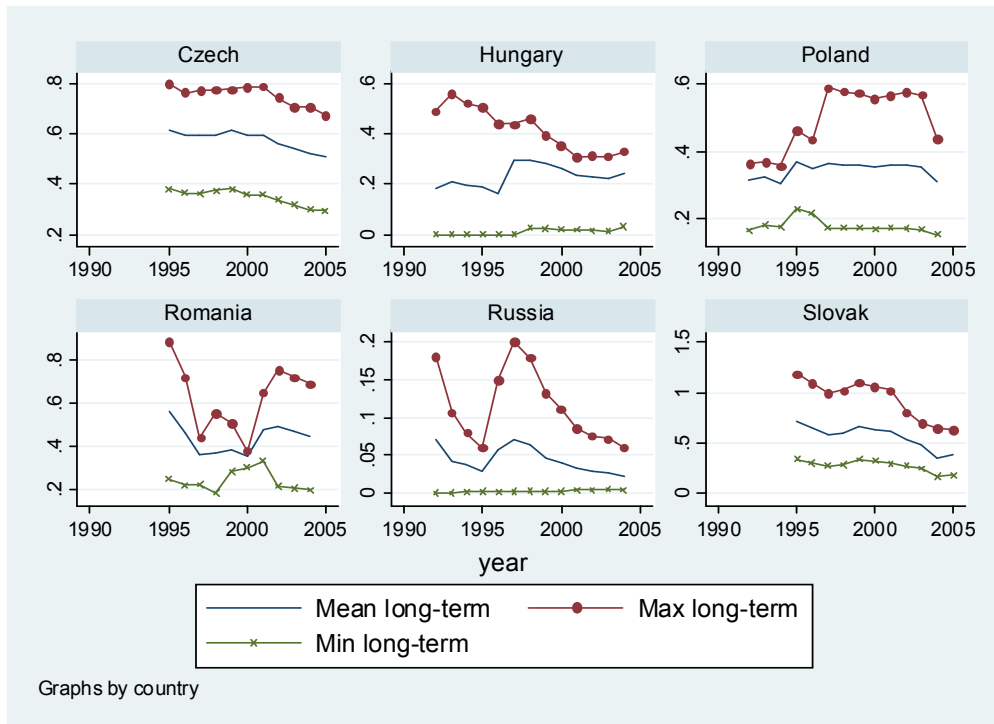


Figure 5: Net replacement rates initial phase (averages, max and min)

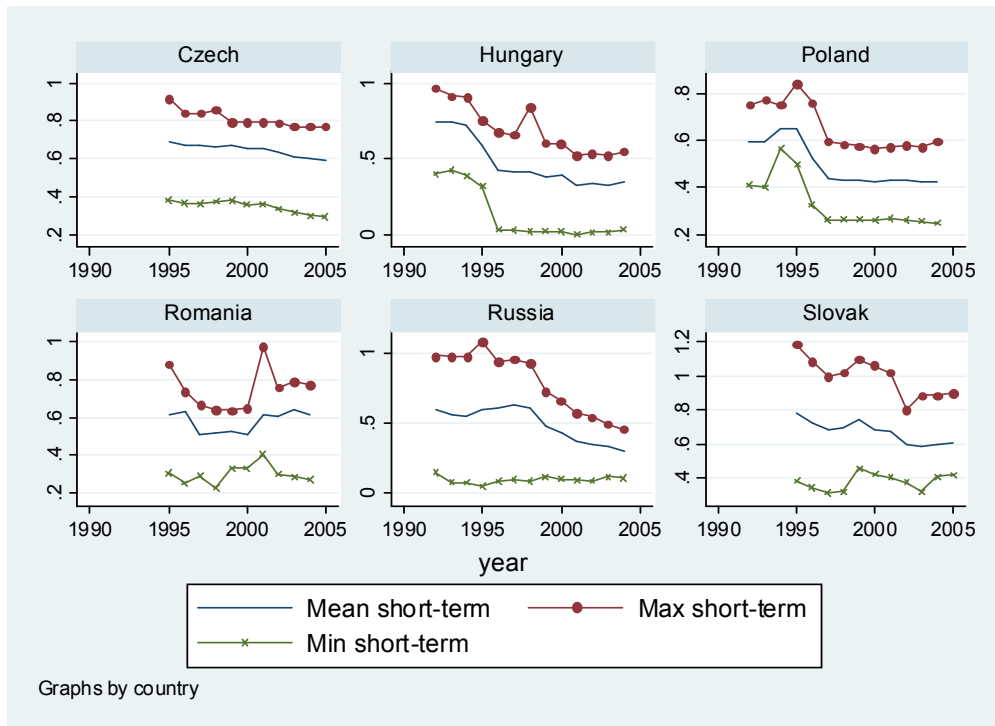


Figure 6a: Correlations of unemployment and unemployment benefits

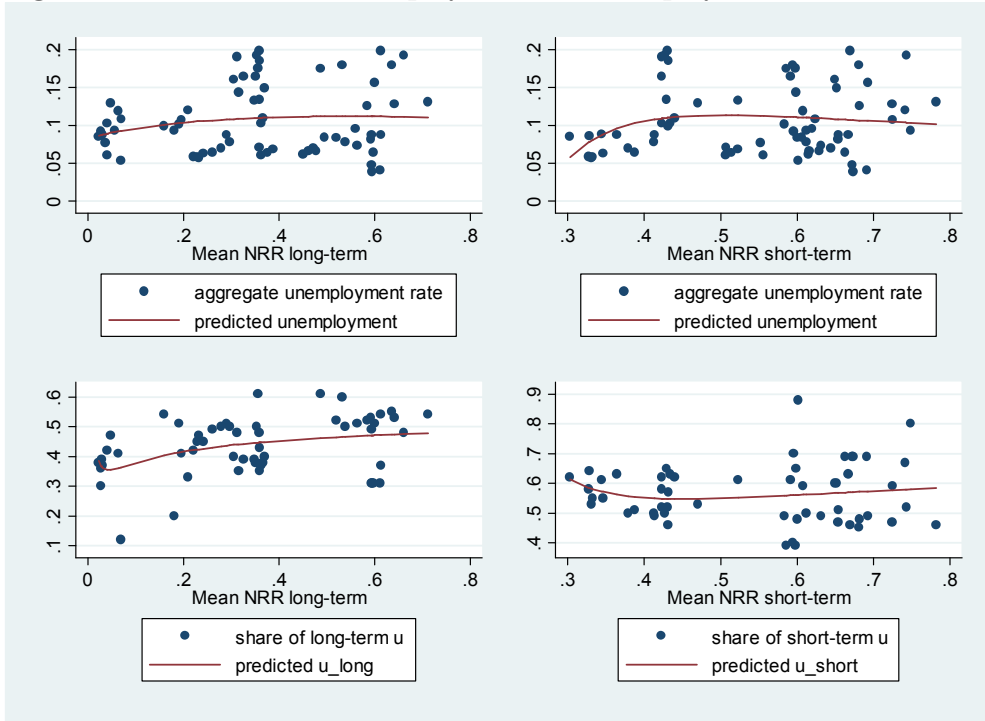


Figure 6b: Correlations of demeaned unemployment and unemployment benefits

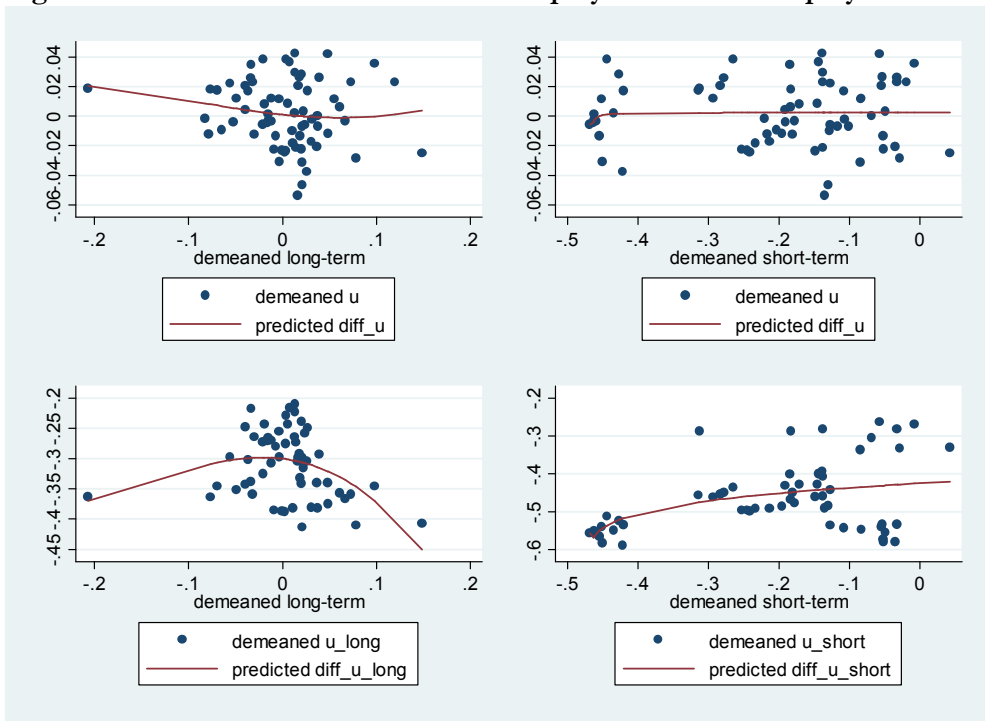


Figure 7: Hungary -predicted flows and by receipt of benefit (UI, UA, Disability)

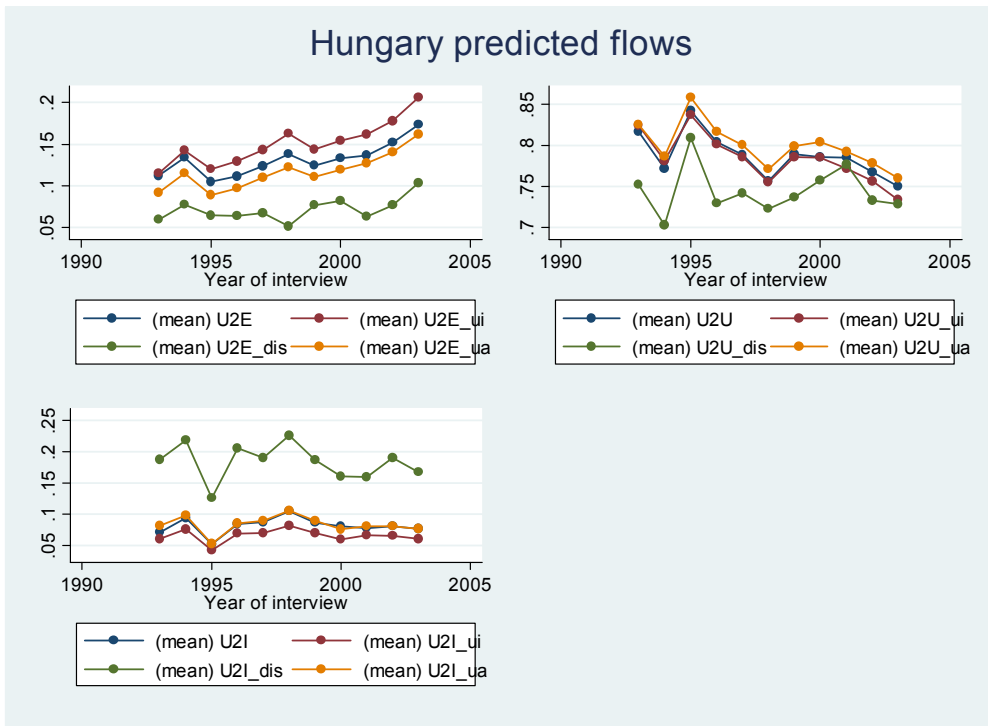


Figure 8: Czech Republic - predicted flows and by registration for unemployment benefits

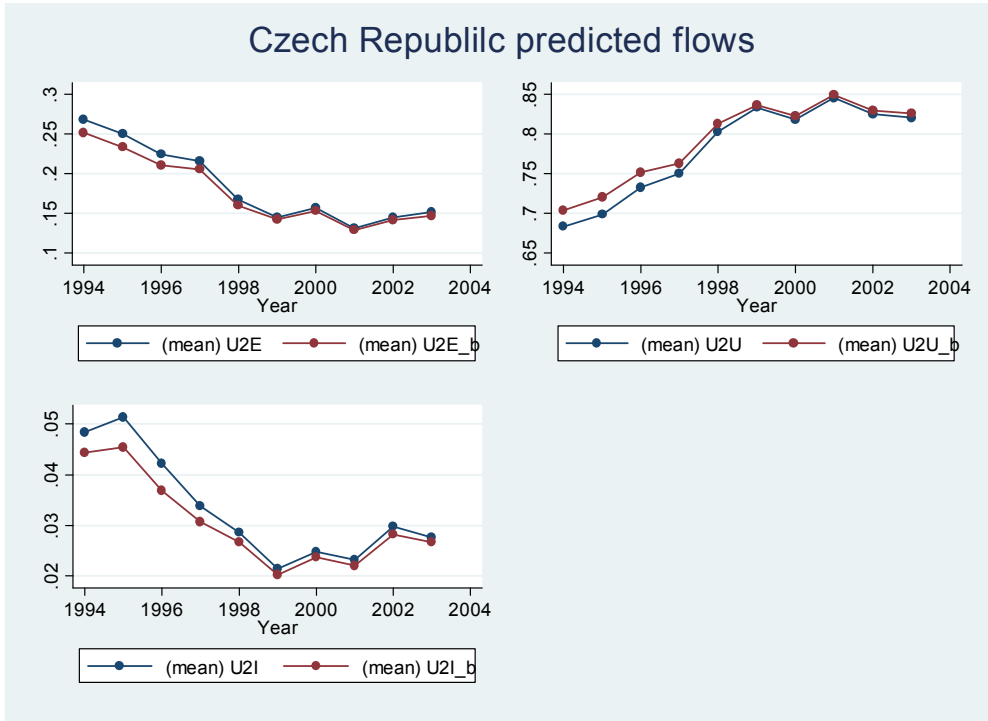


Figure 9: Poland – predicted flows and by registration for unemployment benefit

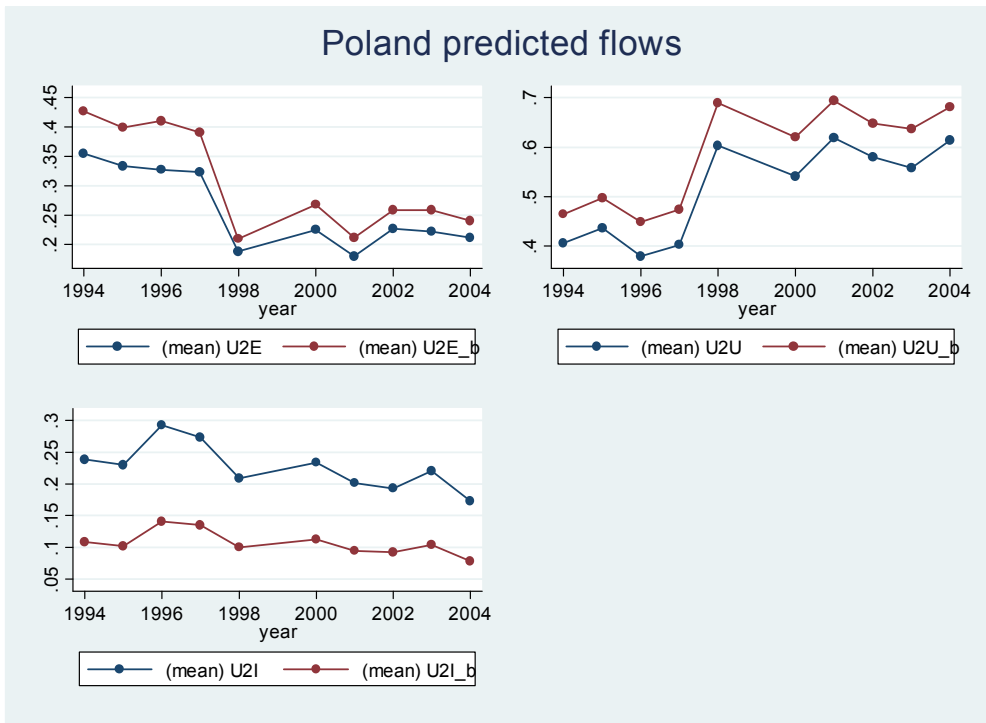


Table 1: LFS Descriptive statistics

	Poland		Hungary		Czech Republic	
	Mean	Std. Div	Mean	Std. Div	Mean	Std. Div
15-24	0.12	0.33	0.11	0.31	0.17	0.38
25-39	0.45	0.50	0.45	0.50	0.39	0.49
40-54	0.39	0.49	0.40	0.49	0.37	0.48
55-64	0.04	0.20	0.04	0.20	0.06	0.24
higher	0.03	0.17	0.04	0.19	0.03	0.16
secondary	0.09	0.28	0.20	0.40	0.22	0.41
vocational	0.65	0.48	0.38	0.48	0.49	0.50
primary	0.23	0.42	0.39	0.49	0.26	0.44
0-3m	0.17	0.38	0.13	0.33	0.22	0.41
3-6m	0.21	0.41	0.14	0.35	0.18	0.38
6-12m	0.26	0.44	0.22	0.41	0.23	0.42
12+	0.36	0.48	0.52	0.50	0.38	0.48
agriculture	0.07	0.26	0.11	0.32	0.06	0.24
construction	0.15	0.36	0.11	0.31	0.10	0.31
trade	0.18	0.39	0.16	0.37	0.16	0.37
services	0.12	0.32	0.09	0.29	0.13	0.34
public	0.15	0.36	0.17	0.37	0.16	0.36
manufacturing	0.32	0.16	0.36	0.48	0.38	0.49
Professional	0.02	0.16	0.02	0.14	0.12	0.33
Managerial	0.15	0.35	0.02	0.14	0.02	0.13
Skilled non- manual	0.60	0.49	0.41	0.49	0.26	0.44
Skilled manual	0.20	0.40	0.13	0.34	0.24	0.43
Unskilled	0.02	0.15	0.42	0.49	0.36	0.48
N	12755		53197		48673	

Table 2: Summary of labour market transitions

	Poland (1993-2004)	Czech Republic(1994-2004)	Hungary(1993-2003)
E→E	↑	+/-	+/-
E→U	↓	+/-	↓
E→I	↓	↓	↓
U→E	↓	↓	↑
U→U	↑	↑	↓
U→I	↓	↓	+/-
I→E	↓	↓	+/-
I→U	↓	+/-	↓
I→I	↑	↑	+/-

Source: Various rounds of country LFS data, full tables are available from the authors on request

Table 3: Multinomial regression – unemployment to employment

	Pooled U2E	1993 U2E	1994 U2E	1995 U2E	1996 U2E	1997 U2E	1998 U2E	1999 U2E	2000 U2E	2001 U2E	2002 U2E	2003 U2E	2004 U2E
Czech													
NRR	-0.003 -0.56			-0.0105 -0.48	0.0141 -0.62	-0.0017 -0.08	0.0017 -0.11	-0.0041 -0.3	0.0086 -0.54	0.0144 -0.94	0.039 (2.24)**	0.0375 (1.92)*	
Registered	-0.0119 (2.86)***			-0.0155 -0.92	0.0072 -0.43	-0.0053 -0.36	-0.0193 (1.73)*	-0.0186 (1.76)*	-0.0063 -0.49	-0.0046 -0.38	-0.0044 -0.35	0.0051 -0.01	
NRR	0.0636 (5.81)***			0.049 -0.9	0.0328 -0.57	0.0272 -0.58	0.1214 (3.78)***	0.052 (2.13)**	0.0343 -1.42	0.0469 (1.99)**	0.1176 (4.29)***	0.0691 (1.70)*	
Registered	-0.0531 (6.29)***			-0.0504 -1.19	-0.0153 -0.35	-0.0239 -0.67	-0.1016 (4.13)***	-0.0531 (2.73)***	-0.0279 -1.39	-0.0338 (1.78)*	-0.0755 (3.61)***	-0.0355 -1.2	
Hungary													
NRR	0.0077 -1.5	-0.0082 -0.69	0.0102 -0.73	0.0012 -0.09	0.0141 -0.8	-0.0118 -0.56	0.0403 (2.50)**	-0.0312 (1.77)*	0.0514 (2.58)**	0.0353 -1.58	0.0533 (2.01)**	0.014 -0.51	
NRR	0.0038 -0.72	-0.0111 -0.91	0.005 -0.36	-0.0036 -0.27	0.0142 -0.79	-0.0194 -0.92	0.04 (2.44)**	-0.0326 (1.83)*	0.0443 (2.22)**	0.0315 -1.4	0.0528 (1.97)**	0.0093 -0.33	
Pension	-0.0101 -0.64	0.0576 -1.45	-0.0145 -0.26	-0.0419 -0.8	-0.0159 -0.3	-0.048 -0.74	0.0659 -1.39	0.0134 -0.3	-0.152 (1.66)*	0.052 -0.98	0.0123 -0.16	0.0324 -0.66	
Disability	-0.0579 (4.38)***	-0.1529 (2.26)**	-0.1142 (1.90)*	-0.1066 (1.88)*	0.0183 -0.44	-0.106 (1.90)*	-0.0166 -0.51	-0.0242 -0.75	-0.0637 -1.39	-0.0689 -1.59	-0.006 -0.14	-0.0592 -1.43	
UI	0.0029 -0.84	-0.0095 -0.87	0.0018 -0.14	-0.0047 -0.48	0.0022 -0.19	-0.0209 (1.71)*	0.028 (2.80)***	-0.0209 (2.03)**	0.0164 -1.41	0.015 -1.22	0.006 -0.42	0.0056 -0.41	
UA	-0.0002 -0.06	-0.0252 -1.2	-0.0286 (1.67)*	-0.0117 -1	0.0099 -0.8	-0.0199 -1.52	0.0086 -0.78	-0.0003 -0.03	0.0181 -1.44	-0.0017 -0.13	0.0211 -1.29	-0.0272 -1.61	
Child care	0.0042 -0.37	0.0013 -0.04	-0.0052 -0.12	-0.0057 -0.2	0.0205 -0.6	-0.032 -0.69	0.0359 -1.11	-0.0547 -1.21	-0.0347 -0.69	0.0439 -1.22	-0.0113 -0.21	0.134 (3.07)***	
Pension	-0.0102 -0.65	0.0578 -1.45	-0.0195 -0.35	-0.045 -0.86	-0.0174 -0.32	-0.055 -0.85	0.0653 -1.38	0.0148 -0.33	-0.1541 (1.68)*	0.05 -0.94	0.0067 -0.09	0.0299 -0.61	
Disability	-0.0581 (4.39)***	-0.1536 (2.27)**	-0.1182 (1.96)**	0.11 (1.94)*	0.0177 -0.43	-0.1131 (2.02)**	-0.0173 -0.53	-0.0223 -0.69	-0.0652 -1.42	-0.072 (1.66)*	-0.0092 -0.21	-0.0634 -1.54	
Poland													
NRR	0.0622 -1.61		0.1191 -1.11	0.0337 -0.33	0.0996 -1	0.4592 (2.48)**	0.3107 -1.14		-0.2175 -1.19	-0.0752 -0.52	0.0563 -0.25	0.1372 -0.78	0.1193 -0.81
Registered	0.0596 (5.87)***		0.0861 (2.67)***	0.0675 (2.02)**	0.099 (2.73)***	0.1019 (2.88)***	-0.0198 -0.53		0.079 (2.65)***	0.0356 -1.43	0.1193 (3.06)***	0.0641 (2.15)**	-0.016 -0.56
NRR	0.0296 -0.76		0.1361 -1.28	-0.0002 0	-0.0083 -0.08	0.3604 (1.90)*	0.3444 -1.27		-0.326 (1.75)*	-0.1031 -0.7	-0.012 -0.05	0.0848 -0.48	0.1321 -0.88
Registered	0.0586 (5.73)***		0.0884 (2.74)***	0.0681 (2.01)**	0.1001 (2.60)***	0.0881 (2.43)**	-0.0306 -0.42		0.0878 (2.91)***	0.0375 -1.5	0.1194 (3.04)***	0.0615 (2.05)**	-0.0187 -0.66

Note: Control variables include age, occupation, education, sex, region, duration of unemployment, dummies for quarter and years (in the pooled regression). All variables have been standardised across countries to ensure comparability. *significance level 10% **significance level 5%

Table 4: Multinomial regression – unemployment to inactivity

	Pooled U2I	1993 U2I	1994 U2I	1995 U2I	1996 U2I	1997 U2I	1998 U2I	1999 U2I	2000 U2I	2001 U2I	2002 U2I	2003 U2I	2004 U2I
Czech													
NRR	-0.0074 (3.14)***			-0.0183 (1.84)*	0.0005 -0.16	-0.0059 -0.77	-0.0036 -0.58	-0.0042 -0.84	0.0029 -0.52	0.0023 -0.36	-0.0141 (1.75)*	-0.0004 -0.04	
Registered	-0.0035 (1.97)**			-0.0147 (1.98)**	0.0008 -0.23	-0.0023 -0.42	-0.0016 -0.34	-0.0017 -0.46	0.0028 -0.63	-0.0005 -0.11	-0.0106 (2.04)**	-0.0003 -0.09	
NRR	-0.0039 -0.76			-0.0025 -0.1	-0.0025 -0.13	-0.0176 -0.94	-0.0091 -0.66	-0.0086 -0.88	0.0004 -0.04	0.0074 -0.73	-0.0025 -0.17	0.0003 -0.14	
Registered	-0.0006 -0.17			-0.0129 -0.66	0.0024 -0.22	0.0093 -0.69	0.0044 -0.44	0.0037 -0.52	0.0026 -0.38	-0.0049 -0.64	-0.0091 -0.92	-0.0004 -0.16	
Hungary													
NRR	-0.0287 (7.14)***	-0.0302 (3.34)***	-0.0208 (1.99)**	-0.0019 -0.21	-0.0419 (3.53)***	-0.0599 (3.26)***	-0.0455 (3.05)***	-0.0275 (1.98)**	-0.0025 -0.17	-0.0273 -1.56	-0.0319 (1.66)*	0.0063 -0.34	
NRR	-0.019 (4.57)***	-0.0217 (2.17)**	-0.0141 -1.28	0.0069 -0.75	-0.0357 (2.90)***	-0.0578 (3.08)***	-0.0258 (1.68)*	-0.0192 -1.35	0.0096 -0.66	-0.0229 -1.29	-0.024 -1.23	0.0209 -1.11	
Pension	0.0345 (4.81)***	0.0151 -0.78	0.0328 -1.33	0.0324 (2.18)**	0.0232 -1.19	-0.0423 -1.17	0.0509 (2.03)**	0.0375 -1.46	0.0723 (3.34)***	0.0623 (2.34)**	-0.0068 -0.18	0.0425 (1.77)*	
Disability	0.0558 (10.00)***	0.0569 (3.17)***	0.0509 (2.10)**	0.0518 (3.74)***	0.039 (2.05)**	0.0407 (1.80)*	0.0927 (5.58)***	0.0439 (2.60)***	0.054 (3.36)***	0.0084 -0.39	0.0488 (2.65)***	0.0578 (3.66)***	
UI	-0.0189 (6.44)***	-0.0214 (2.42)**	-0.0247 (2.41)**	0.0062 -0.93	-0.0259 (3.13)***	-0.0423 (3.72)***	-0.0381 (3.78)***	-0.0168 (1.90)*	-0.0063 -0.69	-0.0024 -0.25	-0.0339 (3.02)***	0.0032 -0.33	
UA	-0.0045 -1.5	-0.0005 -0.04	0.0041 -0.33	-0.0067 -0.89	-0.0132 (1.68)*	-0.0293 (2.74)***	-0.0015 -0.16	-0.0023 -0.29	0.0075 -0.89	-0.0155 -1.54	-0.0033 -0.32	0.0081 -0.78	
Child care	0.0413 (5.89)***	0.0215 -0.87	0.0228 -0.85	0.0487 (3.58)***	0.035 (1.76)*	0.0489 (2.04)**	0.0574 (2.59)***	0.0428 (2.15)**	0.0136 -0.47	-0.0319 -0.88	0.0697 (2.90)***	0.0727 (3.01)***	
Pension	0.0342 (4.79)***	0.0137 -0.7	0.0276 -1.12	0.0321 (2.18)**	0.023 -1.19	-0.0467 -1.31	0.0525 (2.12)**	0.0381 -1.49	0.0712 (3.29)***	0.0617 (2.32)**	-0.0073 -0.2	0.0425 (1.77)*	
Disability	0.0552 (9.88)***	0.0565 (3.14)***	0.047 (1.96)*	0.0491 (3.58)***	0.0383 (2.02)**	0.0364 -1.63	0.0926 (5.57)***	0.0453 (2.68)***	0.0532 (3.31)***	0.0082 -0.38	0.0466 (2.57)**	0.0578 (3.64)***	
Poland													
NRR	-0.0683 (2.55)**		-0.0814 -1.17	-0.1252 (1.81)*	-0.1053 -1.39	-0.1556 -1.21	-0.1361 (2.19)**		-0.2724 (2.08)**	-0.12 -1.23	-0.1667 -1.4	-0.4378 (3.81)***	0.1827 (2.67)***
Registered	-0.0789 (12.85)***		-0.0673 (3.73)***	-0.065 (3.40)***	-0.1283 (5.62)***	-0.0673 (2.84)***	-0.0057 -0.76		-0.1083 (6.08)***	-0.0838 (5.67)***	-0.0442 (2.29)**	-0.0783 (4.80)***	-0.0499 (3.90)***
NRR	-0.0167 -0.63		-0.0902 -1.28	-0.0919 -1.31	0.0514 -0.64	-0.0842 -0.65	-0.1199 (2.12)**		-0.1192 -0.93	-0.0614 -0.65	-0.1417 -1.22	-0.37 (3.32)***	0.1965 (3.00)***
Registered	-0.0782 (12.56)***		-0.068 (3.77)***	-0.0603 (3.13)***	-0.1345 (5.41)***	-0.0639 -0.79	-0.0022 0		-0.1045 (5.73)***	-0.0826 (5.56)***	-0.0419 (2.19)**	-0.0698 (4.36)***	-0.0532 (4.15)***

Note: Control variables include age, occupation, education, sex, region, duration of unemployment, dummies for quarter and years (in the pooled regression). All variables have been standardised across countries to ensure comparability. *significance level 10% **significance level 5%