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Unemployment in East and West Europe

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UNEMPLOYMENT IN EAST AND WEST EUROPE⁺

1. Introduction

Almost two decades after the fall of the Berlin Wall, unemployment is still a major problem in the post communist economies of the former Soviet bloc and Yugoslavia, including the new members of the European Union (EU). High unemployment has also been a long-term, protracted issue in much of Western Europe. The question hence arises as to whether the nature of the problem is different or whether high unemployment is generated by similar underlying forces.

In Central-East Europe, three hypotheses have emerged as leading explanations for the phenomenon, namely that high unemployment is the result of a) macroeconomic policies or major external shocks, b) problems related to the economic structures of these countries, and c) unfinished transition from plan to market. The discussion parallels that in Western Europe, where the focus in explaining unemployment has been on the relative importance of a) aggregate demand shocks, b) structural (mismatch) shocks and c) hysteresis. The appropriate policies for alleviating unemployment obviously depend on identifying the nature of the problem.

In this paper, we use new data to address this issue, taking into account the theoretical and applied literature on unemployment and vacancies. Our strategy is to compare the evolution of unemployment and related phenomena in four different transition economies and one geographically close West European market economy. In particular, we use 1991-2005 *panel data* on the unemployed U , vacancies V , inflow S into unemployment, and outflow O from unemployment in five former communist economies that are now members of the EU (the Czech Republic, Hungary, Poland, Slovakia, and eastern part of Germany – hereafter “East Germany”) and in the western part of Germany (a benchmark western economy – hereafter “West Germany”) to examine the evolution of unemployment together with that of inflows into unemployment and vacancies. The comparison of the transition economies with an otherwise similar and spatially close market economy is useful because it enables us to identify the main differences

and similarities in the evolution of the key variables, and thus draw conclusions as to whether different or similar factors are work.

From an analytical standpoint we are also comparing an interesting set of transition economies. East Germany, Czech Republic and Slovakia were until the end of communism close adherents to the centrally planned, state-ownership system, with East Germany subsequently merging with a mature market economy (our benchmark) and its functioning institutions and the Czech and Slovak republics pursuing an independent path developing market institutions from scratch. In contrast, communist Hungary and (to a lesser extent) Poland had already introduced some market oriented reforms and Poland had a non-negligible private sector (especially in agriculture) throughout the communist era. We are hence able to assess if the outcomes differ systematically with the diverse initial conditions and subsequent paths.

In order to introduce the main phenomena, in Table 1 we provide time series statistics on GDP, unemployment, inflow, outflow and vacancies in the six economies. In the left panel of the table we give the real GDP growth, as well as unemployment, inflow and vacancies expressed as a share of the labor force in each country. In the right panel we provide the inflow rate, outflow rate and U/V ratio (a commonly used measure of labor market tightness). The inflow rate is expressed as inflow into unemployment relative to total employment, while the outflow rate is given by outflow divided by the number of unemployed.

As may be seen from the table, all countries went through an economic downturn in the early 1990s, although its timing, duration and severity varied across the countries. The Czech Republic also experienced market type recession in the late 1990s and West Germany in the early 2000s. The six economies differ markedly in terms of their unemployment, flows and vacancy levels and rates.¹ West Germany is in the intermediate range, displaying between 1991 and 2005 an unemployment rate that

¹ Numbers presented are country aggregates based on a district level database. Because some districts for some countries are excluded from our analysis due to changes of district borders, unemployment data in Table 1 may differ slightly from

increases from 5% to 10%, inflow rate that rises from 0.9% to 1.6%, outflow rate that declines from 17-24% to 10-11%, and a vacancy rate (as a share of the labor force) that varies between 0.7% and 1.4%. The changes in these variables occur mostly in two waves, reflecting the business cycles and possibly also a shift toward a service economy with higher natural labor turnover. East Germany, in contrast, registers an unemployment rate rising to 18.6%, inflow as a share of the labor force rate almost doubling from already high level of 1.5% to 2.5 %, outflow rate fluctuating around 13-14% since the mid 1990s, and a vacancy rate rising from 0.4% in 1991 to about 1% in the late 1990s and remaining at that level in the 2000s. For most of the 1991-2005 period, the East German part of the German economy hence displays a very high unemployment rate that reflects the extraordinarily high inflow rate. Note, however, that East Germany has lower outflow rates relative to the number of unemployed and a similar vacancy rate as the Western part of Germany. The East German economy therefore operates with a higher unemployment rate in the presence of very sizable active labor market policies that lead to relatively high outflows out of unemployment, but unfortunately do not prevent high (subsequent) inflows into unemployment. Slovakia and Poland represent two transition economies that, like East Germany, operate with very high unemployment rates but, unlike East Germany, have not experienced an administratively set high wage level and cross-border subsidies. For most of the 1990s and 2000s, these two economies have experienced an unemployment rate in the 14% to 20% range, accompanied by relatively high inflow (1.2-1.3% of the labor force) and low outflow rate (most of the time staying below 10%). In most years, they have also had vacancy shares significantly below 1% of the labor force. The Czech Republic is an intermediate case, with unemployment rising from the low rate of 3-4% in the early-to-mid 1990s to 8-10% range since then. Its inflow rate has risen from extraordinarily low levels of about 0.6-0.8% in the early-to-mid 1990s to a still relatively low level of 1.1-1.2% since then while the outflow rate declined from high levels of about 17.2-24.1% to more common levels 10.3-12.4%. Its vacancy share has declined

the official aggregate statistics.

from very high levels 1.4-1.9% in the early-to-mid 1990s to 0.8-1.1% since then. Finally, Hungary has achieved the lowest and rather steady level of unemployment. After reaching an unemployment rate of about 11% on the mid-to-late 1990s, Hungary has succeeded to lower the rate to around 8% in the mid 2000s, reduced its inflow rate to 1.4%, raised the outflow rate to 14-16% and kept the vacancy share at 1.0-1.1%. Hungary's success is hence brought about by keeping the outflow rate relatively high and inflow rate relatively low.

In view of this background, one could analyze the unemployment issue of the transition (new EU member) economies relative to that of mature market economies (e.g., West Germany) by examining the relationship between aggregate economic activity on one hand and unemployment and its dynamics on the other hand by focusing on either inflows (job destruction in firms) or outflows (matching of the unemployed and vacancies). In the present paper we focus on GDP, inflows and shifts in unemployment and vacancies. In a companion paper (Münich and Svejnar, 2006) we use newly collected district-level data on individuals and vacancies to identify the extent to which the countries exhibit different levels of efficiency in matching.

The paper is structured as follows: We start in Section 2 by presenting a conceptual stylized framework of a Beveridge curve and the vacancy supply curve. Related to this framework, we present in Section 3 evidence on shifts in unemployment and vacancies. In Section 4 we discuss the role of labor turnover (inflow into unemployment) in economic adjustments, while in Section 5 we assess the importance of transition-related shocks relative to shocks experienced by a market economy such as West Germany. We conclude in Section 6.

2. The Conceptual Framework

Since the conventional labor demand and supply framework does not lend itself easily to explaining the coexistence of unemployment and vacancies, we use the framework outlined by Jackman,

Pissarides and Savouri (1990), whereby any given outcome in the unemployment-vacancy (U-V) space may be seen as an intersection of the Beveridge (UV) curve and the vacancy supply (VS) curve (see Graph 1). The Beveridge curve characterizes labor market equilibrium in the sense that unemployment exists (the unemployed and vacancies do not match instantaneously) and the flow into unemployment is equal to the flow out of unemployment. The Beveridge curve is negatively sloped because the supply of more vacancies implies lower unemployment. Points above the UV curve represent situations in which there are too many vacancies for the number of unemployed and unemployment is therefore falling. Conversely, points below the UV curve reflect too few vacancies relative to the number of unemployed and unemployment is rising. The VS curve in turn maps combinations of unemployment and vacancies that reflect the employment and wage setting behavior of firms and workers. The intersection of the UV and VS curves then gives the equilibrium rate of unemployment and vacancies. The advantage of this framework is that it relies on relatively well measured economic indicators for which we have long and consistent time series and which are comparable across the countries that we study.

< Graph 1: about here >

In line with the three hypotheses advanced in the context of the transition and West European labor markets, one can distinguish three types of shifts in the U-V space as shown on Graph 1: a) aggregate demand shocks, b) structural (mismatch) shocks and c) hysteresis. The aggregate demand shocks (denoted a) shift the VS curve, with adverse shocks shifting the VS curve down (to the right). These shocks may be of various types, including (i) fiscal/ monetary internal shocks or external exchange rate and oil shocks and (ii) wage pressure (e.g., increase in trade union power or higher taxation of labor). The structural shocks (denoted b) in turn lead to outward shifts to the right of the UV curve because of structural changes such as sectoral shifts in the demand for final output, increase in mismatch between the unemployed and vacancies or reduced intensity of search among the unemployed. It has been argued that these shifts are more pronounced in transitional countries during the early years of the transition.

Hysteresis appears when an adverse aggregate demand shock (rightward shift in the VS curve) is accompanied or followed by irreversible adverse structural shocks (rightward shifts in the UV curve) such that the economy does not return back to its original position (A in Graph 1) when the adverse demand shock recedes, but ends up at point D in Graph 1. This could be brought about by long term unemployed losing their skills or reducing search effort resulting in declining propensity of their matching, firms streamlining their employment (re-hiring) practices after a demand shock or a number of similar factors.

3. Evidence on Shifts in Unemployment and Vacancies

The West German U-V scatter in Figure 1a suggests that during 1991-2005 this benchmark European market economy was still suffering from the hysteresis that it and several other West European countries had experienced already during 1970's and 1980s (Jackman et al., 1990). In particular, West Germany experienced a rightward shift of the VS curve in the early 1990s and early 2000s recessions, followed by a hysteretic shift to the right of the UV curve in the mid 1990s and mid 2000s.² Symmetrically to the rightward shifts of the VS curve in the early 1990s and 2000s, the VS curve shifted to the left in the 1997-2000 period of relative boom. An important aspect of these developments is the fact that West German labor turnover almost doubled during the 1991-2005 period. Taking this into account, it appears that the hysteresis observed in 1991-2005 is largely due to structural shocks brought about by sectoral shifts in the demand for final output (a shift from manufacturing toward services with a higher natural turnover rate).

An analysis of the U-V space data paths in the transition economies of Central-East Europe suggests that during the 1991-2005 period these countries also experienced aggregate demand shocks,

² The hysteresis of the 1990s may be observed from the fact that when demand recovered mid-to-late 1990s and the vacancy rate rose above its 1991 value, the unemployment rate declined only slightly and did not approach the low rates

structural shocks and hysteresis. What differed across these economies, and relative to West Germany, was the relative size and timing of these events. The comparison of Slovakia and the Czech Republic in Figure 1b is particularly telling, given that until 1993 the two republics shared the same laws, institutions and currency (see Ham, Svejnar and Terrell, 1998, and Basu, Estrin and Svejnar, 2005). The Figure confirms the message from Table 1, namely that Slovakia experienced a deeper and somewhat faster economic downturn than the Czech Republic immediately after the Velvet Revolution of 1989. The Slovak VS curve shifted down to the right already by 1991, while it remained high in the north-west in the Czech Republic. In the 1990s, Slovakia experienced outward shifts of the UV curve, while the Czech Republic's VS curve shifted right during its recession in the late 1990s. In the 2000s, the Czech Republic suffered an outward shift in the UV curve, while a wave of important reforms enabled Slovakia to reduce unemployment (reducing inflows and raising outflows) while keeping vacancies more or less constant. The Czech Republic hence benefited from a rapid rise in vacancies at the start of the transition, but then followed in a milder form the pattern observed in Slovakia a few years earlier. Given the lower initial aggregate demand in Slovakia, the early rise in the unemployment rate was much greater there than in the Czech Republic. The data in Table 1 and the shifts in the UV space in Figure 1b hence suggest that the difference between the double digit unemployment rate in Slovakia and the 3-4% rate in the Czech Republic in the early-to-mid 1990s can be explained to a large extent by the much greater initial economic downturn in Slovakia. Another factor that has contributed to the differential unemployment rate in the two countries is the higher proportion of Romany population in total population in Slovakia than the Czech Republic, with the Romanies experiencing considerably above average unemployment rates in both countries.

Throughout the 1990s the East German shifts in the U-V space, presented in Figure 1a, were qualitatively similar to those in the Slovak Republic except that some of the standard shifts were

camouflaged by the massive government interventions in the labor market. In particular, because of the sizable West-East German financial transfers, the authorities in East Germany were in a position to allocate much greater resources than other governments to active labor market policies (ALMPs) that emphasized retraining of the unemployed. Hence, while the 1998 ALMP/GDP expenditure ratio was 0.13% in the Czech Republic, 0.39% in Hungary and 0.44% in Poland, it was 1.26% in Germany as a whole, with the eastern lands receiving higher per capita allocations than the western lands.³ As may be seen from the figure, except for the late 1990s and early 2000s when the VS curve shifted to the right, the East German economy suffered from a relatively continuous outward shift of the UV curve between 1991 and 1998, driven by a dramatically rising inflow into unemployment and growing structural problems.

Hungary and Poland, as we mentioned earlier, started the transition with some elements of private property and market economy. In Hungary, we have data from 1995 onward (Figure 1c). In the 1995-96 period of slow economic growth we observe some hysteresis as the UV curve shifts outward. This is followed by a leftward shift in the VS curve during the 1997-1999 period of relatively strong growth. Between 2000 and 2002 one observes the UV curve shifting in and then out during the 2002-2004 period, reflecting (with a short delay) the rapid economic growth at the turn of the century and a slowdown in 2002-2003. Compared to the Czech and Slovak republics (but not East Germany), Hungary hence displays more shifts in the UV than VS curve, suggesting that the economy was coping intensively with structural issues and aggregate demand shocks were less important as the GDP growth was relatively steady.

Poland, in part because of the partially private nature of the economy under communism and in part because of the early onset of the transition, had a high unemployment rate (13%) already in 1992. The economy experienced primarily shifts in the UV curve in the 1990s (Figure 1c). In particular, one observes the UV curve shifting out during the 1992-2003 period of relatively slow economic growth,

³ See OECD Employment Outlook (1999).

followed by a very pronounced inward shift in the UV curve during the rapid growth of 1994-1997. In fact, in no other country examined here does one see such a pronounced inward shift in the UV curve as we observe in Poland in the mid 1990s. Institutional evidence indicates that there was another factor contributing to the inward shift in Poland's UV curve, namely an introduction of stricter rules governing the disbursement of unemployment benefits. As Poland's economic growth started slowing down in 1998, the VS curve shifted to the right, together with the UV curve shifting out (hysteresis). This was followed by a leftward shift in the VS curve in the 2000s as the economy started rebounding in the early-to-mid 2000s. Hence, in the 1990s Poland appears to have undergone major structural adjustments associated with the transition, while since the turn of the century it has been resembling a standard market economy with shifts in the VS curve reflecting fluctuations in economic activity and shifts in the UV curve being relatively moderate.

The extent to which the communist economies undertook market oriented reforms and had some private enterprise activities thus appears to have influenced these countries' subsequent restructuring and growth paths. Hungary and Poland were already in part restructured, while Czech and Slovak republics maintained soft budget constraints to prevent bankruptcy of current and former state-owned firms (Lizal and Svejnar, 2002), thus cushioning layoffs. Similarly, the merger of East and West Germany, accompanied by the rapidly rising labor cost and other specific policies in East Germany, resulted in major negative shocks and hysteresis in the East German economy.

4. The Role of Labor Turnover in Economic Adjustments

During the last two decades, the Western part of Germany, like other market economies, has been undergoing significant adjustments in response to globalization. At the firm level, one observes a relatively sizable increase in the labor turnover rate. The corresponding labor market statistic on which analysts focus is the inflow rate into unemployment. As may be seen in Figure 2, the inflow rate in West

Germany increased by two-thirds between 1991 and 2005. While this major upward trend contains some cyclical variation, on the whole it was quite steady. The rise in the inflow rate in market economies such as West Germany appears to be driven in part by a decline of some traditional industries and rise of the service sector, with the former having a lower and the latter a higher rate of turnover. These different rates of turnover in turn seem to be caused by lower competition and greater firm-specific human capital in the declining relative to the rising sectors of the economy. Another part of the explanation for the rising inflow rate is growing international competition and greater frequency of shocks that result in permanently higher rates of job destruction and job creation.

Models of transition from plan to market assume that the turnover (inflow) rate would rise dramatically as the old state sector sheds workers who go through unemployment into new jobs that are being created in the emerging private sector (e.g., Aghion and Blanchard, 1994, Blanchard, 1997, and Castanheira and Roland, 2000). The models predict that the inflow rate would be temporarily very high and gradually decline and approach the level observed in otherwise similar market economies such as West Germany.

Interestingly, data from the five transition economies, presented in Figure 2, indicate that the inflow rate trajectories have been very different from the theoretical scenario. First, except for East Germany (to be discussed presently), none of the transition countries that we study had a considerably higher inflow rate than West Germany during the entire 1991-2005 period. In fact, some of the countries had a lower inflow rate than West Germany for extended periods of time -- the Czech Republic in the early-to-mid 1990s being a notable example. Second, by the mid 2000s the inflow rate in all economies except East Germany converges to a similar range (1.1-1.6). Third, by the mid-2000s the West German inflow rate actually exceeded the rate observed in the Czech Republic, Hungary and Slovakia, and was

similar to that in Poland.⁴

What explains this pattern? Obviously many factors may be at work. One leading hypothesis is that the transition economies experienced significant job-to-job mobility rather than job-to-unemployment flows. This argument has for instance been made by Boeri (1999) and evidence provided by Terrell and Sorm (1999) indicates that in the Czech Republic this flow indeed existed, although it was possibly more moderate than might have been expected. Using a worker survey, München, Svejnar and Terrell (2003) and Jurajda and Terrell (2003) also provide evidence that the majority of worker-firm separations in the Czech Republic were quits rather than layoffs, thus suggesting that these workers moved because they had other jobs rather than because they were forced into unemployment (see also Boeri, Burda and Köllö, 1998 for other evidence).

Another potential explanation is that the amount and speed of restructuring in the transition economies was not as large as theorists expected, relative to restructuring in market economies (see Könings et al. 1996). This could be because the market economies were restructuring substantially in view of globalization, some transition countries such as Hungary and Poland were already in part restructured, and other transition economies such as Czech and Slovak republics proceeded slowly in cutting off current and former state-owned firms from subsidies (Lizal and Svejnar, 2002). Finally, Bruno (1996) argues that the growing opposition to the transition-related aggregate uncertainty has led to the introduction of a particular combination of social welfare policies that have hindered the absorption of workers dismissed in later stages of transition.

As mentioned above, East Germany is a special case. Its inflow rate in the early 1990s was already around 1.6% -- a level that West Germany reached only in the mid-2000s. Moreover, after increasing slowly to about 2% in the early 1990s, the East German inflow rate rose dramatically in the

⁴ The Slovak inflow rate profile has a concave part and it could be argued that it resembles the model prediction. However, the rise occurs only in the late 1990s rather than at the start of the transition in the early 1990s.

mid-1990s, reaching 3% and remaining around that level. Compared to the convergence in inflow rates observed in the other transition economies and West Germany, East Germany hence remains an outlying case.

5. Transition-Related Shocks

Our findings raise the question as to what extent unemployment in transition economies has been brought about by shocks that are related to the specific aggregate and structural policies pursued by these countries in order to effect the transition, and to what extent they reflect shocks that affect otherwise similar market economies. In this section we provide an answer by taking the West German economy as a benchmark and calculating the unemployment rate that each of the transition economies under study would have experienced, had it had the same inflow rate (reflecting the turnover rate) as West Germany during the 1991-2005 period.

Conceptually, it is useful to start by noting that the unemployment rate as a stock variable is determined by the inflow rate into and outflow rate from unemployment, with the variation in the two flows determining unemployment dynamics. In a steady state, inflow equals outflow so that $S = O$ and the steady state unemployment rate, u_r , is given by $u_r = U/LF = 1/(1 + o_r/s_r)$, where $s_r = S/E$ is the steady state inflow rate and $o_r = O/U$ is the steady state outflow rate. We apply this steady state formula, use the actual West German inflow rate for s_r and calculate for each country the hypothetical unemployment rate that would exist if in each year the country had the same inflow rate as West Germany.

In Figure 3 we present for each country the actual and hypothetical unemployment rates. As may be seen from the Figure, had the countries experienced the West German inflow rate, their unemployment rates would have been much more similar than they actually were. Put differently, the different inflow rates across these countries contributed in a major way to the differences in their observed unemployment

rates. The differences are driven particularly by the Czech Republic and East Germany. Had these two economies experienced the West German rate of inflow, the Czech Republic would have in most years had considerably higher unemployment rate, while East Germany would have had much lower unemployment in all years during the 1991-2005 period. Slovakia, would have avoided the build-up of unemployment at the turn of the century, a phenomenon that may have been brought about by delayed restructuring, and in the mid 2000s it would have had a similar unemployment rate as the hypothetical rate of the Czech Republic. Finally, Poland and Hungary are countries where the actual and hypothetical unemployment rates are almost identical because the actual inflow rate in these countries was very similar to the one in the West Germany (see Figure 2). In Poland this occurred despite very sizable fluctuations (between 10% and 20%) in the unemployment rate. In Hungary the two rates register relatively limited fluctuations, with the hypothetical rate showing somewhat more pronounced changes than the actual rate. In this context it is important to reiterate that at the start of the transition, East Germany, Czech Republic and Slovakia were much purer centrally planned economies than Hungary and Poland, with the latter two having already introduced many market oriented reforms and having some private sector. The fact that during the transition the country-specific aggregate policy and restructuring shocks in the latter two countries contributed much less to unemployment than in the three more orthodox ex-communist economies is consistent with these differences in the initial conditions and deserves more research in the future.

6. Conclusions

In the mid-2000s, unemployment is still relatively high and varied in many Western and Central-East European countries. Our examination of the underlying inflow into unemployment, outflow from unemployment and vacancy data suggests that despite diverse initial conditions and subsequent paths, the patterns observed in the western part of Germany (our benchmark market economy) and in the Czech

Republic, Hungary, Poland, and Slovakia are surprisingly similar. All countries have experienced aggregate demand shocks, structural shocks and hysteresis. The eastern part of Germany appears to be a special case because the merger of East and West Germany was accompanied by a rapidly rising labor cost and very active labor market policies in the East. This in turn resulted in dramatically rising inflows and greater hysteresis in the East German economy. Overall, what has differed across these economies is the relative size and timing of these events.

Our analysis suggests that the extent to which the communist economies undertook reforms and had some private enterprise activities before the transition appears to have influenced these countries' subsequent restructuring and growth paths. Thus in Hungary and Poland the country-specific aggregate policy and restructuring shocks contributed much less to unemployment than in the three more orthodox ex-communist economies (Czech Republic, East Germany and Slovakia). Hungary and Poland also showed greater similarities in the inflow (turnover) rate to West Germany -- probably because they were already in part restructured. Despite no initial restructuring, the Czechs and (to a lesser extent) Slovaks in turn showed some similarities to these other economies because they cushioned layoffs by maintaining soft budget constraints for firms. These and other differences in the initial conditions deserve more research in the future. An alternative and possibly complementary hypothesis for the similarities in inflows, also worth further research, is that the transition economies experienced significant job-to-job mobility in addition to job-to-unemployment flows.

One of our most interesting findings is that the inflow rate was rising gradually in the western part of Germany as well as in the Czech Republic, Hungary, Poland, and Slovakia. In the western part of the German economy, as in some other market economies, this seems to reflect increasing adjustments in response to globalization. In the Central-East European transition economies (excluding the eastern part of Germany), contrary to the theoretical models, one does not observe an initially rapid rise in the inflow rate, followed by a decline and convergence of this rate to the levels of market economies. Rather, there

is a relatively gradual rise in the inflow rate towards the level of market economies. Hence, except for East Germany, common factors seem to play an important part in the West and East.

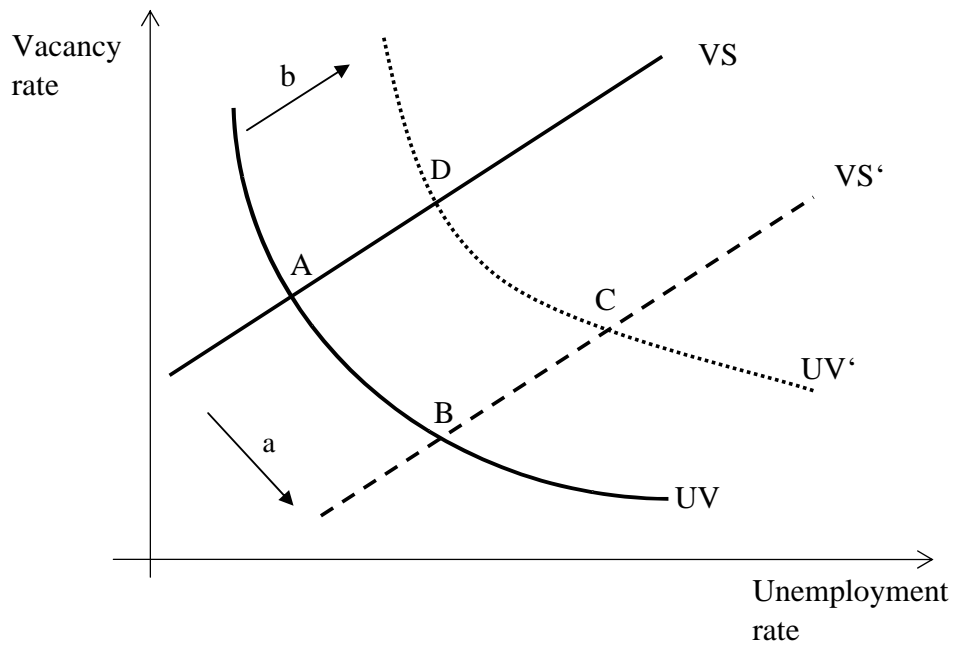
Despite the commonality of gradually growing inflows rates, the differences in the observed unemployment rates among these economies turn out to be attributable to a considerable extent to the actual differences in the inflow rates. Our counterfactual analysis indicates that had all the Central-East European transition countries experienced the West German inflow rate, their unemployment rates would have been relatively similar throughout the entire 1991-2005 period. In fact, since in the 2000s the inflow rate in all the sampled economies except for East Germany converged to the West German rate, there was also convergence in the unemployment rate across all these economies. Moreover, the trajectories in the unemployment-vacancy space observed in the Central-East European countries increasingly resemble those observed in the developed market economies. Interestingly, these similarities arise despite differences in the institutional setting across these economies.

Combining our results with the fact that the Central-East European economies (other than East Germany) have experienced much higher economic growth than West Germany, one obtains the widely noted finding that firms in these countries have been rapidly increasing labor productivity, often without a major net creation of jobs.

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Graph 1: Beveridge, vacancy supply curves and shocks in the U-V space.

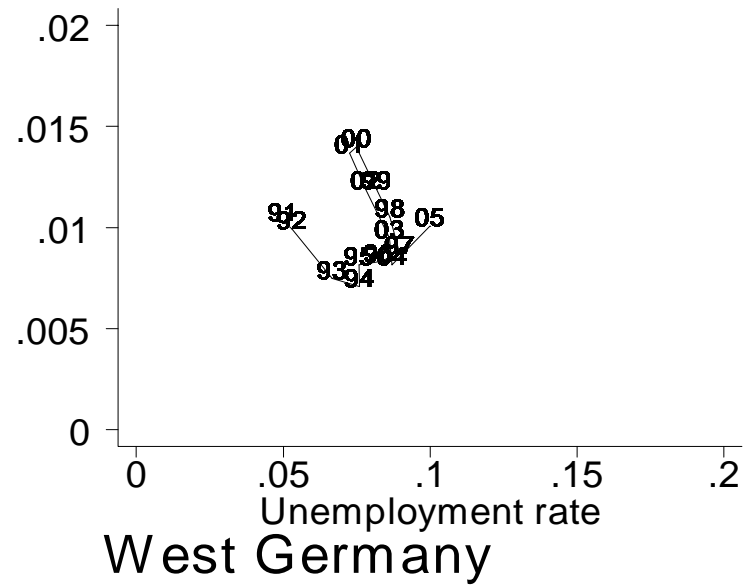
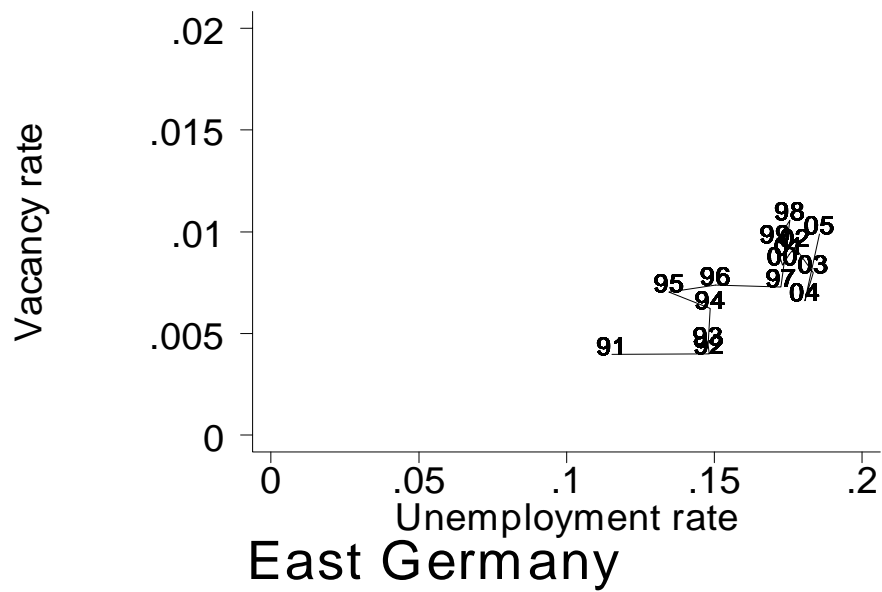


Figure 1a: Empirical trajectories in the unemployment-vacancy space

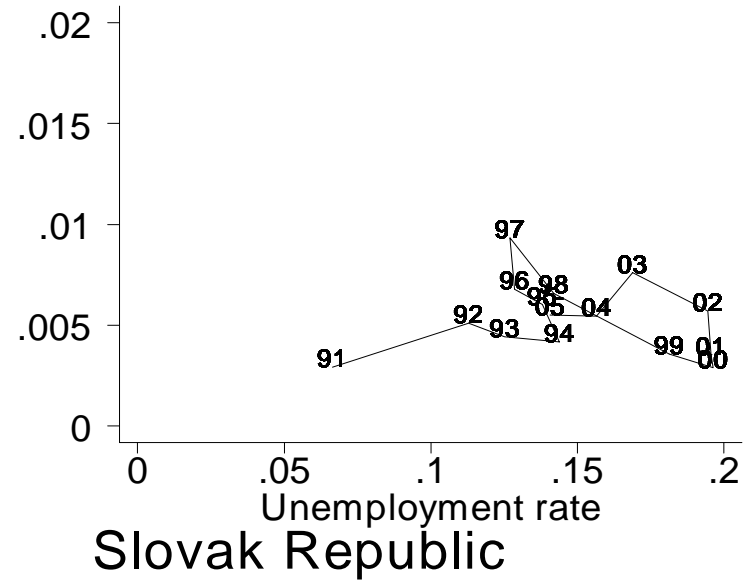
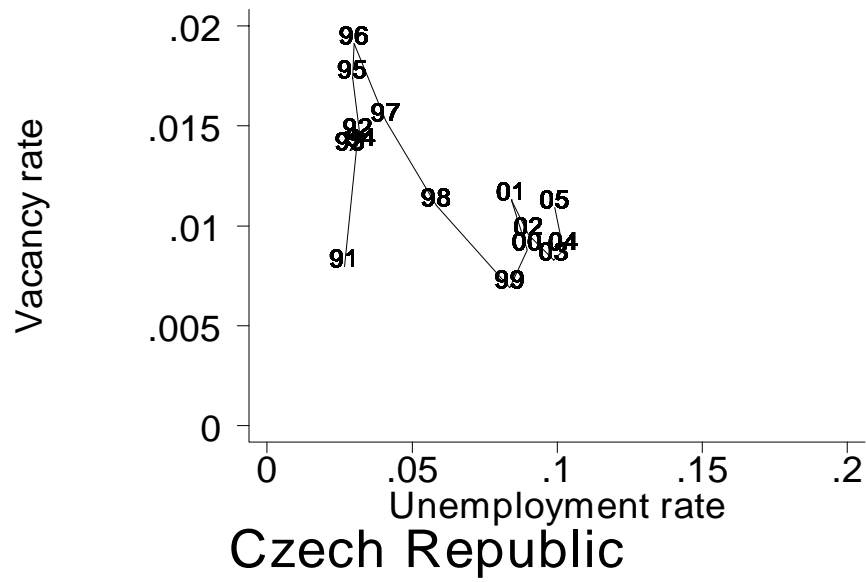


Figure 1b: Empirical trajectories in the unemployment-vacancy space

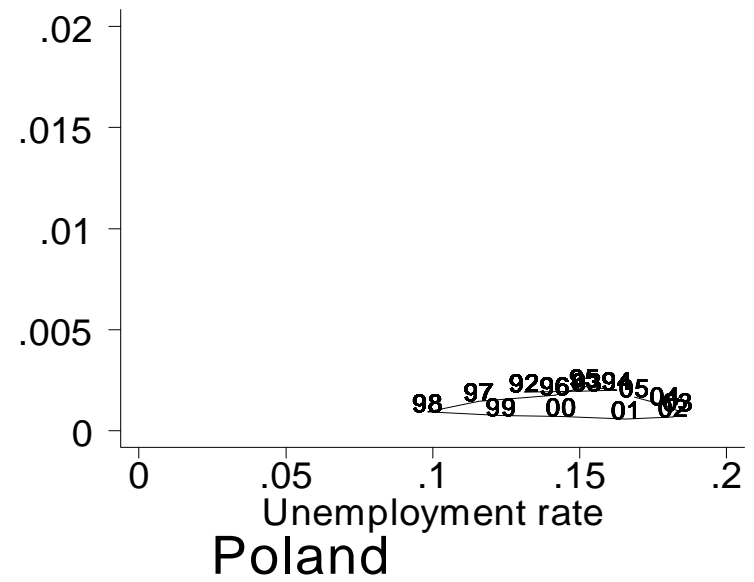
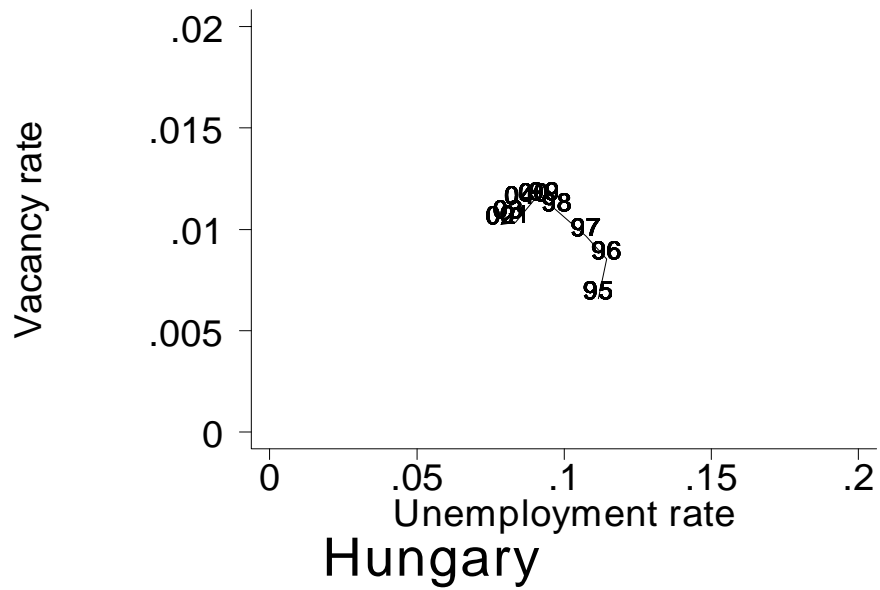


Figure 1c: Empirical trajectories in the unemployment-vacancy space

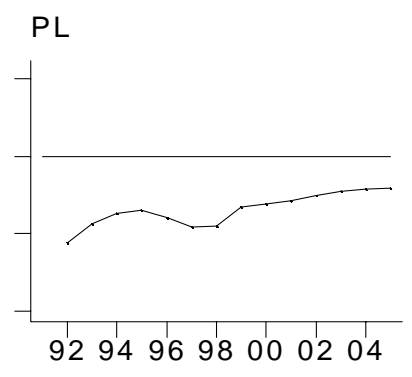
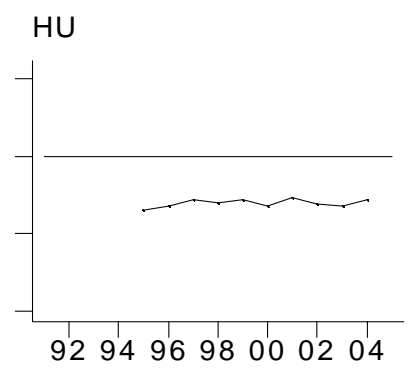
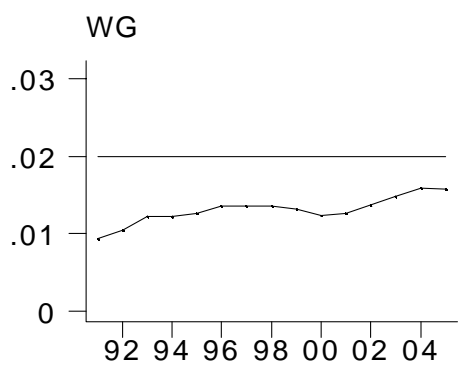
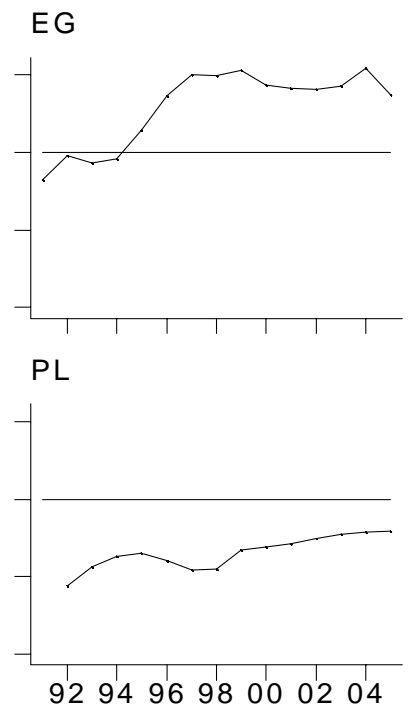
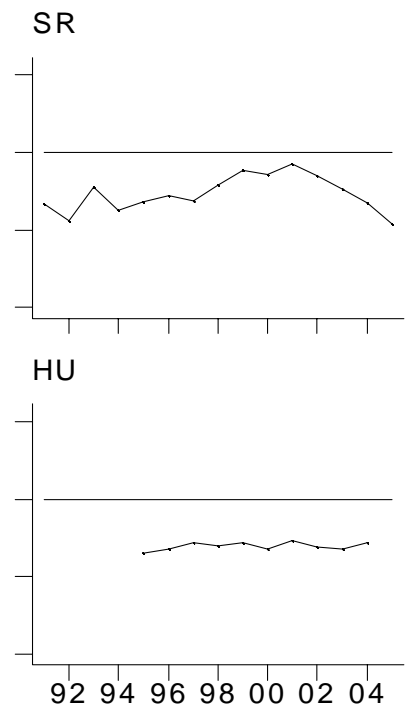
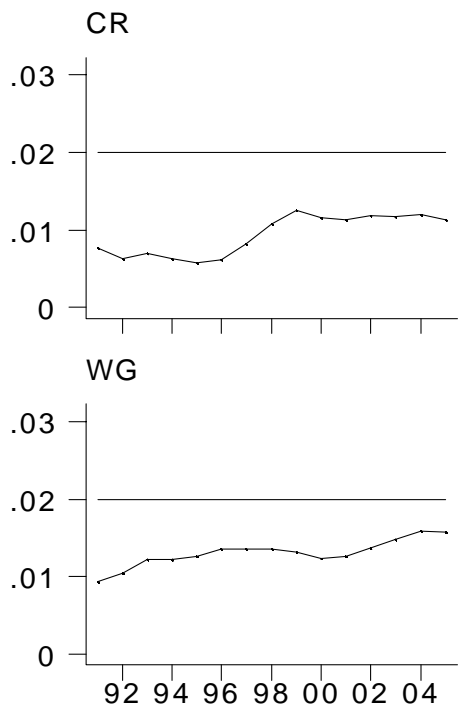


Figure 2: Inflow rates during 1992-2005

○— Unemployment rate

— Eq. Unempl. rate*|Sr~WG

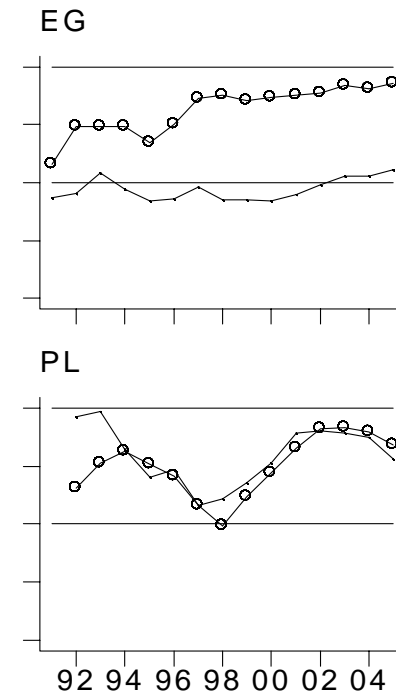
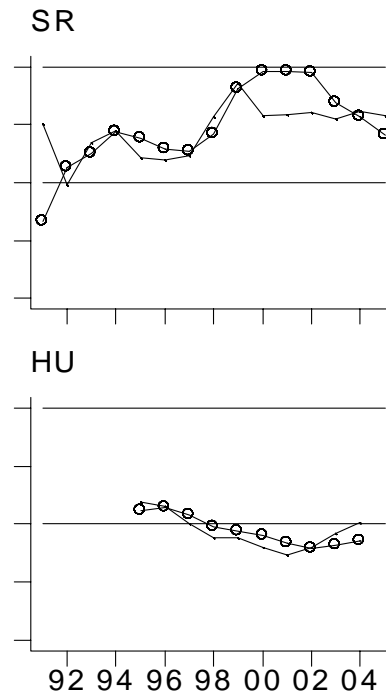
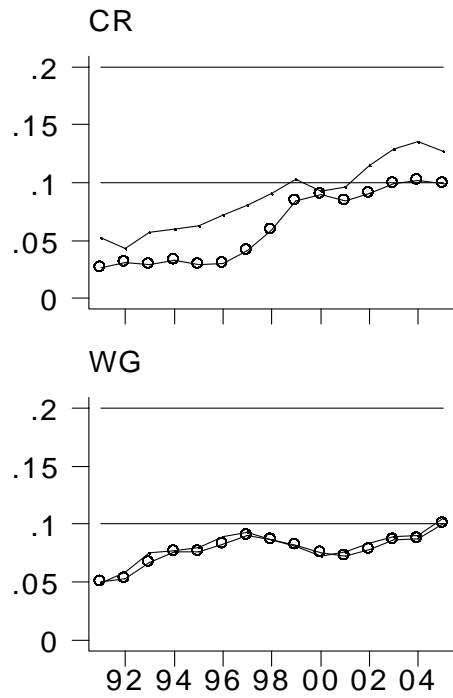


Figure 3: Actual and hypothetical unemployment rates during 1992-2005