The influence of institutions
on the labour market performance
A comparison between Austria and Germany

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Abstract
This paper identifies the links between institutions and the labour market performance in Austria and Germany. We apply fixed effects panel estimations and seemingly unrelated regression system equation estimations. After controlling for the macroeconomic indicators - real GDP growth, the long-term interest rate, the oil price, and the German unification shock - we find that labour market institutions have country-specific influences, even in countries with the same language and very similar economic institutions. In Germany, the deregulation of the labour market has so far not been a success story. In Austria, where the labour market is more deregulated than in Germany, the labour market performance has been considerably better.

Keywords: SUR system estimation, Labour market institutions, Employment, Unemployment

JEL Classification: E24, J31, J51

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1 Introduction
The Single Market Programme of the European Union, completed in 1992, aimed at increased competition and productivity gains, resulting in lower product prices and thus reducing inflationary pressure and stimulating final demand.

In March 2000, the Lisbon European Council launched the strategy for economic, social and environmental renewal of the European Union until 2010. This strategy includes the completion of the reforms on the product, service, capital, and labour markets initiated within the Single Market Programme. Among the objectives of the Lisbon strategy, the EU wide employment rate should be increased to 70 percent, with an intermediate target of 67 percent in 2005 (European Commission, 2004). In 2005, the employment rate averaged 63.8 percent in the EU25. The corresponding figures for Austria and Germany are 68.6 percent and 65.4 percent, respectively. The total unemployment rate in the EU25 averaged 8.8 percent in 2005. In Austria, it only amounted to 5.2 percent, compared to 9.5 percent in Germany. This comparison shows that Austria is not only performing better than Germany or the EU average, but is already close to meeting the Lisbon goal regarding the overall employment rate (or even meeting the intermediate target). Germany, on the other hand, has to struggle to improve its labour market performance.

The still existing gap between the Lisbon goals and the actual economic performance indicates that further reforms on the goods and factor markets are required in order to support growth and employment in the European Union. In this regard, labour market institutions are crucial. Increased labour mobility as well as a reduction of the difference between wages and unemployment benefits induces wage moderation by limiting the scope for exploiting economic rents. A high degree of coordination of wage negotiations enables to take economy-wide developments into account. On the other hand, the creation of employment or at least the maintenance of existing jobs would benefit if firm-specific developments are taken into account in wage negotiations.

According to modern growth theories, policy and institutional settings have an impact on the path of long-term growth. To some extent, regulation is necessary to ensure the functioning of market economies, for example in the areas of competition, natural monopolies, consumer protection, property rights and environmental protection. Institutions can increase efficiency by correcting market failure. On the other hand, over-regulation might worsen the resource allocation and reduce the incentives for innovation, thereby exerting adverse effects on the growth potential.
In his widely recognized paper, Nickell (1997) argue that the European job market is in some important aspects rigid and inflexible, causing high unemployment rates. We questioned this general statement and show in a two-country comparison that macroeconomic policies as well as country-specific influences of labour market institutions are important. As Nickell (2006) points out, it is misleading to talk about the “European” labour market, as the four largest economies (Germany, France, Italy, and Spain) are characterised by relatively high unemployment, whereas most of the smaller EU countries have considerable lower unemployment. Therefore, we allow for cross-country differences in the influence of institutions on the labour market performance.

The outline of the paper is as follows: In the next chapter, the theoretical background and a literature survey on the links between institutions and the labour market outcome is delineated. In chapter 3, an overview on the historical labour market performance in Austria and Germany is given. The results of the econometric estimations are discussed in chapter 4. Finally, conclusions are drawn in chapter 5.

2 Theoretical background and literature review

Appropriate institutions are important for a smooth working of the labour market (Agell, 1999, Blanchard, 2004). Information problems for both employees and firms generate imperfections in matching and monitoring processes. Different degrees of market power of labour market participants and the risk of becoming unemployed require an appropriate mix of the institutional framework. However, such regulations also cause rigidities, which may impede the reallocation of labour in the case of shocks and structural changes. Thus, over-regulation may worsen the labour market outcome. Nickell (2003) argues that about half of the unemployment differences across OECD countries in the 1980s and 1990s can be traced back to different labour market institutions and regulations.

In order to examine these issues, a variety of variables have been developed in the literature, covering various aspects of the institutional framework. These indicators include employment protection legislation, the structure of wage determination, unemployment benefits and active labour market policies. In addition, labour taxes might influence the labour market performance.

Extensive employment protection raises the costs of adjusting employment over the business cycle. Strengthening employment protection raises the firing costs. Dismissals become more difficult and firms will be more cautious about filling vacancies. For newly hired workers, the negotiated wages will be lower to compensate for the increased job security (Cahuc and
Stronger employment protection may also raise the bargaining power of insiders and increase their renegotiated wages. The overall effect of stricter employment protection on wages and unemployment is ambiguous. Job protection may be compensated by lower wage growth and a lower unemployment rate. On the other hand, employment protection makes regular employment more stable. As personnel selections within firms are more effective, involuntary separations are reduced. In addition, a higher degree of employment protection can support investment in firm specific human capital, thereby inducing productivity and competitiveness gains (Pissarides, 2001; Belot and van Ours, 2002; Anderhub, Königstein and Kübler, 2003).

Trade unions and employers associations are highly important for the wage negotiation process in Europe. Due to the bilateral monopoly structure of the labour market, economic rents are shared. The outcome depends on the relative bargaining power of each party and their strategic interactions. Wages and other working conditions are determined by collective bargaining agreements either on a firm, regional, sectoral or on a national level. In the Scandinavian countries, bargaining takes place on a national level, in United Kingdom and the US, the firm level is preferred, whereas in France, bargaining takes place on a sectoral level (Cahuc and Zylberberg, 2006, Ch. 12). In Austria, negotiations take place on the sectoral level, but macroeconomic conditions are taken into account. In particular, the expected overall inflation rate and parts of the sectoral productivity growth rate serve as the reference value for wage development. In Germany, wages are negotiated on a regional and a sectoral level at the same time, i.e. negotiations are carried out for specific sectors in certain regions, but trade unions and employers associations of the same sector in other regions normally adopt wages originally negotiated for the “pilot region” (“pattern bargaining”). The outcomes of negotiations on a sectoral level often do not only bind the bargaining parties, but also employers and employees within a particular sector and may have a signal effect for other sectors. Early empirical studies about the wage bargaining came to the conclusion that decentralized wage bargaining is associated with higher unemployment rates, probably because of higher wages. On the other hand, in a centralized bargaining process, flexibility is lost. Calmfors and Driffill (1988) show that employment may be supported if union power is accompanied by a high degree of coordination of firms and workers. In a centralised bargaining system, the overall macroeconomic conditions can better be taken into account, and the internalisation of the consequences of high wage demands is improved. Thus, both a highly centralised and a largely decentralised wage bargaining process seem to dominate the
intermediate case with sectoral bargaining, where the advantages of both systems cannot be fully exploited and wages tend to be too high.

As wage bargaining in most Euro area countries can be characterised as being neither totally decentralised nor fully centralised, reforms in this area should support centralisation or decentralization. If reforms allow taking more account of firm specific developments in wage negotiations the probable lower wage increases could support the European Central Bank in ensuring price stability. In addition, as country-specific shocks and in particular firm or sector specific shocks are absorbed by flexible wages and prices, the ECB could better focus on area-wide developments. Ultimately, wage restraint would support job creation.

Generous unemployment benefits and long benefit duration periods reduce the gap between net wage earnings and transfer payments, and thus the incentives to seek regular employment. The unemployed will become more selective to find an appropriate job. This implies that the matching process becomes less effective in the short run. Ample unemployment benefits imply only small foregone earnings in case of becoming unemployed. Thus, the fear of being dismissed declines, and an upward pressure on wages is generated. The positive impact of benefit levels and durations on the length of unemployment periods has been found in numerous microeconometric studies. However, more generous unemployment benefits could also increase the incentives for human capital accumulation. As the search process is allowed to take longer, it becomes more likely to get an appropriate job, resulting in higher productivity, output and wages. The job duration increases and short-term unemployment decreases. Furthermore, participation in the labour force might become more attractive, as it is a prerequisite to be eligible for the benefits. Thus, the employment rate will increase.

Active labour market policies aim at reducing the dependence of people on unemployment benefits by improving their chances to find paid employment. This is relevant in particular for low skilled workers (OECD, 2003). Strategies include public employment schemes, labour market training, and measures for the young and disabled. Insofar as the employability of the participants is supported, the labour market performance should improve. However, regular employment can be crowded out by subsidised work. In addition, employment is affected negatively by the fact that active labour market policies are in almost all cases financed by distortionary taxes and social security contributions of employers and employees. Furthermore, training programmes might not match with the qualifications really demanded by firms (Martin and Grubb, 2001).
Taxes on labour income drive a wedge between the wages as employer’s costs and the purchasing power of wages. Due to the progressivity of a tax system, the marginal income is more heavily taxed than the average one. The tax share that is borne by the employers will raise the marginal costs of employment, thereby reducing labour demand. If higher labour taxes are fully compensated by lower wages, the product wage paid by firms will be unchanged, but the consumption wage received by households declines with distortions on the decision of the household to engage in the official labour market. The distance to transfer payments is narrowed, and the incentives of households to work in the official labour market are reduced. Overall, rising labour taxes can be expected to have a negative impact on employment. Especially in the low income - low productivity range, high marginal tax rates can generate inactivity traps.

For a panel of 17 OECD countries over the period 1983 to 1993, Scarpetta (1996) finds evidence for a positive effect of unemployment benefits as well as employment protection regulations on both the level and persistence of unemployment. Regarding the relationship between the centralisation of wage bargaining and the employment performance, this study supports the hump-shaped hypothesis according to which both highly centralised and largely decentralised bargaining systems generate better results than the intermediate case. Finally, active labour market policies are found to reduce unemployment, although the effect is rather weak. In addition, these policies tend to increase labour force participation, which limits the unemployment reducing effect.

Nickell (1997) finds that employment protection reduces the unemployment rate slightly. He argues that laws that raise the cost of employment adjustment will tend to reduce the inflow into unemployment and, because they make firms more cautious about hiring, will also reduce the flow out of unemployment into work. The overall impact on unemployment is likely to be rather small, because both effects tend to cancel each other out. Elmeskov et. al (1998) find that increasing employment protection raises unemployment. In panel regression analyses for 20 OECD countries over the period 1960 to 1995, Nunziata (2001, 2002) finds that wage bargaining coordination negatively affects labour costs and unemployment. The hump-shaped hypothesis, however, is not confirmed by these studies. In addition to its direct negative impact, wage bargaining coordination counteracts the positive effect of union density and of the tax wedge on labour costs and unemployment. The papers find that stricter employment protection increases the persistence, but not the level of unemployment. On the other hand, unemployment benefits raise the unemployment level. Nunziata (2002) concludes that 55
percent of the rise in European unemployment from the 1960s to the first half of the 1990s can be explained by changes in labour market institutions.

Based on panel regressions for 20 OECD countries between 1960 and 1999, Baker et al. (2002) find only weak evidence for the influence of institutions on labour market outcomes. The most robust results are found concerning the negative impact of coordinated wage bargaining on unemployment, in particular for the period since the early 1980s. A significant positive effect of the tax wedge on unemployment can only be detected until the beginning of the 1980s. On the other hand, this study cannot support the hypothesis that employment protection and unemployment benefits increase unemployment.

For a panel of 13 EU countries (EU15 without Luxembourg and Greece), the effects of labour market reforms on employment and on long-term growth have been analysed by the EFN (2004a, 2004b). A positive impact of labour market deregulation on long-term growth is found, which is mainly due to supported capital deepening. More flexibility and increased incentives to work appear to be appropriate strategies to improve the employment performance.

Employment can be expected to be influenced by the degree of competition in the product market as captured by the mark-up ratio. Blanchard and Giavazzi (2001) consider a model with a product market that is characterised by monopolistic competition. The elasticity of demand is assumed to depend negatively on the degree of product market regulation. This negative relationship can be explained by the notion that the demand elasticity is an increasing function of the number of firms. The latter in turn depends negatively on the cost of entry. Thus, removing barriers to entry increases the number of firms, which raises the elasticity of demand and thus lowers the level of rents in the economy. In this context, firms choose labour to maximise the present discounted value of future cash flows. Changing employment causes adjustment costs. The authors assume that these adjustment costs can be affected by product market regulation. The model generates predictions about the relationship between product market regulations, the mark-up (or the level of rents) and the level of employment. Deregulation, by reducing the mark-up, leads to a higher demand for labour.

Another reason for a negative relationship between the mark-up and employment is that economies of scale should disappear as a result of emerging new technologies (Coppens and Vivet, 2004). If sunk costs are low and entry and exit barriers are reduced, the number of firms increases, entailing a positive impact on job creation. Employment is also supported by the fact that lower profit margins are accompanied by lower real wage claims and thus by
reduced structural unemployment. More competition in product markets tends to lead to lower wage mark-ups. Thus, the price mark-up and the wage mark-up are generally positively related, and reforms diminishing the former also lead to declines of the latter.

In Weyerstrass et al. (2006) it is shown that lower mark-up ratios lead to higher employment and lower unemployment. In that study, the mark-up is explained by labour market institutions.

According to Blanchard and Wolfers (2000), the interaction between macroeconomic shocks and institutions may be crucial for the development of EU labour markets. A substantial part of the institutional framework was already in place in the 1960s and 1970s, when unemployment was quite low. The rise in unemployment since then may be explained by adverse supply shocks like the oil crises in the 1970s or financial crises of the social security systems because of unfavourable demographic trends. But these shocks hit the EU countries in a symmetric way. Thus, they can account for a general increase in the unemployment rate, but the cross-country variation is left unexplained. If institutions are not optimally designed, the persistence of unemployment in response to shocks might be longer. Several authors have examined this issue, including Nickell (1997), Elmeskof et al. (1998), Blanchard and Wolfers (2000), and Nickell et al. (2002). In most of these papers, the impact of institutions on unemployment is investigated for a sample of 20 OECD countries. Other studies (e.g. Belot and van Ours 2001) have controlled for interactions between institutions and macroeconomic shocks or within the set of institutions, stressing the relevance of the appropriate institutional mix. For example, the effects of an increase in payroll taxes on the incentives to work are found to be larger in countries with more generous unemployment benefit systems.

In these studies, the evidence regarding the link between institutions and the labour market performance is in some respects ambiguous (Baker et al., 2002). Most importantly, many of the regulations are no more rigid in the group of high unemployment countries than among those with low unemployment. Results often appear to be ambiguous. Stricter protection of jobs increases long-term unemployment, but the effect is no longer significant when the overall unemployment rate is considered. Employment protection legislation seems to have almost no impact on the level of unemployment. It should be noticed that the last result is not in contrast to economic theory, because employment protection results in higher firing costs and lower hiring costs with an ambiguous overall effect on unemployment (Cahuc and Zylberberg, 2006, Ch. 12). Trade union power and bargaining coverage tend to raise
unemployment, but this effect is no longer present if wage setting is highly coordinated. This highlights the importance of the institutional framework.

Comparing the actual outcome with a model assuming fixed institutions over time, Nickell et al. (2002) conclude that about half of the unemployment experience can be traced back to institutional shifts in the 1960 to 1995 period, especially in the tax and transfer systems. The IMF (2003) comes to the conclusion that institutions and interactions among them play a vital role for the evolution of unemployment in France and Italy, but not so in Germany. As Berthold and Fehn (2006) point out, one important reason for the rising unemployment in Germany may be seen in the lack of adapting labour market institutions to the changing economic environment, characterised especially by German unification, but also the integration of the Eastern European countries and the increasing economic globalisation in general.

3 The labour markets in Austria and Germany

This section provides some stylised facts on the labour markets in Austria and Germany. Figure 1 depicts the development of the employment rates in the two countries over the period 1960 to 2005. The trajectories of the unemployment rates can be seen in figure 2.

Figure 1: Employment rates (ER) in Austria and Germany

![Employment rates (ER) in Austria and Germany](image)

Sources: Eurostat, Euroindicators; own calculations.

From 1960 to the middle of the 1980s, the employment rate in Germany declined more or less steadily. After recovering from the middle of the 1980s on, employment again fell sharply in the aftermath of German unification in 1990. After the first and second oil price shocks in
1974 and 1982, unemployment in Germany increased significantly. It is also evident that unemployment in Germany displays a high degree of hysteresis, i.e. after the shocks have vanished unemployment did not return to its pre-shock level. A sharp increase of the unemployment rate occurred after German unification. The unification treaty stipulated that contracted wages in East German Mark were converted into Deutsche Mark at par resulting in short-run variable costs that were higher than the market prices for the produced goods. (Akerlof et. al., 1991).

While in Germany the decline of the employment rate was more or less steady, in Austria employment declined sharply in 1975. This drop can be traced back to changes in the statistical definition of people that are officially counted as employees. From 1975 onwards unemployment in Austria has been markedly lower than in Germany.

The divergent labour market development in Austria and Germany can at least partly be attributed to differences in labour market institutions. As an example, as a reaction to the first oil price shock early retirement schemes were introduced in Austria so as to confine the rise of unemployment. However, due to financing problems, since the middle of the 1980s and in particular since the year 2000 entitlements to early retirements have become more restrictive. In contrast to the first oil price hike, after the second oil price shock in 1979/80, unemployment in Austria exhibited a marked increase.

Figure 2: Unemployment rates (UR) in Austria and Germany

![Diagram showing unemployment rates in Austria and Germany from 1960 to 2005.](chart.png)

Sources: Eurostat, Euroindicators; own calculations.

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3 We thank Günther Chaloupek from the Austrian Chamber of Labour for this remark.

4 In the estimations, this drop is accounted for by a dummy variable.
The comparatively low unemployment in Austria may also be due to lower overall regulation of the labour market. Dismissals in Austria are easier, and in this case, the employee has the right to get a pre-defined severance payment. In Germany, employment protection is stricter. As a result, dismissed employees often go to court in order to get re-employed or to receive a high severance payment for compensation (Büttner et. al., 2006).

The Austrian system of wage negotiations is characterised by a high degree of centralisation. This system is known as “social partnership” (“Sozialpartnerschaft”). Social partners comprise trade unions and employers’ associations. Besides wage formation, the social partners play an active role in the political process in Austria. Though wages are set on the level of industries, macroeconomic conditions are taken into account. In addition to short-term objectives like wage increases, long-term objectives such as job security and employment creation are equally important. As a result of this social partnership, in an international perspective Austria exhibits a high degree of wage coordination. In addition, trade union density is comparatively high in Austria, although it declined from 63 percent in 1970 to around 40 percent in 2002 (OECD, 2004; Eironline, 2002). In Austria, more than 95 percent of the entire workforce is covered by collective wage bargaining. Over time, this figure has remained stable (OECD, 2004).

In Germany, wages are bargained on the level of industries between trade unions and employers’ associations. Though in principle the agreements are only binding for those firms which are members of the respective employers’ association, the federal minister of labour can declare in consensus with the social partners the agreements as binding for the entire industry (“Allgemeinverbindlichkeitserklärung”). As a reaction to the rising unemployment, in particular in the aftermath of German unification in 1990, important steps in the direction of labour market deregulation have been undertaken. Wage settlements on the level of individual companies have become increasingly important. This required the introduction of “opening-up” clauses allowing firms and trade unions to diverge from industry-wide settlements. A prominent example of firm-specific settlements is the “5000 times 5000 model” of Volkswagen. This model, established in 2001, foresees the creation of 5000 new jobs, each employee earning a gross monthly wage of 5000 German marks. Furthermore, the working hours are more flexible as compared to the regular collective agreement (iwd, 2001).

In addition to allowing more firm-level negotiations, the declaration of wage settlements as binding for all firms of an industry has become less widespread in the recent decade. As a

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5 http://www.sozialpartner.at.

6 Data for 2000.
result of these developments, trade union density and wage bargaining centralisation have declined in Germany, particularly so in the eastern part. In Germany as a whole, trade union density (trade union members as a percentage of all employees) declined from 32 percent in 1970 to 25 percent in 2002 (OECD, 2004; Eironline, 2002). While in 1980, collective wage bargaining in Germany covered more than 80 percent of the workforce, until 2000 this figure declined to 68 percent (OECD, 2004).

4 Empirical investigations
This section presents the results of the econometric estimations concerning the influence of institutions and macroeconomic conditions on the labour market performance in Austria and Germany.

4.1 Data
As labour market indicators, the employment rates and the unemployment rates are considered. Institutional variables comprise the unemployment benefit duration, the benefit replacement rate, the employment protection legislation, the level of coordination in the wage bargaining process, as well as the tax wedge on labour income, the size of the government and an overall labour market regulation index. In addition to labour market institutions, macroeconomic conditions are taken into account. The latter are approximated by real GDP growth, the oil price in domestic currency and the long-term and short-term interest rates. Rising real GDP will be associated with increasing employment and declining unemployment. An increasing long-term interest rate will negatively affect fixed capital formation. Thus, a rising interest rate might induce companies to substitute capital for labour. In this case, employment would increase, and unemployment would decline. Thus, while real GDP growth captures the short-term business cycle influence on unemployment, the long-term interest rate may capture longer-term macroeconomic conditions. The oil price shall approximate external shocks on the economy. Increasing oil prices raise production costs and decrease the purchasing power of households. As a result, both supply and demand will decrease with a detrimental impact on employment. Other macroeconomic indicators like inflation rate, short-term interest rates or real labour cost proved to be insignificant in our final estimation.

Data on (un-)employment rates in accordance with ILO criteria can be obtained from OECD labour force statistics. For institutions, an annual database (Labour Market Institutional Data Base) for a sample of 20 OECD countries, covering the period from 1960 to 1995, can be found in Nickell and Nunziata (2001). Indicators comprise employment protection legislation,

7 West Germany until 1990, the unified Germany from 1991 onwards.
benefit replacement rates, and trade union density, i.e. the share of unionised workers in total employment. As a main shortcoming, the database only covers data until 1995. Fortunately, an update, extending the period to 1998, can be found in Nickell (2003). The benefit replacement rates and trade union density can be prolonged by OECD measures. These data mergers enable the extension of the sample up to 2001. The index for the size of the government and the overall labour market regulation index are taken from the Fraser Institute database and cover the period from 1970 to 2004. These indicators are increasing in decreasing size of government and in more deregulation of the labour market, respectively. The labour market regulation index comprises five sub-indicators: (i) the impact of minimum wages, (ii) hiring and firing practices, (iii) the part of the labour force for which wages are set by collective centralised bargaining, (iv) unemployment insurance, and (v) the use of conscripts. The indicator measuring the size of government consists of four sub-indicators: (i) general government consumption as a share of total consumption, (ii) transfers and subsidies as a share of GDP, (iii) government enterprises and investment as a share of gross investment, and (iv) the top marginal tax rate. The latter sub-indicator is divided into the top marginal income tax rate and the top marginal income and payroll tax rate.

In the following, we discuss the important institutional variables that proved significant in our final estimation for Austria or Germany. Figure 3 below shows the development of labour market institutions in Austria and Germany over time. Over the entire period, union density in Austria has been higher than in Germany, but it has been declining over time and converged to the German value (panel a). Even though in 2000, union density only amounted to about 37 percent in Austria and 25 percent in Germany, the percentage of employees covered by collective wage agreements is considerably higher. The figures amount to 98 percent in Austria and 68 percent in Germany, respectively (Büttner et al, 2006). This discrepancy has several reasons: Firstly, the government may declare a collective wage agreement binding also for those companies and employees that are not members in the employer’s association or trade union, respectively (Allgemeinverbindlichkeitserklärung). Secondly, in Austria for all companies membership in the employer’s association is compulsory. Thirdly, while by law companies are required to pay collectively agreed-upon wages to trade union members only, they have an incentive to pay the same wage for non-members as well. The reason is that otherwise employees get an incentive to join the trade unions and those gain increasing power in the bargaining process in comparison to the employer’s associations.
Figure 3: Development of labour market institutions in Austria and Germany over time

(a) union density

(b) benefit replacement rate

(c) employment protection

(d) overall labour market regulation

Notes: UD: union density: total reported union members in relation to all employees
BRR: benefit replacement rate: benefits in the first year of unemployment, as a percentage of earnings before tax
EP: employment protection: index [0, 2], increasing with strictness of employment protection
LREG: overall labour market regulation: index [1, 10], increasing with less labour market regulation

The benefit replacement rate has remained almost constant in Germany (panel b). On the other hand, since the middle of the 1960s it has considerably increased in Austria. Before the first oil price shock in the middle of the 1970s, the benefit replacement rate was significantly lower in Austria, but after the second oil price shock in 1979/80, the gap has almost been closed. At the end of the 1990s, benefit replacement in Austria was slightly higher than in Germany. The increase in the benefit replacement rate in Austria might have been undertaken in order to reduce the income losses that have occurred with the rising unemployment after the oil price shocks.

Since the middle of the 1960s, employment protection has been more generous in Germany (panel c). In Germany, it increased sharply between 1960 and 1972. Afterwards, it remained almost constant until 1995, but in the most recent decade it was reduced to some extent. In Austria, employment protection became more generous between 1973 and 1983. Since the middle of the 1990s, it has again been reduced, as in Germany.
According to the overall labour market regulation index, the Austrian labour market has been less regulated than the German one (panel d). Interestingly, between 1995 and 2002, the German labour market regulation has increased, reflected in a declining index. The recent reforms, in particular those named after the former government counsellor Peter Hartz, have led to a considerable deregulation of the German labour market. At the same time, the Austrian labour market has been made more flexible as well.

**Figure 4: Index of size of government in Austria and Germany**

As can be seen from figure 4, until the middle of the 1990s, the size of the government has been considerably larger in Austria, reflected in smaller values of the respective index. At the end of the 1990s, the Austrian government started substantial privatisations of state-owned companies. In Germany, the privatisation wave started even earlier in the beginning of the 1990s, increasing in the last few years under the impression of the German failure to meet the criteria of the Stability and Growth Pact. This led to a sizeable increase in the respective indicator since the index rises as the government influence in the economy declines.

### 4.2 Empirical results – employment rate

Because some of the variables may be non-stationary, we use a recently proposed unit root test to analyse the time series behaviour. We perform the IPS panel unit root test according to Im, Pearson, and Shin (2003). This test accounts for individual unit root processes of the time series and pools separate independent ADF unit root tests. This test has greater power than the Levin and Lin (2002) test, which assumes a common unit root process. We perform the IPS test with a constant term in the ADF equation. Based on the Schwarz criterion, the optimal lag length for the cross section series varies between zero and one. The results show that for the
time period from 1960 to 2005, the hypothesis of a unit root process can be rejected. This is also true for the first sub-period (1960 to 1990), but not for the period after German unification. In the following analysis for the employment and unemployment rates, we assume that the data are stationary. This is in line with the results of Smolny (2003) for the Old and New Länder in Germany.

Most of the econometric analyses discussed in section 2 above are based on reduced-form static (un)employment equations and assume that institutions have an identical effect across countries. In this paper, we avoid this restriction in the estimation procedure. To analyse the links between the employment rate and institutional variables, taking macroeconomic conditions into account, a panel data set for Austria and Germany is used. We apply the general-to-specific approach and estimate a fixed effects model with a rich data set of macroeconomic and institutional variables. We use a seemingly unrelated estimation method to account for autocorrelation. The results are available upon request. In this estimation, a number of coefficients are not significantly different from zero. This is especially true for the cross-country institutional variables. As the total pooled number of observations is only 70, it is useful to select only significant variables.

Therefore, we apply a seemingly unrelated multi-equation system estimation and use the general-to-specific approach in an unbalanced sample. The seemingly unrelated regression (SUR) method estimates the parameters of the system, accounting for heteroskedasticity and contemporaneous correlation in the errors $\epsilon_i$ and $\zeta_i$ across equations. We estimate the following system

\begin{align}
(1a) \quad Y_{it} &= \alpha_i + \beta X_{it} + \gamma_i Z_{it} + \epsilon_{it}, \\
(1b) \quad Z_{it} &= \delta_i + \eta_i U_{Rit-1} + \zeta_{it}
\end{align}

with the employment rate $Y$, country-specific constant effects $\alpha_i$, the explanatory macroeconomic variables $X$, country-specific institutional variables $Z$. $i = \text{DE, AT}$ is the country index and $t$ the time index. To account for possible endogeneity problems, institutional variables $Z$ are explained by lagged unemployment rates (UR) and a country-specific constant term $\delta_i$. Additionally, in the German equation (1a) a 1991-step-dummy variable, taking the value one from 1991 onwards and zero before, is included to account for German unification. Additionally, a 1975-step-dummy is included in the Austrian equation to account for the statistical changes discussed above.

8 The results are available on request.
Country-specific institutions are only allowed to have an influence on their own country. Restricting the institutional parameter to be identical across countries, $\gamma_{DE} = \gamma_{AT}$ was not supported by the data. E.g., in the case with the three institutional variables union density, employment protection and benefit replacement rate, a Wald-test rejects this hypothesis on a one-percent level. Non-significant coefficients at the ten-percent level are successively restricted to be zero. Additionally, a residual analysis is performed. In table 1, we present the results for our final estimation of the employment equations.

**Table 1: Estimation results - employment rates**

<table>
<thead>
<tr>
<th>System estimation employment rates</th>
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<tr>
<td>Seemingly unrelated regression, unbalanced, 1961-1999</td>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Austria (AT)</th>
<th>Germany (DE)</th>
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<tbody>
<tr>
<td>Real GDP Growth</td>
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<td></td>
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<tr>
<td>Oil price (in euro)</td>
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<tr>
<td>Long-term interest rate</td>
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<tr>
<td>Linear trend</td>
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<td>German unification step-dummy 1991</td>
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</tr>
<tr>
<td>Constant</td>
<td>93.80***</td>
<td>51.19***</td>
</tr>
<tr>
<td>Union density (AT)</td>
<td>-0.53***</td>
<td>-</td>
</tr>
<tr>
<td>Union density (DE)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Employment protection (AT)</td>
<td>5.20**</td>
<td>-</td>
</tr>
<tr>
<td>Employment protection (DE)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Benefit replacement rate (AT)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Benefit replacement rate (DE)</td>
<td>-</td>
<td>0.44***</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.92</td>
<td>0.93</td>
</tr>
<tr>
<td>Jarque-Bera normality test</td>
<td>0.62</td>
<td>0.07</td>
</tr>
</tbody>
</table>

***, ***, *** denotes significance at the 10, 5, 1 percent level
As expected, real GDP growth has a positive impact on the employment rates in Austria and Germany. Decreasing oil prices positively affect employment, whereas high long-term interest rates coincide with economic upturns and therefore with high employment. Although we observe a significant negative trend of the employment rates, German unification with the joining of the New Länder had a positive impact on the employment rate. The model predicts a 3 percentage point increase in the employment rate in the year 1991.

Looking at the institutional variables, we observe that higher employment protection increases the employment rate in Austria. This finding is in line with the predictions of the recently presented matching model by Cahuc and Zylberberg (2006, Ch. 12) and in principle in line with the work of Pissarides (2001) and Belot and van Ours (2002). The benefit replacement rate is positive and highly significant for Germany and negative and insignificant for Austria. Therefore, the benefit replacement rate is not included in the final estimation. Nevertheless, the hypothesis that these institutional parameters in Germany and Austria are equal could be rejected. In section 2, we argued that generous unemployment benefits have an increasing effect on the unemployment rate but could have a positive influence on productivity, output and employment. An inspection of the German data shows that until the mid 1980s, the employment rate and the benefit replacement rate followed negative trends. A reason for this observation might be financial pressure to finance the increasing payments resulting from the rising unemployment. On the other side, especially before the first oil price shock, better benefit replacement conditions coincide with decreasing employment (and increasing unemployment) rates in Austria, resulting in higher public dept.

The explained variance of our estimation is high in the German and the Austrian employment equation. In both estimated equations, we do not find any evidence against the normality of the residuals.

### 4.3 Empirical results – unemployment rate

Table 2 shows the final system estimation results for the unemployment rates. As expected, higher real GDP growth reduces unemployment. Furthermore, higher long-term interest rates are associated with declining unemployment. An increasing long-term interest rate will negatively affect fixed capital formation. Thus, a rising interest rate might induce companies to substitute capital for labour. As in both countries unemployment has exhibited a rising tendency, a linear time trend has been included in the estimation and proved to be significant.

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9 Again, institutional variables are explained by the lagged unemployment rate.
The constant is significantly different from zero only in the Austrian unemployment equation and has a negative sign. German unification increased the unemployment rate significantly.

Regarding labour market institutions, in Austria detailed labour market indicators proved to be significant, whereas in Germany, the overall labour market regulation index outperformed more detailed institutional variables. In Austria, lower trade union density decreases unemployment. Powerful trade unions with a large number of members and employers associations with a high degree of organisation can be expected to raise the negotiated wages above the equilibrium, resulting in higher unemployment. Our results confirm previous panel studies (e.g., Nunziata, 2002, Nickell et al., 2005). The negative relationship between the unemployment benefit replacement rate and the unemployment rate in Austria may be explained by the fact that in times of rising unemployment, high levels of unemployment benefits lead to financing problems. If the unemployment benefit system had not been reformed, rising unemployment insurance payments by employees and employers would have been the consequence. The resulting rise in labour costs would have further aggravated the unemployment problem. Alternatively, the deficit of the unemployment insurance system could have been financed by higher transfers from the general budget, resulting in higher public debt. Thus, as unemployment in Austria and particularly in Germany had risen to high levels, the benefit replacement rate was reduced.

In an international perspective, employment protection and other labour market regulations used to be high in Germany. As a reaction to the rising unemployment in the 1990s, employment protection was to some extent loosened so as to make it easier for companies to dismiss workers in economic downturns and provide newly hired workers with lower job security. Thus, the level of employment protection has been reduced in times of low economic growth with rising unemployment. The lower firing costs overweight possible stimulating effects on the employment rate due to lower hiring costs. In our estimation, the overall labour market regulation index is highly significant. One index point of more deregulation increases the unemployment rate by 4 percentage points.

The government size index is significant with a negative sign. The index is decreasing in the size of government. Therefore, according to our estimation results for Germany, a decreasing size of government leads to a decrease in the unemployment rate.

Other labour market institutions that can be found in the literature (e.g., the benefit duration) proved not to be significant in Austria or Germany. The explained variance in both equations is very high according to the adjusted $R^2$, 0.94 in the Austrian case and 0.92 in the German
one. According to the Jarque-Bera test, we do not find any significant non-normality in the residuals of both equations.

Table 2: Estimation results - unemployment rates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Austria (AT)</th>
<th>Germany (DE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP Growth</td>
<td>-0.09***</td>
<td></td>
</tr>
<tr>
<td>Long-term interest rate</td>
<td>-0.10***</td>
<td></td>
</tr>
<tr>
<td>Linear trend</td>
<td>0.23***</td>
<td></td>
</tr>
<tr>
<td>German unification step-dummy 1991</td>
<td></td>
<td>0.84***</td>
</tr>
<tr>
<td>Constant</td>
<td>-9.53***</td>
<td>-2.28</td>
</tr>
<tr>
<td>Union density (AT)</td>
<td>0.18***</td>
<td>-</td>
</tr>
<tr>
<td>Union density (DE)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Benefit replacement rate (AT)</td>
<td>-0.04***</td>
<td>-</td>
</tr>
<tr>
<td>Benefit replacement rate (DE)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overall labour market regulation (AT)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overall labour market regulation (DE)</td>
<td>-</td>
<td>4.08***</td>
</tr>
<tr>
<td>Size of government (AT)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Size of government (DE)</td>
<td>-</td>
<td>-2.33***</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.93</td>
<td>0.92</td>
</tr>
<tr>
<td>Jarque-Bera normality test</td>
<td>1.60</td>
<td>4.57</td>
</tr>
</tbody>
</table>

***, ***, *** denotes significance at the 10, 5, 1 percent level

5 Conclusions

In this paper, we analyse the links between labour market institutions and the employment and unemployment performance in Austria and Germany. From a theoretical point of view, institutional variables may have positive, negative or no influences on the labour market performance (Cahuc and Zylberberg, 2006).
We use labour market institution variables from Nickell and Nunziata (2001), Nickell (2003) and the Fraser institute database, and find some new results. In our study, both fixed effects panel and system equation estimations are applied. We find that institutional variables have a country-specific influence, even in countries with the same language and very similar economic institutions.

After controlling for the influence of macroeconomic conditions, we find that in Austria higher trade union density is associated with an increase in unemployment. This is in line with previous studies, see e.g., Nunziata (2002) and Nickell et al. (2005). A negative relationship between unemployment and the benefit replacement rate exists in Austria. The employment rate in Austria is positively affected by employment protection, while it is negatively influenced by trade union density and the benefit replacement rate.

In the German case, the joining of the New Länder had an important positive effect on the employment rate but at the same time it also increased the unemployment rate. Policy mistakes during the German unification process are one important reason for the sharp increase in unemployment (Berthold and Fehn, 2006). In contrast to the Austrian case, the benefit replacement rate positively influences the German employment rate. In Germany, the deregulation of the labour market has so far not been a success story. According to our results, deregulation increases the unemployment rate. Decreasing employment protection lowers the firing costs, but also the hiring costs of new employees. Overall, the first effect overweights the latter one, resulting in higher unemployment. On the other hand, an increase in government size leads to an increase in the unemployment rate. The different effects of institutions on the labour market performance in Austria and Germany underline the necessity for taking country-specific conditions into account.

The estimation results show clearly that caution is required when assessing the appropriateness of institutions. While certain institutions may be appropriate in certain macroeconomic environments or for certain countries, in other countries or in other macroeconomic environments the same institutions may result in different macroeconomic outcomes.

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