

Wage Curve in Germany and Italy: A New Holy Grail?

Andreas Ammermueller[♦], Claudio Lucifora^{*},
Federica Origo[♥] and Thomas Zwick[♦]

First draft: February 2006

PLEASE DO NOT QUOTE

Abstract

This paper investigates the functioning of regional labour markets in Italy and Germany. In the light of high and persistent differences in unemployment and wage rates between the North and South of Italy and the West and East of Germany, we analyse the existence of a negative relation linking wage levels to shocks in local unemployment rates - i.e. the wage curve. Using micro data on hourly wages properly matched to local unemployment rates, we specify and empirically test different wage equations. On the basis of our results, we find no evidence for the existence of a “wage curve” in Italy. In the case of Germany, results are quite sensitive to the model specification and the group considered. In both countries, the reaction of wages to local unemployment varies significantly along the wage distribution, being more sensitive around the median quantiles. We conclude that there is no uniform wage curve and call for a differentiated analysis for various groups.

Key-words: wage curve, local labour markets, quantile regressions

JEL Code: J3, J6, R1

[♦] Centre for European Economic Research (ZEW), Mannheim, Germany

^{*} Università Cattolica di Milano, Italy and IZA

[♥] Università degli Studi di Bergamo, Italy

1. Introduction

The existence and persistence of significant differences in economic conditions and in factor prices across areas within a country are common phenomena to most industrialised countries¹. This evidence might be difficult to reconcile with the “standard” description of the functioning of labour markets. However, when “amenities”² vary substantially across areas, dispersion in wages and economic conditions may well characterise a (long run) equilibrium. In this context, the analysis of local labour markets can provide useful insights for the co-existence of very prosperous regions - with low unemployment rates and high incomes - and less prosperous ones - with higher unemployment rates and lower incomes.

The OECD points to Germany and Italy as prime examples in Europe for large and persistent regional disparities on the labour market (OECD, 2000). In both countries the correlation between net migration and unemployment rates by region is quite strong. However, the scale of movement is not sufficient to act as a rapid adjustment mechanism. It can therefore be assumed that the disparities in unemployment, employment and participation are the consequence of distortions or market failures that imply welfare costs for specific regions, groups within them, and for the entire nation.

This paper aims at investigating the functioning of local labour markets in Germany and Italy, two countries characterized by quite rigid labour markets and centralized wage bargaining. In particular, we estimate the relationship linking wage levels to local unemployment rates, the so-called wage curve. We tackle estimation problems such as unobserved heterogeneity using fixed effects, lags in the transmission of the unemployment effect and endogeneity of unemployment using instrumental variables. In addition, we test the robustness of our results by splitting the sample into different employee groups and running wage quantile regressions. We find widely diverging results, depending on the group in focus or the estimation method used.

In light of the above considerations, in section 2 we discuss some theoretical implications. Section 3 presents the Italian and German institutional setting, while section 4 offers an overview of the main stylised facts concerning the functioning of local labour markets in the two countries in the last decades. The empirical analysis of the wage - (local) unemployment relationship and the econometric model estimated are presented in section 5. The last section contains the concluding remarks and some policy implications.

2. Unemployment and Wages

The relationship between unemployment and wages has often been object of controversies. According to the textbook analysis of the labour market, local

¹ This is typical of both countries with a federal statute (such as USA, Canada, Germany, etc.) and of countries in which the (internal) convergence across areas is not yet accomplished (such as Great Britain, Spain, France, Italy, etc.).

² This term is intended to include all those factors (such as environment, weather, as well as economic conditions, etc.) that affect the welfare of individuals living in a certain area.

unemployment may result from asymmetric shocks affecting the demand or the supply of labour and from wages failing to adjust to the market clearing level. In this context, the relationship between wage and unemployment is a temporary phenomenon characterising the adjustment process in the labour market. Alternatively, when reference is made to those theories in which the existence of imperfect competition on either product or labour markets (or both) is assumed, unemployment may well be considered as a key feature of the equilibrium. In other words, an “equilibrium” relation between wages and (local) unemployment might exist (Nickell *et al.*, 1991; Blanchflower and Oswald, 1994a).

A vast empirical literature has investigated the different hypotheses suggesting the existence of a relationship between wages and unemployment. Traditionally, empirical studies have focused on the relation between the *variation* of wages and the *level* of unemployment. The existence of such trade-off – the Phillips curve - is considered a well established feature of the functioning of labour markets as well as a tool for economic policy (Bean, 1994; Fabiani *et al.*, 1997).

The focus of the present analysis, however, departs from the standard Phillips curve framework, in that it is assumed that there might be a long run “equilibrium” relation between the *level* of wages and the *level* of local unemployment. In other words, we shall not be concerned with an analysis of the adjustment process in a local labour market when perturbed by a shock, but rather the focus will be on those factors which affect the relationship between the wage paid to workers in a given area and the unemployment rate prevailing in the same area. This relation, after the seminal work of Blanchflower and Oswald, is better known as the “wage curve” (Blanchflower and Oswald, 1990, 1994a, b).

In the remainder of this section, we shall consider some possible theoretical explanations which may help to interpret the features of the wage curve in the Italian and German context.

2.1. Compensating Differentials, Migration Flows, and equilibrium

According to the compensating differentials hypothesis, individuals living in areas characterised by some unpleasant attributes such as remoteness, high housing prices or high costs for local services, need to be adequately compensated for the disutility they incur by living and working there. In equilibrium, there is a pecuniary compensation associated to disadvantaged areas such that the expected utility is equalised across all the different locations³.

When local unemployment is high, workers weight the utility they get out of wages paid in the area by the probability of obtaining a job therein and move across areas responding to the different arbitrage conditions which characterise local wages and unemployment. Costless mobility occurs up to the point in which expected utility is equalised across areas: this is the “no-mobility” equilibrium. In this context, the (long run) spatial correlation between wages and unemployment across areas is positive: that is areas with high unemployment also pay higher wages.

However, it has been argued that the hypothesis of costless mobility might be unrealistic and that the existence of fixed costs may well characterise the mobility decisions of individuals. In this case, a move across areas will be an optimal response

³ This idea goes back to the compensating differentials hypothesis by Adam Smith and to the more recent version proposed by Harris and Todaro (1970) in the context of developing countries.

only when “permanent” conditions vary (long run), while no move will be observed when conditions vary only “temporarily” (short run). Areas with different degrees of amenities will lie along the equilibrium locus satisfying the local wage-unemployment trade-off (with individual wage w and regional unemployment U , compare Figure 1)⁴.

(Figure 1 around here)

In other words, when the hypothesis that localisation choices are made only at discrete intervals and that mobility costs in the short run are prohibitively high, then a (no mobility) equilibrium without migration flows across areas may be shown to exist (Blanchflower and Oswald, 1994a).

It can be noted that while “permanent” labour market conditions - across areas - are not generally observed, the trade-off between “current” levels of wages and unemployment - within areas - can be easily investigated. The latter will be the main focus of the present study.

Different hypotheses have been proposed in the literature to explain the co-variation (in equilibrium levels) of wages and unemployment. In terms of efficiency wage models low unemployment requires higher wages to deter workers’ shirking (Akerlof and Yellen, 1990; Shapiro and Stiglitz, 1984) and to reduce labour turnover (Salop, 1979).

Alternatively, when wages are determined through collective bargaining the unemployment rate plays the role of moderating trade unions wage aspirations: the higher the number of jobless individuals the lower the bargaining power of unions. The main result, in terms of wage-unemployment equilibria, under the above hypothesis is that (local) unemployment and the level of wages, within each area, will be negatively correlated.

Note that a negative relationship between “current” levels of wages and unemployment is not necessarily in contradiction with the concept of compensating differentials and with the idea that - *ceteris paribus* - “permanent” levels of wages might be positively correlated (in the long run) to unemployment rates across areas. While the former describes deviations of unemployment and wage from the permanent features which characterise each area, the latter describes an equilibrium of such permanent features across different areas.

In the next sections both these aspects will be analysed in the cases of Germany and Italy. First we describe the institutional setting in both countries and present some stylised facts on regional labour market differences. Then we shall try to investigate the existence of a positive relation between permanent values of wage and unemployment at a local level looking at the structure of wage and local unemployment differentials (given the assumption of a “no mobility” equilibrium). Then, we shall study the equilibrium conditions of the current values of the same variables (i.e., how wage levels react to variation of local unemployment rates).

⁴ For example, assume the existence of two areas, one more appealing than the other one for the presence of a higher degree of “amenities”. In order to respect the long run “no migration equilibrium”, the first area will present lower wages and higher unemployment as opposed to the other. Had not been so, the less appealing area would be completely inhabited. Then the two areas, even sharing the same trade-off between wage and unemployment, will take, *ceteris paribus*, different positions on the wage curve: on the top left for less pleasant areas, on the bottom right for more appealing ones.

3. The Institutional Setting

Germany

In Germany, the largest regional differences on the labour market are observed between the former East German states (Mecklenburg-Western Pomerania, Saxony-Anhalt, Brandenburg, Berlin, Thuringia, and Saxony) and the West German states. Also in West Germany, there are persistent regional differences, but they are relatively small in comparison to the East-West divide (OECD, 2000). The persistent differences between East and West Germany are related to several institutional decisions in 1989 and 1990 (Sinn and Sinn, 1991). After re-unification the closing of the wage gap was more rapid than the improvements in labour productivity in East Germany. This made production in traditional firms too costly (piece rates are still almost 10% higher in the East on average) and led to a massive de-industrialisation. Mainly subsidiaries of West German or international enterprises with established brands (and their related market and price setting power) and experience in marketing and export survived the first half of the nineties. The main problem of start-ups by local entrepreneurs was a lack of capital. The massive structural break incurred by the bankruptcy of most of the traditional firms and relatively low investments from West Germany and abroad led to a high and persistent unemployment.

Usually two arguments are raised for the rapid wage increases in East Germany. First, unions and politicians argued that without comparable wages in both parts of the country, there would be brain-drain and a dramatic migration from the East to the West. In addition, several commentators predicted the creation of a “German Mezzogiorno” if the living conditions would not converge (and wages and social benefits were seen as crucial parts of the living conditions that should be comparable in all regions of Germany by the constitution). Second, West German firms had no interest in a low-cost competition with comparable institutional rules and infrastructure within the own country.

In addition to the relatively low labour demand, incentives to look for a new job from unemployment are lower in East Germany than in the West because the relatively generous West German social benefits system was almost fully transferred to the East part of the country, but productivity, labour demand and living costs are lower.

The consequences are that investments and economic growth in East Germany are lower than in West Germany since 1995 and unemployment is persistently higher. Migration from East to West Germany is confined to young and relatively well-educated people and this reduces the attractiveness of the labour force in the East. Productivity is still only 70% of the level in West Germany. The net transfers of more than 80 billion per year from West to East are mainly spent for consumption and welfare benefits instead of investments. The topical propositions to improve the situation do not promise a quick fix of the problems, but they could at least reduce the East West divide somewhat.⁵

⁵ First, it is proposed to reduce regulations and over generous social benefits. Second, subsidies should be concentrated on regions and sectors with the highest future potential such as the automotive industry and the high technology sector in the regions of the cities of Dresden and Leipzig. Third workfare programmes such as the so-called “Magdeburger Alternative” should push unemployed into low-paid jobs at the level of regional productivity with additional public transfers in order to secure a decent standard of living.

Italy

In Italy the debate on the existence of significant differences in local labour market conditions has a long standing tradition and has been associated with a long sequence of policy measures and “special” regimes. In particular, the latter have regarded the more disadvantaged areas of the country (mainly located in the Southern regions), the so-called “Mezzogiorno”. The main policies implemented in recent decades were aimed at promoting faster convergence in income levels across areas, through national collective bargaining and (after 1968) through the abolition of the so-called “gabbie salariali” (which were used to set wage differences in collective negotiations across areas). At the same time, faced with increasing gaps in productivity levels and a different degree of competitiveness between Northern and Southern regions, a substantial flow of transfers and subsidies (mainly in the form of cuts in social security contributions) was directed towards firms operating in the more depressed areas. In the political arena the focus has been placed on the rigidities emerging from these institutional arrangements and, in particular, on the constraints imposed on the functioning of local labour markets (in terms of distortions of both relative factor prices and competitiveness with respect to local economic conditions).

The empirical evidence also shows a progressive polarisation of labour market conditions in different areas of the country (mainly the North-South divide) over the last decades, characterized by growing unemployment differentials and the reduction in (internal) migration flows - from the South to the North of Italy (Attanasio and Schioppa, 1992). In a number of previous studies, the relationship between wages and unemployment was showed to be rather weak, with significant differences existing between small and large firms and between Northern and Southern regions (Bodo and Sestito, 1994; Faini, 1995; Casavola *et al.*, 1995; Maida *et al.*, 2005).

The political debate has recently been centred again on the lack of flexibility and segmentation of local labour markets. However, despite general consensus among economists and policy makers on the need of establishing a closer link between local economic conditions and the functioning of the labour market, the proposals vary substantially as to which are the desirable measures to implement. In this respect, some favour a new form of *gabbie salariali* for (national) collective bargaining, while others argue in favour of a complete decentralisation of wage bargaining.

The institutional changes which, in recent years, have taken place both in the composition and in the determination of labour costs (i.e. elimination of the wage indexation mechanism - the *scala mobile* - and seniority premia; the tripartite incomes policy agreement of July 1993), as well as the progressive reduction of transfers and subsidies to firms operating in the South, should be seen as a mean to increase the overall flexibility of the labour market.

Further contractual flexibility introduced by recent labour market reforms (such as temporary help employment with the so called “Treu Package” in 1997 and other forms of temporary contracts – including staff leasing, job sharing and on call jobs – with the “Biagi law” in 2003) should go in the same direction.

In the light of the above considerations, it might be useful to investigate further the nature of the wage-unemployment differences which characterise local labour markets, and also see whether a more flexible wage bargaining system could effectively guarantee a closer link between local unemployment and wage levels. In other words,

what it is needed is an estimate of the elasticity that links wages to local unemployment. In the remainder of this work some of the issues discussed above will be addressed.

4. Some Stylised Facts

In this section some stylised facts concerning the functioning of local labour markets in Germany and Italy are presented, paying specific attention to the evolution of wage and unemployment differentials between, Northern and Southern regions in Italy, Western and Eastern ones in Germany.

A caveat, particularly relevant in the Italian case, is related to the presence of a large share of the labour force employed in the underground economy. Whilst the effective size of this non-regular form of employment is not known, its effect on the functioning of local labour markets might be relevant. This is an obvious limit in any analysis of the wage-unemployment relationship which the present study shares with previous work and which should be born in mind in the interpretation of the results.

In both Italy and Germany, unemployment rates show considerable differences across regions. Besides the traditional divide between North (3-8%) and South unemployment rates (about 15-20%) in Italy, West (6-12%) and East (14-21%) ones in Germany, there are noticeable differences also among neighbouring regions. Those differences underline the existence of a very low geographical workers mobility and exhibit a significant persistence over time (Faini *et al.*, 1996).

Figures 2a-2c depict the evolution of regional unemployment rates in Italy (1991-2004) and Germany (1996-2002). More specifically, in figure 2a each point represents a specific region, whose coordinates are given by its unemployment rate differential (with respect to the corresponding national average) at the beginning and the end of the period considered. The figure clearly shows the above mentioned North-South and West-East divides: all Italian Northern regions and German Western ones (with the exception of Bremen) are characterized by unemployment rates below the national average in both years, while the opposite is true for the regions in the South of Italy and East of Germany. In Italy, despite the relative improvement of labour market performance in Southern regions in the late 1990s and early 2000s (Southern unemployment rates differentials were relatively lower in 2004 than in 1991), differences among Italian regions are still wide and very persistent, with a very stable regions' ranking over time. The same emerges in the case of Germany, where differences are less relevant than in Italy but still growing over the period considered.

Figures 2b and 2c confirm that regional unemployment rates are always below the average national one in all the Northern Italian regions and Western German ones over the whole period considered, while the opposite is true (i.e., the regional unemployment rates are higher than the national one) in the South of Italy and East of Germany.

(Figures 2a-2c around here)

Turning to wages, Figure 3 reports the structure and the evolution of regional wage differentials in Italy (1991-2004) and Germany (1996-2000). Wage differentials have been computed as deviations of regional wages from national averages, once again at the beginning and at the end of the period considered. The scattered diagrams indicate

that the structure of wage differentials is much more stable but more dispersed in Germany than in Italy.

In general, most Northern Italian regions pay higher wages than the national average, but relatively high wages are registered at least in one of the years considered also in some Southern ones (such as Calabria and Sardegna). Over time no clear-cut trends seem to emerge (since both some Northern and Southern regions have been improving their relative position), even if for most of the South (mainly Campania, Molise, Puglia and Sicilia) wage differentials have been widening in the last decade.

In Germany wage levels were more than 15% lower than the national average in the Eastern parts and there was almost no cohesion process between 1996 and 2000. The only exception is the federal capital Berlin. Its former western part belongs to the western collective bargaining area. This is important because most wages belong or at least are oriented at the collective bargaining accord struck separately for different regions. While it was originally planned to increase the Eastern collective bargaining wages quickly to the Western level, still Eastern collective bargaining wages are lower than Western wages. In addition, a much higher share of establishments does not take part in collective bargaining in the East and pays wages lower than the bargained wage or opts out of paying the full wage on the basis of an acute economic emergency.

(Figure 3 around here)

At this point it would be interesting to study more closely the relationship between wages and unemployment at the local level. One obvious feature of the previous analysis is that some “permanent” characteristics appear to shape the long term structure of both wages and unemployment levels across areas. However, when the focus is placed on flexibility issues and on the ability of local labour markets to adjust to specific shocks, then what is really necessary for the identification of the wage curve is how variations in current unemployment are related to variations in current wages across areas. In other words, it is important to purge the analysis from the long term features (observable and unobservable) that characterise local labour markets such as the quality of the infrastructure, the costs of living or the emergence of industry clusters and specific economic characteristics of regions (the so-called “fixed or permanent effects”).

As a first approximation, in Figure 4 we plot first differences in regional wages and unemployment. On inspection of the cloud of points in the diagram, no clear cut negative relationship – as implied by the theoretical framework - between unemployment and wages appears in either country. Nonetheless, wage first differences are much more heterogenous in Italy than in Germany (probably also due to the longer time span considered).

(Figure 4 around here)

5. The Empirical Analysis

In the empirical literature the wage curve has been often specified (and estimated) as a reduced form assuming the (local) unemployment variable as exogenous. However, if

the wage curve is interpreted as a structural relation, it is necessary to introduce some assumptions concerning how the market equilibrium is determined: namely, a relation written either in terms of a price equation or of a labour demand curve is necessary.

The model can be written as follows:

$$w_j = \phi[\mathcal{J}(U_j), \rho_i, \mathbf{X}_j] \quad [1]$$

$$U_j = \varphi(w_j, \rho_i, \sigma_j, \mathbf{Z}_j) \quad [2]$$

$$E(\Gamma_j) = \Gamma^* \quad [3]$$

where j indexes the area (ρ), w is the wage level, U the local unemployment, σ a demand shock, and X and Z are two vectors of control variables (i.e. respectively for the wage curve [1] and the price/labour demand curve [2]). The model is closed by the “no-migration condition” according to which, in equilibrium, expected utility should be equalised across areas.

The identification of equation [1] can be obtained either by assuming that only variations in σ occur (i.e. idiosyncratic shocks affect only the demand), or using Instrumental Variables techniques to instrument local unemployment⁶. A further option is also to consider a recursive model, in which wage levels only depend on past unemployment.

Empirical estimates of the wage curve are usually based on highly disaggregated data, such that the heterogeneity present in local labour markets both in terms of workers’ (i.e. age, education, work experience, etc.) and firms’ characteristics (i.e. size, level of unionisation, profitability, etc.) is controlled for. However, the unemployment rate is usually referred to the area where individuals work (or firms are located). The use of variables at different levels of disaggregation may lead to biased estimates if all the individuals who work in the same region share some common factors. More precisely, the estimates of the more aggregated variable (i.e., the unemployment rate) present lower standard errors. From a statistical point of view, this can overestimate the importance of local unemployment in influencing individual wages.

To tackle the problem there are a number of options available. First, estimates can be obtained using cell means (conditional or not on a given set of characteristics) for the more disaggregated variable, where the actual degrees of freedom are determined by the more aggregated variable. Second, a “two stage” procedure has been proposed by Moulton (1986, 1990). In the first step, estimates of area wage differentials (using regional or provincial dummies) conditional on a given set of individual and firms’ characteristics are obtained for each period. In the second step, the estimated wage differentials are regressed against local unemployment as well as both time and area fixed effects. This model is estimated using standard errors from first stage regression as weights⁷.

⁶ Note that less than 10% of the studies on wage curves use instrumental variables to control for endogeneity of the unemployment rate and used OLS as the estimation technique instead (Nijkamp and Poot, 2005). Studies controlling for endogeneity reduces the wage curve elasticity.

⁷ Equation [3] assumes that mobility flows are equal to zero and that there is no spatial correlation between areas (i.e., $\text{cov}(w^k, w^h) = 0$ if $k \neq h$, where k and h are regions) (cf. Anselin, 1988). However, the

5.1. An Econometric Specification for the Wage Curve

The specification adopted in most empirical studies of the wage curve is as follows:

$$w_{ijt} = \rho_i + \tau_t + \phi f(U_{jt}) + \beta X_{ijt} + \varepsilon_{ijt} \quad [4]$$

where w_{ijt} is the (log) wage paid to individual i in the region j at time t ; $f(U_{jt})$ is some non-linear transformation of the local unemployment rate; ρ_i and τ_t are, respectively, area and time fixed effects, while X_{ijt} is a vector of additional factors that may influence wages; finally, ϕ and β are the parameters to be estimated and ε_{ijt} is the error term.

Equation [4] assumes the existence of a long run equilibrium relation between wage levels and local unemployment rates. The expected sign of this relationship - as discussed in a previous section - is negative ($\phi < 0$). However, if there is some inertia in the adjustment process a re-parameterisation of [4] - as in equation [5] below - might be preferable:

$$\Delta w_{ijt} = \rho_i + \tau_t + \gamma_1 f(U_{jt-1}) + \gamma_2 \Delta f(U_{jt}) - \alpha w_{ijt-1} + \beta X_{ijt} + \varepsilon_{ijt} \quad [5]$$

In the above specification the long run equilibrium – between the *level* of wages and the *level* of local unemployment - is embodied in an Error Correction Mechanism (ECM).

Furthermore, some interesting assumptions can be tested. When $|\alpha| \approx 1$ and $\gamma_1 = \gamma_2$ equation [5] reduces to [4]. Also, if $\alpha \approx 0$ the relationship becomes a more traditional augmented Phillips curve; alternatively, when $0 < |\alpha| < 1$ we get a more standard partial adjustment wage equation⁸.

The coefficient α measures the stickiness of wages to variations of the local unemployment rate: the closer α is to unity (in absolute value), the faster is the adjustment of wages to variations in local unemployment.

It is worth stressing, however, that obtaining unbiased estimates of α can be problematic. Blanchard and Katz (1997) point out how inappropriate wage measures (for example, a measure influenced by the number of days worked, such as average annual earnings) or the presence of sampling errors could lead to an upward biased estimate of that coefficient⁹. An important reason is that working hours tend to decline in depressions (Card, 1995). Nevertheless, most empirical estimations of the wage curve are on the basis of annual or monthly data (Nijkamp and Poot, 2005). We avoid this by calculating hourly wages.

existence of spill-over effects between areas close to each other cannot be excluded *a priori*. We tried to assess spill-over effects by taking out migrants between regions from the sample in Germany. The results did not change, however.

⁸ In this case the long run elasticity of wages to local unemployment is $\eta_{w,U} = \gamma_1/\alpha$.

⁹ This kind of bias can be avoided paying particular attention to the measure of wage levels adopted in the empirical analysis: one effective way is to control for the number of hours/days worked (for example, using hourly or weekly earnings instead of annual ones).

5.2. Data and Results

In the empirical analysis for each country we used a matched data set obtained by merging – at the regional level - individual records on wages, personal and firm characteristics as well as geographical location with unemployment rates and other local labour market features reported in the Labour Force Survey (LFS).

Given the aim of our analysis, we restricted our sample to non-agricultural employees working in the private sector, thus excluding self-employed and public sector employees.

In the case of Italy, we used micro-data from different waves of the Bank of Italy's Survey on Households Income and Wealth (SHIW), focusing our attention on the last decade¹⁰. Detailed information on personal and job characteristics of a representative sample of around 4000 private employees (for each wave) is available. Personal characteristics include gender, age, years of education and marital status, while job characteristics include economic sector, years of work experience, tenure, occupation (blue collars, white collars and managers), type of contract (whether full or part-time) and number of hours worked. Individuals are located according to their administrative region of residence (19 regions), covering the entire national territory¹¹. The survey provides direct information on annual net wages, number of months worked and usual weekly hours (including overtime): on the basis of this information, both hourly and monthly wages therefore could be retrieved.

Regional unemployment rates and other local labour market indicators were derived from the Labour Force Survey, as they are periodically published by the National Statistics Office (Istat).

For Germany, our main data source is the German Microcensus (MC). The microcensus is the official representative statistic of the population and the labour market, involving 1% of all households in Germany every year. The total number of households participating in the microcensus is about 370,000 (encompassing 820,000 persons), including about 70,000 households (about 160,000 persons) in the new *Länder* and the eastern part of Berlin.

All households have the same probability of selection for the microcensus. Within the territory of the Federal Republic of Germany, sampling districts are selected in which all households and persons are interviewed. Every year, a quarter of all households included in the sample are replaced. This means that every household stays in the sample for four years. Household numbers are not included in the Scientific Use File. Hence, the microcensus cannot be used as a panel.

The annual standard programme of the microcensus includes characteristics on persons (age, sex, citizenship, etc.), the family and household context. In addition, we know the main and the secondary place of residence, whether the individual is employed, on job search, unemployed or out of the labour force. There is information on the number of children at pre-primary age, pupils, students in the household and information on individual general and vocational level of qualification and on the level of the individual and household net incomes. The microcensus is the data set which is

¹⁰ Since the survey is usually run every two years, we used the 1991, 1993, 1995, 1998, 2000, 2002 and 2004 surveys.

¹¹ Italy is actually divided into 20 administrative regions, characterized by quite different size. Given the relatively low number of observations in SHIW for the smallest regions (less than 50 observations per year), the empirical analysis was based on 19 regions, with Valle d'Aosta aggregated with Piemonte.

most adequate for our research purpose because it combines two advantages: a huge sample size and a large number of covariates on the individual level. The following variables from the microcensus are used in our estimations: net income¹², working time, qualification, job tenure, federal state (*Land*) the individual lives in, and personal characteristics (age and gender).

Besides the microcensus, we use the INKAR (an acronym for indicators and maps of regional development) database and data provided by the German Federal Statistical Office. The INKAR database is published yearly by the Federal Office for Building and Regional Planning in co-operation with the Federal Statistical Office and the Statistical Offices of the German states (*Länder*). It regularly and topically describes the situation of the regional development in Germany and Europe. It includes about 20 indicators on topics such as age and population structure, employment or unemployment. From the INKAR database, the variable “average yearly unemployment rate on state-level” is used.

For both Italy and Germany, we derive hourly income by dividing net income by working time.¹³ We construct the variable “years of education” by using the information on the highest degree of schooling and professional education, taking the standard lengths of all primary, secondary, and tertiary qualifications and add them up accordingly for each person. The variable “labour market experience” is constructed by subtracting the years of education plus six from age. Hence, we actually use a proxy for potential labour market experience¹⁴.

Table 1 presents some estimates of the wage curve for Italy (first panel) and Germany (second panel). The dependent variable used to obtain the estimates reported in Table 1 is derived from area fixed effects (i.e. conditional mean earnings at the regional level) computed in a first stage regression in which, for each year, controls for individual characteristics were also included¹⁵.

In columns 1 and 2 we report estimates obtained fitting the traditional specification of the wage curve – as described in equation [4] – while in the remaining columns we report estimates of a different specification of equation [5] with the dependent variable in first differences and a lagged term on the right-hand-side¹⁶.

In columns 1 and 3 we assess the extent of the potential bias due to the omission of regional fixed effects on the estimate of the elasticity of local unemployment; the latter are included in the remaining specifications. In columns 4 and 6, the change in local unemployment was added¹⁷. It is worth noting that in column 4 the current

¹² In micro-data for Germany net income is given in intervals. We take midpoints of the categories. The problem of earnings information given in categories is less severe than it first seems. First, categories are quite small (e.g. 24 income categories in 2000). Second, individuals usually don't know exactly the monthly income and therefore, measurement error should not be much higher than in other data sets.

¹³ For Germany we restrict hourly earnings to a maximum of 154 € and a minimum of 1.02 €. The upper limit affects only very few observations due to the categorical income variable and the lower limit affects less than 0.5 percent of the sample.

¹⁴ In the Italian data-set we have also a direct measure of work experience. Using the latter instead of potential experience does not change significantly our main results.

¹⁵ More specifically, we control for gender, education, experience and tenure.

¹⁶ It is important to stress that the re-parameterisation of equation [4], given the presence of a lagged dependent variable on the right-hand-side, still implies that the equation is in level – as the theory of the wage curve suggests – and that the error term is not altered by the transformation.

¹⁷ In column 6, the specification reported in [5] is estimated.

unemployment rate is used instead of the lagged one. Finally, given the potential simultaneity between wages and local unemployment, in the last column we used an Instrumental Variables (IV) estimator.

(Table 1 around here)

In general, results show no evidence for a statistically significant negative relationship linking unemployment rates to wages at a regional level in Italy, while in Germany results are quite sensitive to our model specification: while no evidence for a wage curve seems to emerge from the traditional specification in levels, ECM re-parameterisation points out the existence of a (weakly) significant negative effect of local unemployment on wages, even if the size of the effect is much smaller than what the mainstreaming empirical evidence predicts (in absolute value, the long run elasticity is around 0.04, much lower than the “empirical rule” of 0.1, compare Blanchflower and Oswald, 1994a or Nijkamp and Poot, 2005).

The importance of controlling for regional fixed effects clearly emerges from the results of both countries. As shown in Table 1, mainly for Italy a spurious negative correlation emerges between local unemployment and wages only when fixed effects are omitted. Focusing on the dynamics of wages, it is shown that the coefficient α on the lagged dependent variable is generally significantly different from both 0 and 1, suggesting that there might be substantial inertia in the adjustment process of wages.

5.3. Testing the Robustness of the Results

To check the robustness of our results, we also investigate the possibility that a negative relationship between wages and local unemployment might exist in specific segments of the labour market, where a lower degree of regional flexibility might be expected (such as specific regions or groups of workers).

Table 2 presents the main results for different sub-groups of our samples, paying specific attention to the role of gender and education. Even after disaggregating the sample, we were unable to detect any negative and statistically significant relationship between wages and local unemployment in Italy for the sub-groups considered.

(Table 2 around here)

In the case of Italian women and the South of Italy, the wage curve results positively sloped, with a positive significant effect of changes in the rate of unemployment (i.e., the coefficient ϕ_2). Although these results might appear somewhat puzzling, they can be rationalised taking into account the different patterns of labour market participation of women and of employees in the South - as compared with, respectively, males and employees in the North - and how those patterns can affect the relation between wages and local unemployment. Typically, increases in the (local) unemployment rate - whilst having a negligible effect on wage levels - can significantly increase the flow of discouraged workers, mainly of the low paid ones, out of the labour market.

In Germany we only detect a significant negative impact of the regional unemployment rate on individual wages in the Eastern part of the country. The relationship is the highest for the medium educated (like in Italy), but it is also never

significant. In accordance with e.g. Baltagi and Blien (1998) the coefficient of females is large than that of males, the differences are small however and both coefficients are insignificant.

We also tested whether the reaction of wages to local unemployment could vary along the wage distribution.

In presence of minimum wages or any other type of wage floors (such as those imposed by centralized industry wage bargaining), low wages paid in the regular economy may be *de facto* less reactive to local unemployment shocks, mainly when a relative increase in unemployment should make local wages to further decrease. Furthermore, in the upper part of the wage distribution, individual bargaining may be relatively more important than national/firm contracts in determining wage levels and dynamics. If this is the case, shocks in local unemployment might be quite irrelevant in affecting wages, mainly when high paid workers are characterized by valuable (and relatively scarce) skills and knowledge and tend to be more regionally flexible.

In light of the above considerations, in Table 3 we present estimates of the wage curve based on first-step quantile regressions in correspondence with the relevant deciles of the wage distribution in both Italy and Germany¹⁸. Reported estimates refer to the usual wage curve specification, both without and with regional fixed effects (model 1 and 2 in Table 1), and to the ECM re-parameterisation (model 6 in Table 1).

Results for both Italy and Germany show some evidence in favour of a wage curve for the middle part of the wage distribution, but also in this case our conclusions depend on the model specification adopted. In the case of Italy, with the ECM specification we obtain a significant negative relation between regional unemployment and wages around the median (and at the 6th decile), while the effect of unemployment is significantly positive for the lowest decile.

For Germany the relation between regional unemployment and wages is also stronger for the middle part of the wage distribution. This is also found by Büttner and Fitzenberger (1998). The highest correlation is measured for the 4th decile, while also the 6th until the 8th decile have significant negative unemployment coefficients. As for Italy, the correlation is positive for the lowest decile.

(Table 3 around here)

6. Concluding Remarks

In this study we investigated the functioning of local labour markets in Germany and Italy on the basis of individual data. Results show that despite the growing differences in unemployment rates among different areas (mainly between Northern and Southern regions in Italy and East and West in Germany), geographical wage differentials have remained relatively stable over time and fairly insulated from local labour market conditions.

The evidence reported suggests that the traditional negative relationship linking wage levels to local unemployment rates - the wage curve - does not appear yet to be a

¹⁸ More specifically, the dependent variable of the second stage is now made of the regional fixed effects obtained from the first step quantile regressions on individual micro-data, in which for each decile we controlled for the same worker characteristics used in the previous OLS estimates.

stylised fact in all the EU countries, mainly in the Italian labour market: the relevant coefficients often show the wrong sign and are in general not statistically significant. In the case of Germany, results are instead quite sensitive to the model specification and the group considered. In both countries, the reaction of wages to local unemployment varies significantly along the wage distribution, being more sensitive around the median quantiles.

The data used reveal also the existence of inertia in the wage adjustment process: more specifically neither a wage curve, nor a Phillips curve specification seem to provide an adequate description of wage determination in both Italy and Germany (also compare Pannenberg and Schwarze, 1998). These results thus provide additional evidence which casts some doubts on studies based on either of the above specifications.

The “flatness” of the Italian wage curve contrasts with the high levels of unemployment experienced in Southern regions. One of the possible explanations for the above evidence can be found in the structure of collective bargaining, where national agreements appear to be still effective in ensuring little dispersion in wage levels across areas. Furthermore, if the large size of the informal sector in Italy is taken into account, then these findings might simply indicate that adjustment does not occur in the regular sector of the economy, but rather outside of it. This interpretation seems particularly suggestive, though the lack of detailed information on the informal sector makes it only tentative.

In Germany we mainly find a correlation between unemployment and wages for the Eastern part of the country and the medium parts of the wage curve. We interpret these findings as evidence that these groups of employees cannot easily react on wage changes by migrating to other parts of the country or leaving the labour force. Especially in the Eastern part, cheap housing and local services make it rather expensive for many to move to other regions with higher wages and better labour market prospects.

Concluding, our estimations cast doubt on the applicability of a universal empirical law that the unemployment elasticity of pay is around -0.1 (Blanchflower and Oswald, 1994a; Card, 1995). The striking likeness of hundreds of regressions on this subject may be based on the small variance in estimation techniques and disregard of some basic econometric problems, such as the endogeneity of the unemployment variable, lags in the transmission and data on wages that do not take into account cyclical movements of hours worked.

References

- Akerlof, G. and J. Yellen (1990), *The Efficiency Wage Hypothesis*, Cambridge University Press: Cambridge.
- Anselin, L. (1988), *Spatial Econometrics: Methods and Models*, Dordrecht et al.: Kluwer Academic Publisher.
- Attanasio, O. and F. Schioppa (1992), Regional Inequalities, Migration and Mismatch in Italy, 1960-1986, in: F. Padoa Schioppa (ed.), *The Economics of Mismatch*, CEPR, London.
- Baltagi, B. and U. Blien (1998), The German Wage Curve - Evidence from the IAB Employment Sample, *Economics Letters*, 61, 135-142.
- Bean, C. (1994), European Unemployment: A Survey, *Journal of Economic Literature*, 32 (2), 573-619.
- Blackaby, D.H. and A. Manning (1990), The North-South Divide: Questions of Existence and Stability, *Economic Journal*, 100.
- Blanchard, O. and L. Katz (1997), What We Know and Do Not Know about the Natural Rate of Unemployment, *Journal of Economic Perspectives*, 11 (1), 51-72.
- Blanchflower, D. and A. Oswald (1990), The Wage Curve, *Scandinavian Journal of Economics*, 92 (2), 215-235.
- Blanchflower, D. and A. Oswald (1994a), *The Wage Curve*, MIT Press: Cambridge
- Blanchflower, D. and A. Oswald (1994b), International Wage Curves, in: R. Freeman and L. Katz (eds), *Differences and Changes in Wage Structures*, University of Chicago Press: Chicago.
- Büttner, T. and B. Fitzenberger (1998), Central Wage Bargaining and Local Wage Flexibility: Evidence from the Entire Wage Distribution, ZEW Discussion Paper No. 98-39, Mannheim
- Bodo, G. and P. Sestito (1994), Squilibri territoriali nel mercato del lavoro e inflazione, in: C. Dell'Aringa (ed.), *Caratteri strutturali dell'inflazione italiana*, Il Mulino: Bologna.
- Canziani, P. (1997), Cohort Effects on Career Patterns. Evidence from Italy, Spain and the UK, mimeo, Centre for Economic Performance, London School of Economics.
- Card, D. (1995), The Wage Curve: A Review, *Journal of Economic Literature*, 33 (2), 758-799.
- Casavola, P., A. Gavosto and P. Sestito (1995), Salari e mercato del lavoro locale, *Lavoro e Relazioni Industriali: Rivista di Economia Applicata*, 4/95.
- Fabiani, S., A. Locarno, G. Oneto and P. Sestito (1997), NAIRU, Income Policy and Inflation, mimeo, *Bank of Italy*.

- Faini, R. (1995), Stesso lavoro, diverso salario ? Flessibilità, gabbie salariali e ruolo del sindacato nel mezzogiorno, in: AA.VV., *Le nuove frontiere della politica economica*, Il Sole 24 Ore ed.: Milan.
- Faini R., G. Galli and F. Rossi (1996), Mobilità e Disoccupazione in Italia: un'Analisi dell'Offerta di Lavoro, in: G. Galli (ed.), *La Mobilità della Società Italiana*, SIPI editore.
- Harris, J. and M. Todaro (1970), Migration, Unemployment and Development: A Two Sectors Analysis, *American Economic Review*, 60 (1), 126-142.
- Lucifora, C. (1991), *Le teorie del salario di efficienza*, Giuffrè Editore: Milano.
- Lucifora, C. and F. Origo (1999), Alla ricerca della flessibilità: un'analisi della curva dei salari in Italia, *Rivista Italiana degli Economisti*, 1.
- Maida, A., F. Devicienti and L. Pacelli (2005), Revisiting the Wage Curve in Italy, Department of Economics Working Paper Series, Università di Torino, 02/2005.
- Manning, A. (1993), Wage Bargaining and Phillips Curve: The Identification and Specification of Aggregate Wage Equations, *Economic Journal*, 103.
- Moulton, B. (1986), Random Group Effects and the Precision of Regression Estimates, *Journal of Econometrics* 32(3), 385-397.
- Moulton, B. (1990), An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units, *Review of Economics and Statistics*, 72 (2), 334-338.
- Nickell, S., R. Jackman and R. Layard (1991), *Unemployment: Macro-economic Performance and the Labour Market*, Oxford University Press.
- Nijkamp, P. and J. Poot (2005), The Last Word in the Wage Curve? *Journal of Economic Surveys*, 19 (3), 421-450.
- OECD (2000), OECD Employment Outlook, Chapter 2, OECD, Paris.
- Oswald, A. (1985), The Economic Theory of the Trade Unions: An Introductory Survey, *Scandinavian Journal of Economics*, 87.
- Pannenberg, M. and J. Schwarze (1998), Labor Market Slack and the Wage Curve, *Economics Letters*, 58, 351-354.
- Phelps, E.S. (1994), *Structural Slumps: The modern Equilibrium Theory of Unemployment, Interest and Assets*, Harvard University Press: Cambridge Mass.
- Salop, S. (1979), A Model of the Natural Rate of Unemployment, *American Economic Review*, 69 (1), 117-125.
- Shapiro, C. and J. Stiglitz (1984), Equilibrium Unemployment as a Worker Discipline Device, *American Economic Review*, 74 (3), 433-444.
- Sinn, G. and H-W. Sinn (1991), *Kaltstart*, Mohr(Siebeck), Tübingen.

Figure 1 - The wage curve

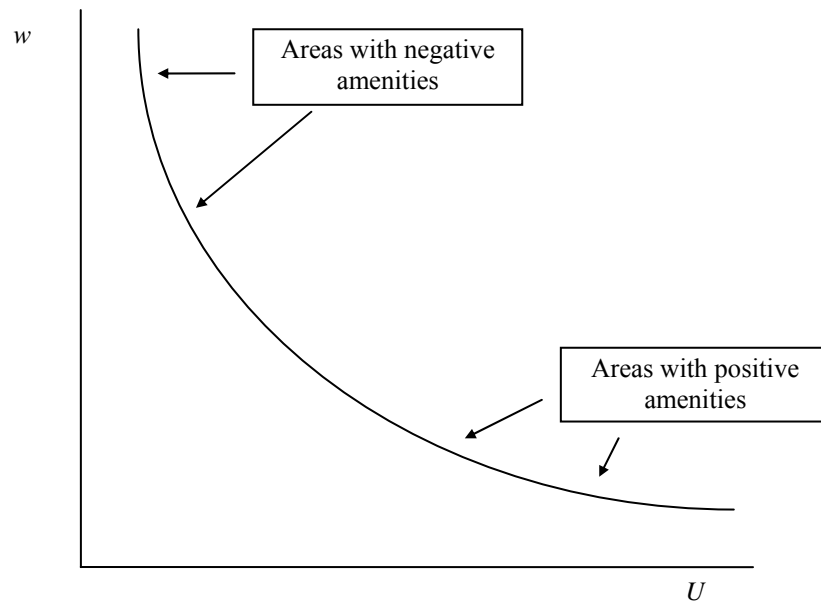
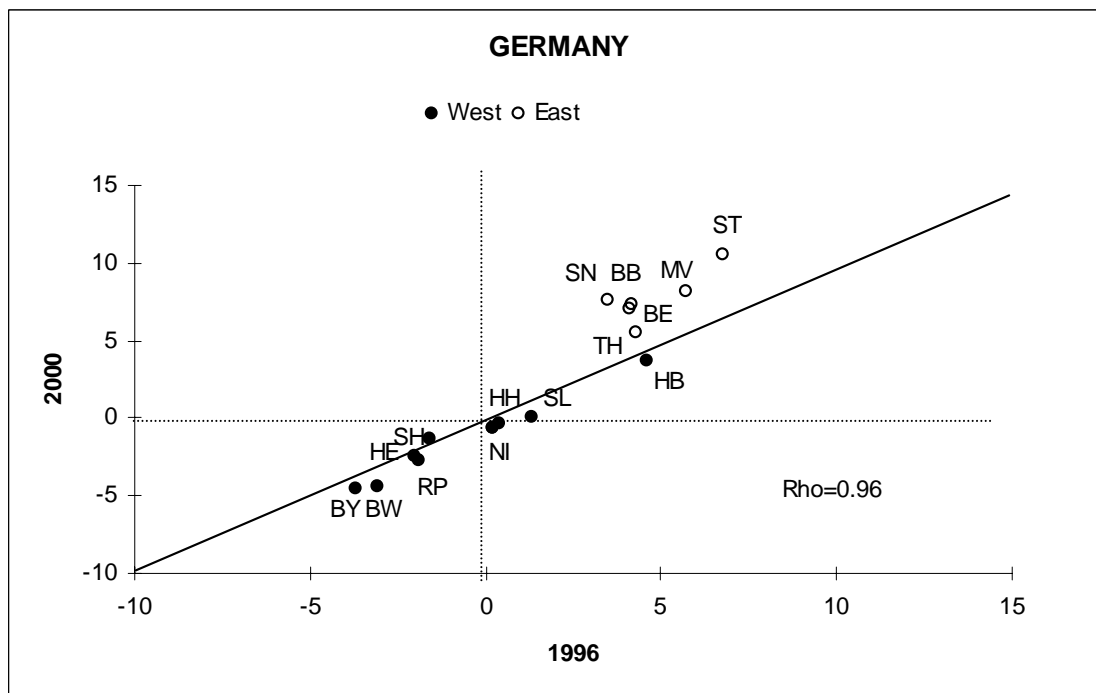
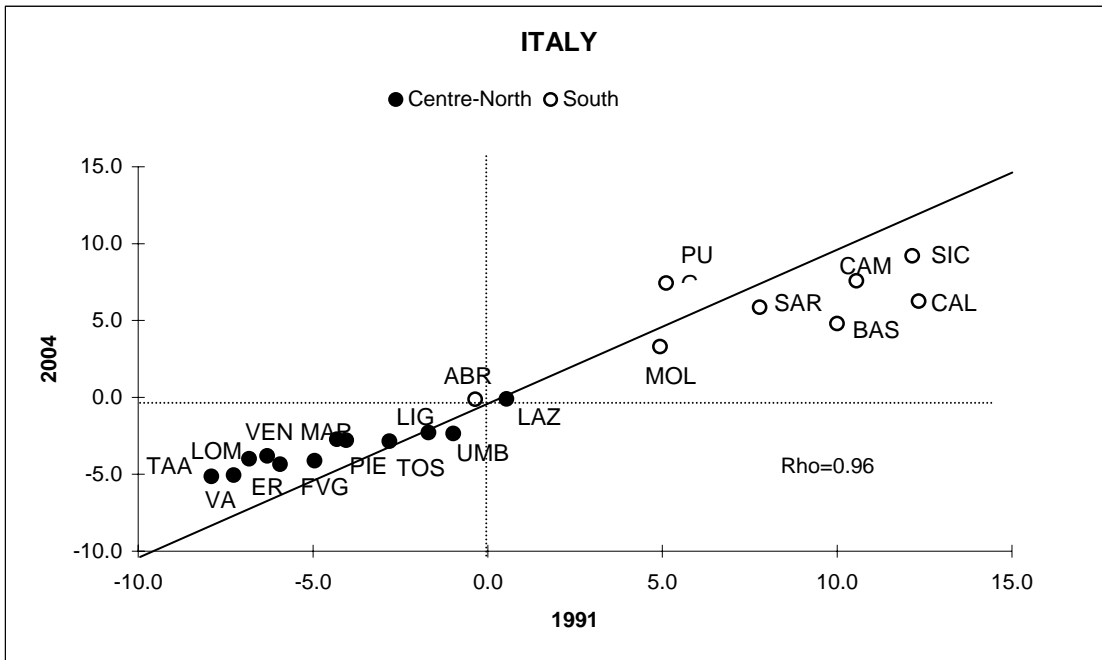


Figure 2a: Evolution of regional unemployment differentials (deviations from national means)



Source: Istat (Italy), INKAR (Germany)

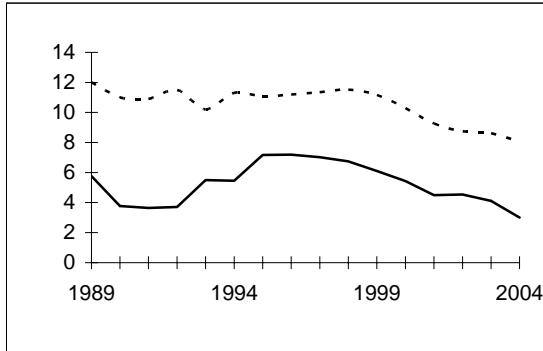
Notes: For each year, per cent deviation of regional unemployment rate from national average (Regional U - National U), Rho = correlation coefficient,

Key for Italian regions: ABR = Abruzzo, BAS = Basilicata, CAL = Calabria, CAM = Campania, ER = Emilia Romagna, FVG = Friuli Venezia Giulia, LAZ = Lazio, LIG= Liguria, LOM = Lombardia, MAR = Marche, MOL = Molise, PIE = Piemonte, PUG = Puglia, SAR = Sardegna, SIC = Sicilia, TAA = Trentino Alto Adige, TOS = Toscana, UMB = Umbria, VA = Valle d'Aosta, VEN = Veneto

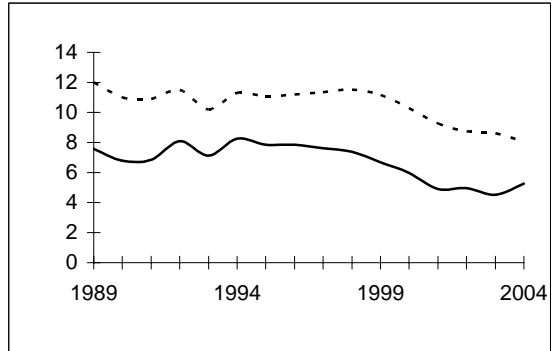
Key for German regions: BW = Baden-Wuerttemberg, BY = Bavaria, BE = Berlin, BB = Brandenburg, HB = Bremen, HH = Hamburg, HE = Hesse, NI = Lower Saxony, MV = Mecklenburg-Western Pomerania, NW = North Rhine-Westphalia, RP = Rhineland-Palatinate, SL = Saarland, SN = Saxony, ST = Saxony-Anhalt, SH = Schleswig-Holstein, TH = Thuringia.

Figure 2b: Evolution of regional and national unemployment in Italy: 1989-2004

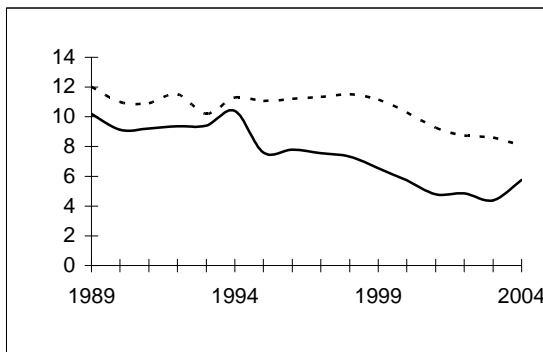
Valle d'Aosta



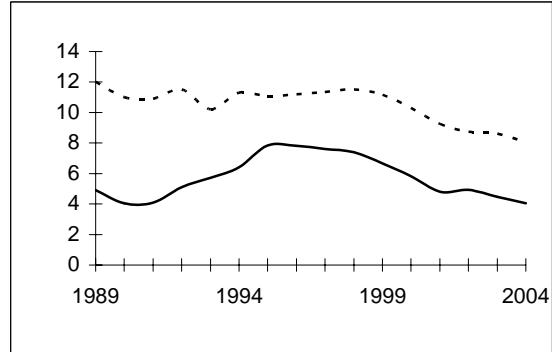
Piemonte



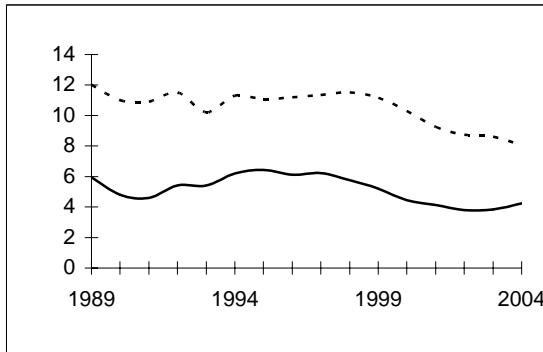
Liguria



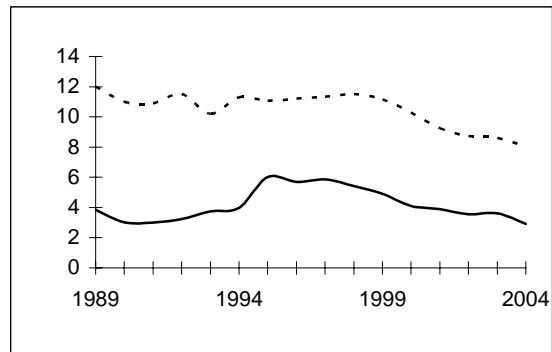
Lombardia



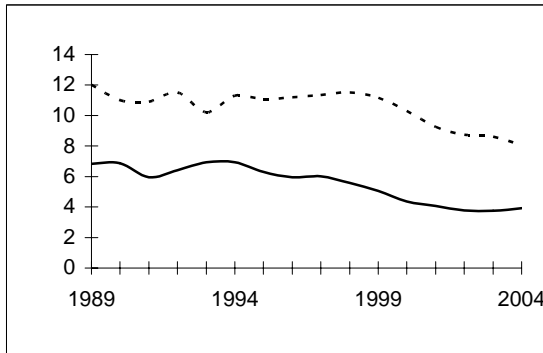
Veneto



Trentino A. A.



Friuli V. G.



Emilia Romagna

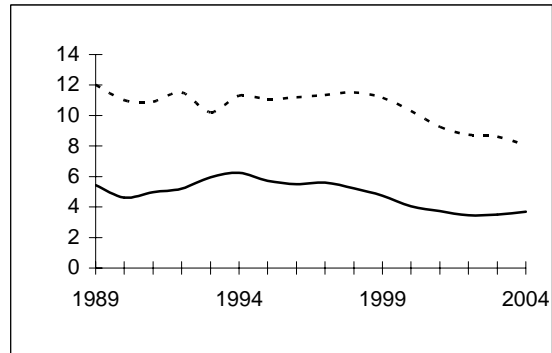
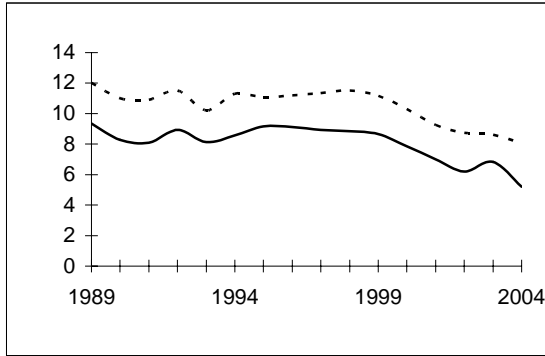
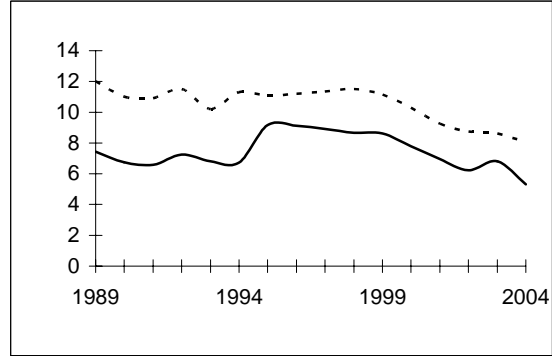


Figure 2b (continued)

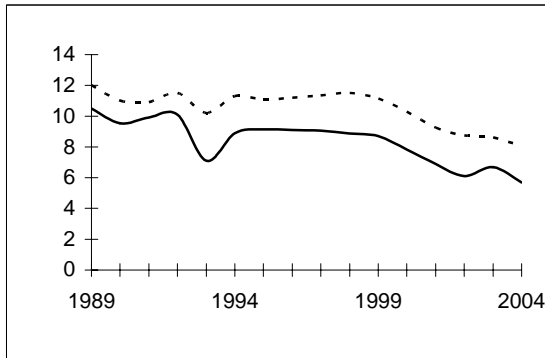
Toscana



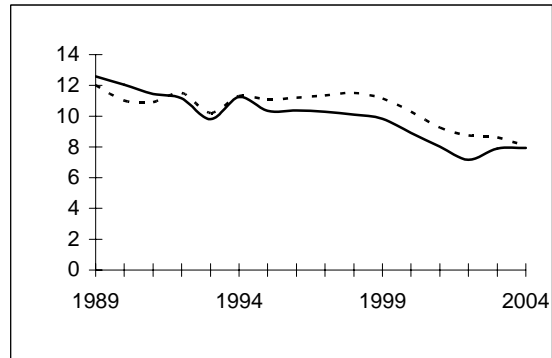
Marche



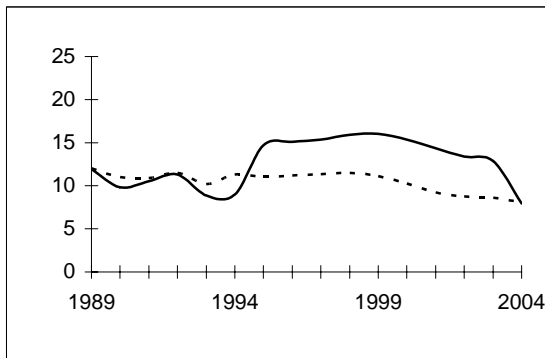
Umbria



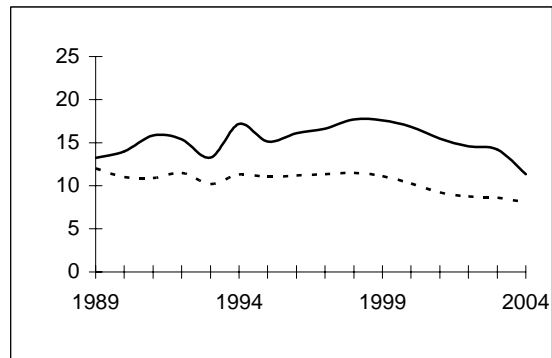
Lazio



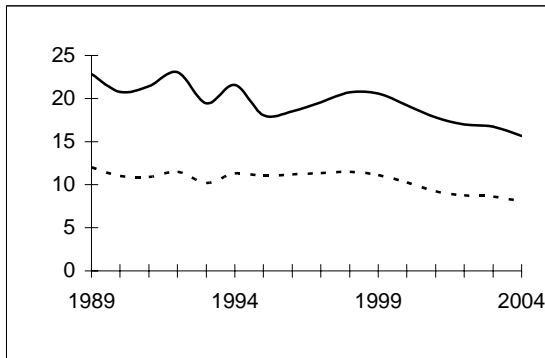
Abruzzo



Molise



Campania



Basilicata

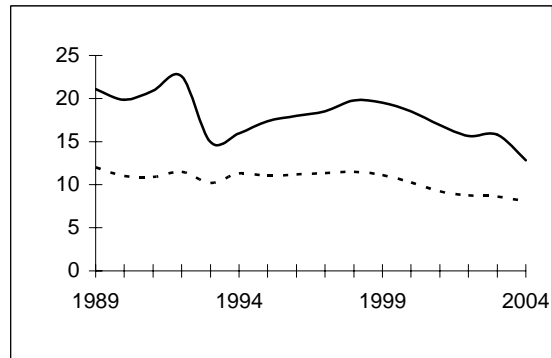
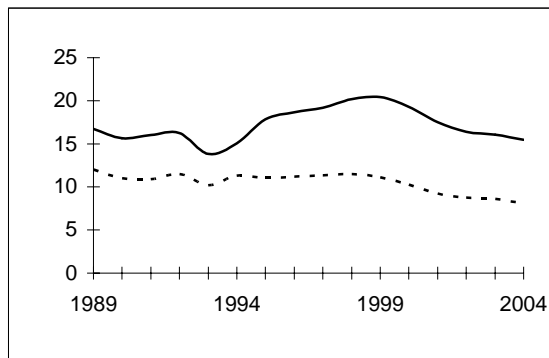
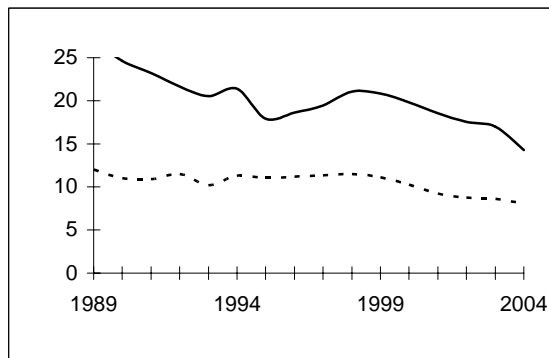


Figure 2b (continued)

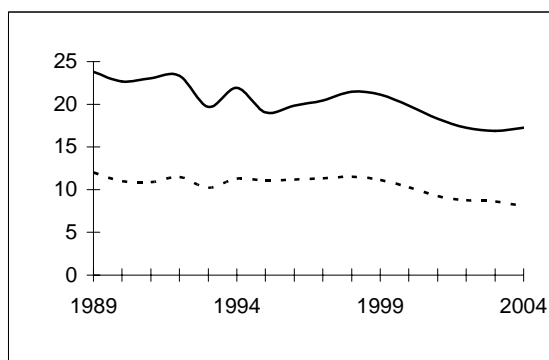
Puglia



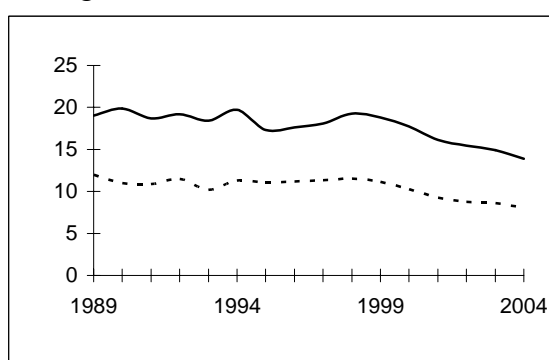
Calabria



Sicilia



Sardegna

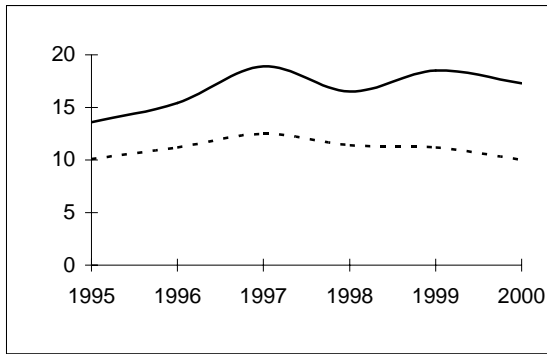


—— regional unemployment rate
----- national unemployment rate

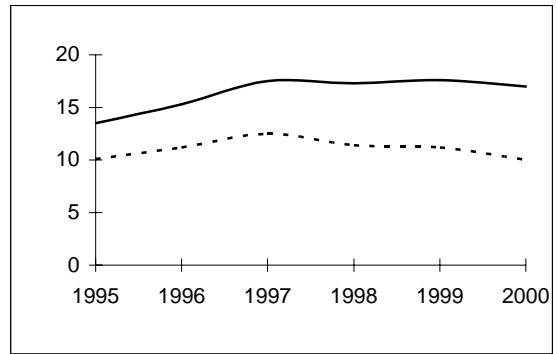
Source: Own calculation on the basis of Istat data

Figure 2c: Evolution of regional and national unemployment in Germany: 1989-2004

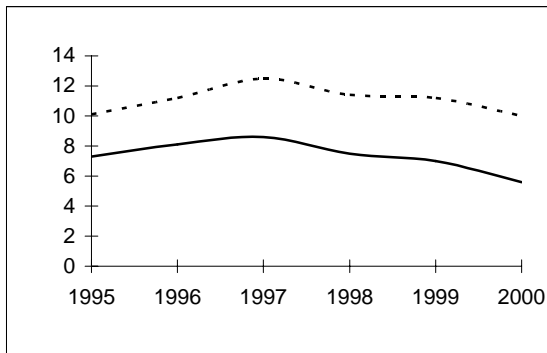
Brandenburg



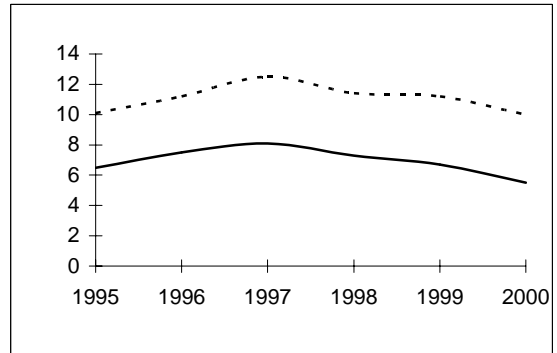
Berlin



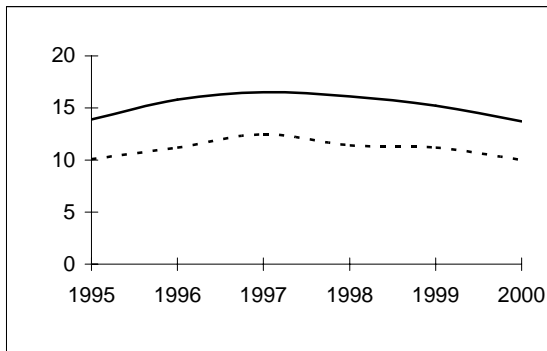
Baden-Wuerttemberg



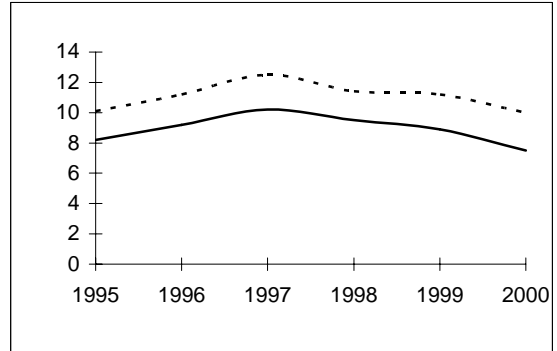
Bavaria



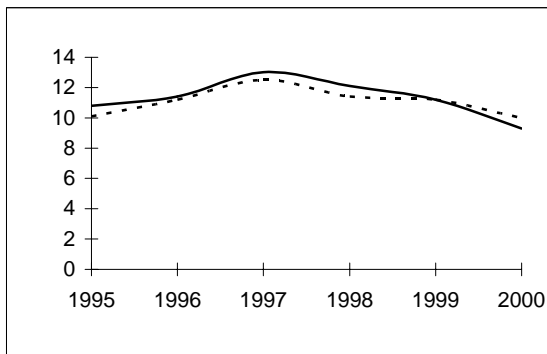
Bremen



Hesse



Hamburg



Mecklenburg-Western Pomerania

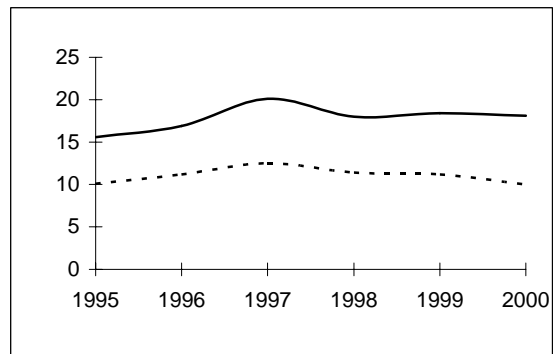
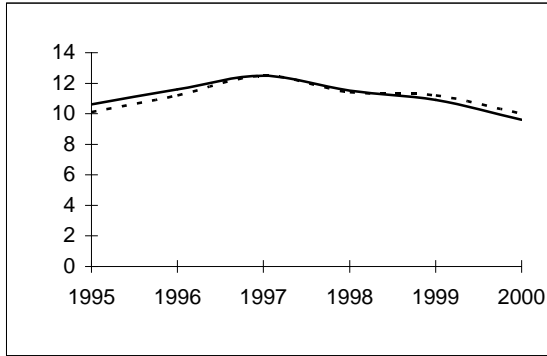
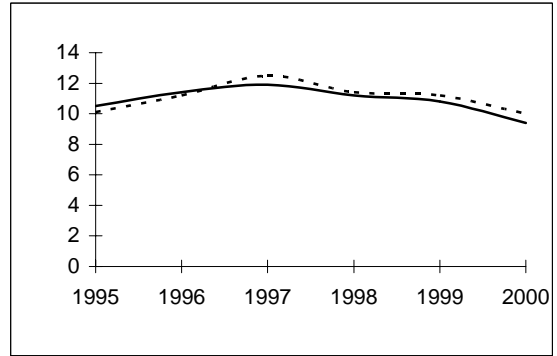


Figure 2c (continued)

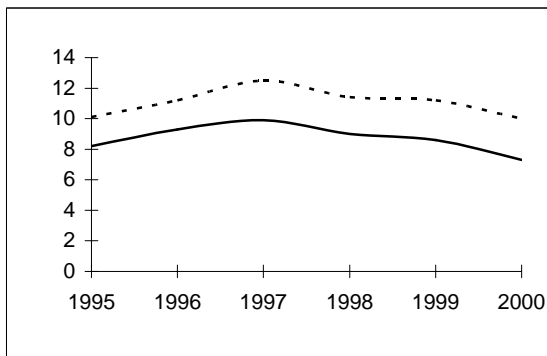
Lower-Saxony



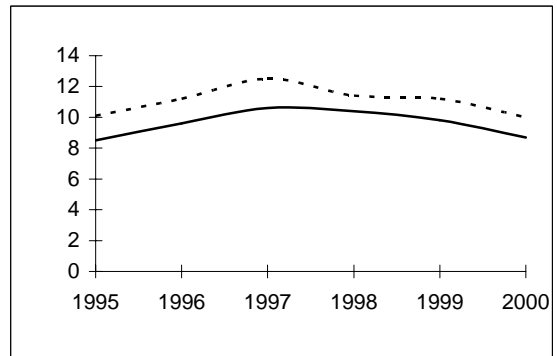
North Rhine-Westphalia



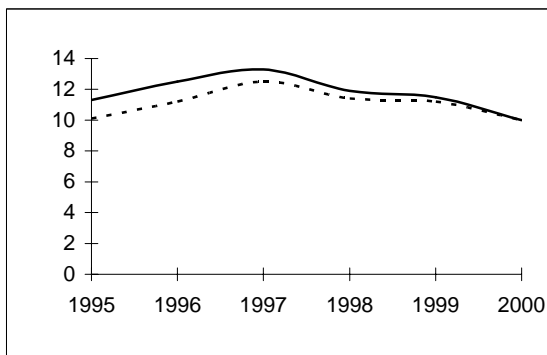
Rhineland-Palatinate



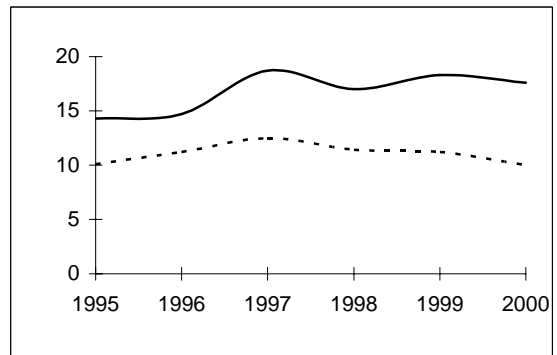
Schleswig-Holstein



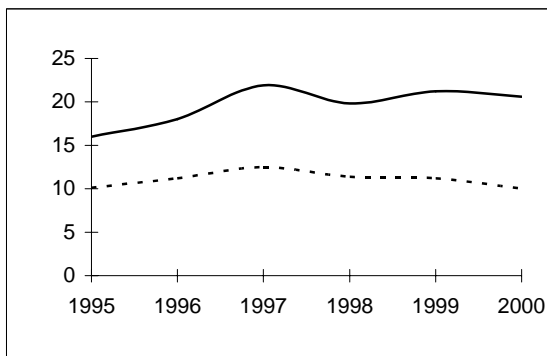
Saarland



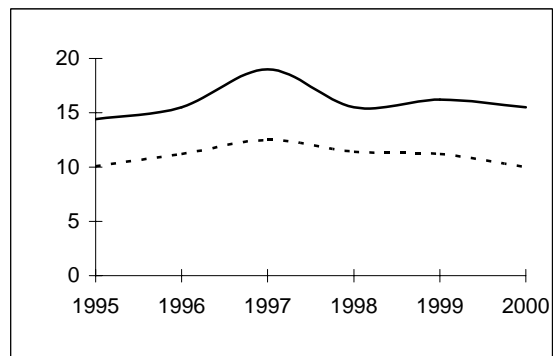
Saxony



Saxony-Anhalt



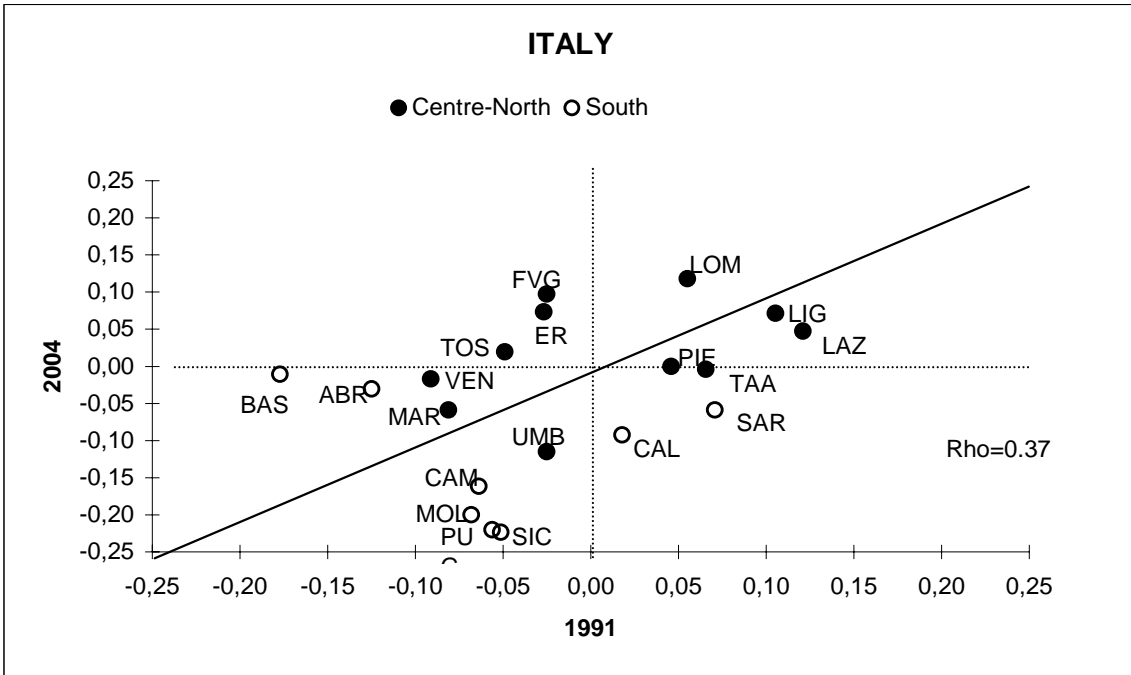
Thuringia



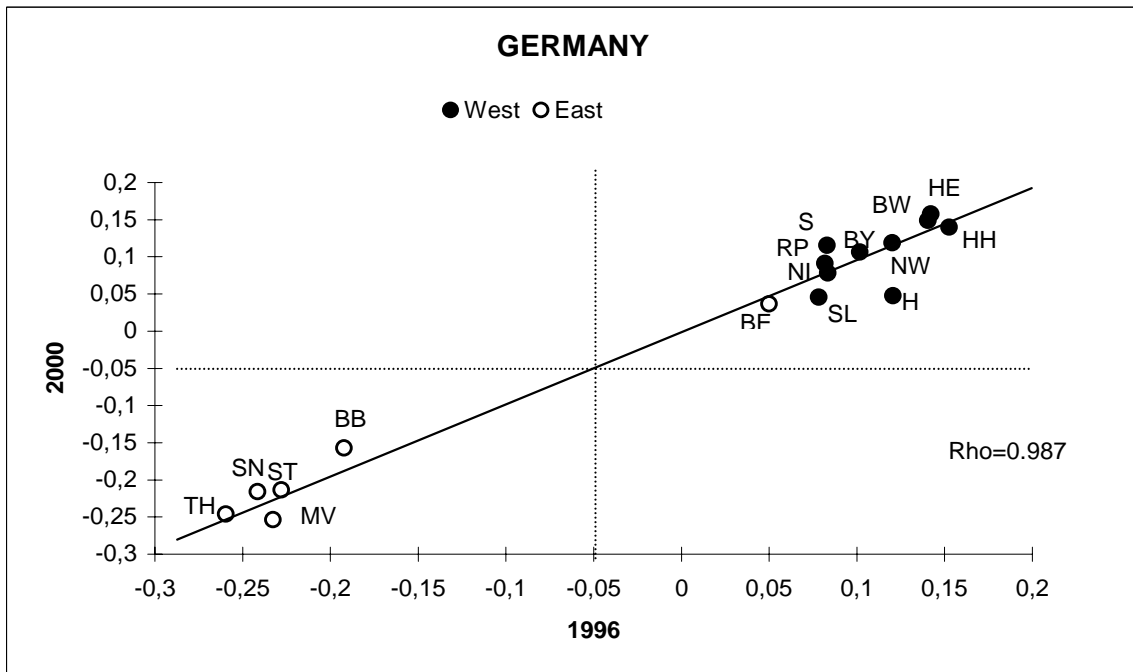
—— regional unemployment rate
 - - - - national unemployment rate

Source: Own calculation on the basis of INKAR data

Figure 3: Evolution of regional wage differentials in non agricultural private sector

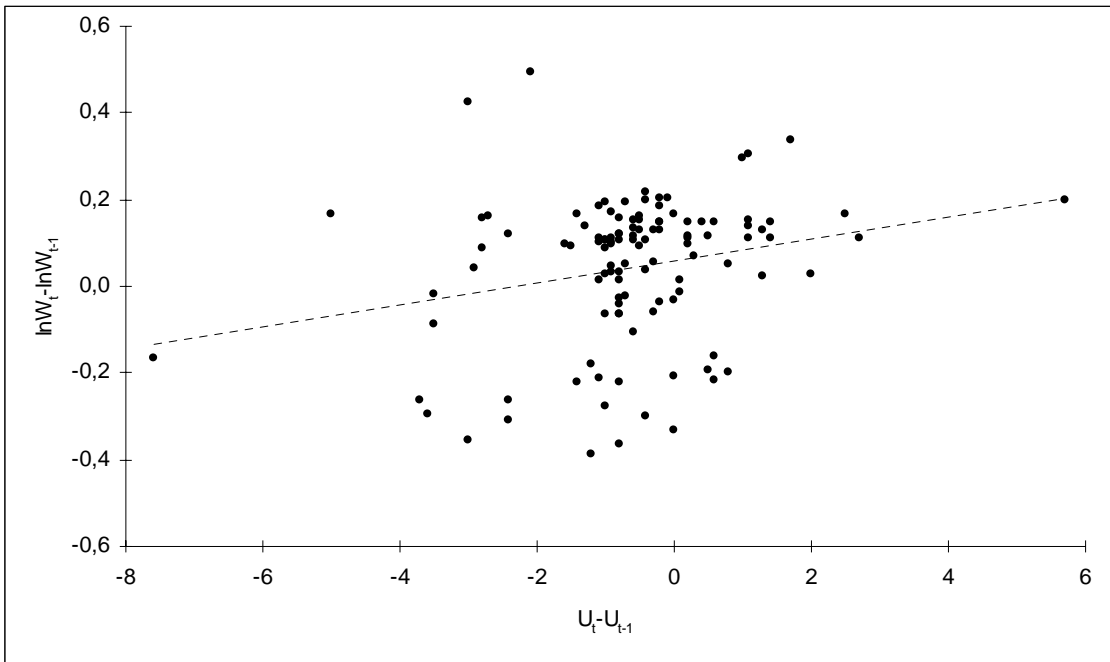


Source: Bank of Italy
 For each year, difference between regional log wage and national average (Regional logw - National logw)
 Rho = correlation coefficient



Source: Micro census 1996, 2000, own calculations
 Rho = correlation coefficient

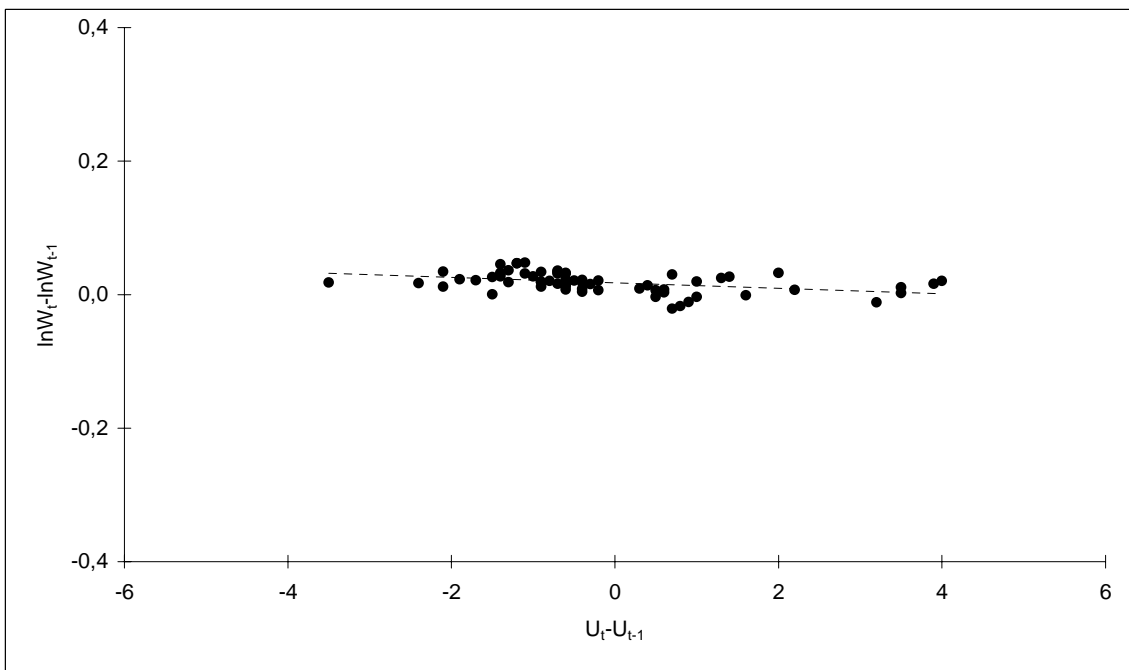
Figure 4a: Unemployment and wages dynamics at the regional level, Italy



Source: Bank of Italy and Istat

Notes: each point is determined by annual variations of wage and unemployment in a given region

Figure 4b - Unemployment and wage dynamics at the regional level, Germany



Source: Statistisches Bundesamt; Micro census 1996, 2000, own calculations

Notes: each point is determined by annual variations of wage and unemployment in a given region

Table 1: Regional Wage Curves for Italy and Germany

ITALY							
Model	GLS				IV*		
	Dep var $\log W_t$		Dep var: $\log W_t - \log W_{t-1}$				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\log U_t$	-0.127 (10.3)	0.022 (0.5)	-0.125 (5.0)	0.012 (0.3)			0.013 (0.2)
$\log U_{t-1}$					0.005 (0.1)	0.013 (0.2)	
DeltaU						0.012 (0.3)	-0.0004 (0.01)
$\log W_{t-1}$			-0.949 (5.4)	-1.364 (10.1)	-1.364 (10.0)	-1.364 (10.0)	-1.364 (10.0)
Fixed effects							
time	yes	yes	yes	yes	yes	yes	yes
regions	no	yes	no	yes	yes	yes	yes
N	133	133	114	114	114	114	114
R ²	0.875	0.921	0.857	0.925	0.925	0.925	0.925
GERMANY							
Model	GLS				IV*		
	Dep var: $\log W_t$		Dep var: $\log W_t - \log W_{t-1}$				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\log U_t$	-0.352 (12.0)	0.009 (0.5)	-0.016 (3.5)	-0.033 (2.1)			-0.035 (-1.8)
$\log U_{t-1}$					-0.027 (-1.3)	-0.035 (-1.8)	
DeltaU						-0.031 (-1.4)	0.0040 (0.15)
$\log W_{t-1}$			-0.042 (-3.6)	-0.794 (-5.3)	-0.788 (-4.2)	-0.788 (-4.6)	-0.788 (-4.6)
Fixed effects							
time	yes	yes	yes	yes	yes	yes	yes
regions	no	yes	no	yes	yes	yes	yes
N	80	80	64	64	64	64	64
R ²	0.63	0.998	0.895	0.947	0.944	0.947	0.947

Note: for Italy, 1991-2004; for Germany, 1996-2000, absolute t statistics based on robust s.e. are reported below each coefficient, dependent variable: regional fixed effects from a set of first step OLS regressions with individual micro-data (for each year, wage equations with controls for region, gender, years of education, experience, experience squared, tenure and tenure²),

* U lags (U_{t-1} and U_{t-2}) were used as instruments for U_t .

Table 2: Regional Wage Curves for Italy and Germany, Different Groups

ITALY							
	Dep var: $\log W_t - \log W_{t-1}$						
	Males	Females	Low edu	Mid edu	High edu	North	South
$\log U_{t-1}$	-0.035 (0.7)	0.080 (0.7)	0.133 (1.6)	-0.176 (1.4)	-0.184 (0.9)	-0.015 (0.2)	0.213 (1.7)
DeltaU	-0.019 (0.4)	0.195 (2.3)	0.057 (0.9)	-0.169 (1.2)	0.024 (0.1)	-0.002 (0.1)	0.195 (2.1)
$\log W_{t-1}$	-1.305 (9.1)	-1.060 (9.9)	-1.312 (9.0)	-0.981 (8.7)	-0.933 (4.9)	-1.200 (7.9)	-1.520 (7.7)
Fixed effects							
time	yes	yes	yes	yes	yes	yes	yes
regions	yes	yes	yes	yes	yes	yes	yes
N	114	114	114	114	114	114	114
R ²	0.926	0.779	0.869	0.538	0.634	0.886	0.962
GERMANY							
	Dep var $\log W_t$		Dep var: $\log W_t - \log W_{t-1}$				
	Males	Females	Low edu	Mid edu	High edu	West	East
$\log U_{t-1}$	-0.035 (1.4)	-0.043 (1.3)	-0.027 (1.0)	-0.072 (1.3)	0.105 (1.1)	-0.073 (1.4)	-0.145 (3.1)
DeltaU	-0.036 (1.8)	-0.022 (-0.5)	0.012 (0.4)	-0.087 (1.5)	-0.064 (0.6)	-0.064 (1.0)	-0.055 (1.3)
$\log W_{t-1}$	-0.986 (5.81)	-0.973 (5.97)	-0.840 (4.01)	-0.964 (6.66)	-1.105 (4.65)	-1.199 (4.6)	-0.663 (2.35)
Fixed effects							
time	yes	yes	yes	yes	yes	yes	yes
regions	yes	yes	yes	yes	yes	yes	yes
N	64	64	64	64	64	40	24
R ²	0.958	0.945	0.943	0.698	0.995	0.959	0.965

Note: for Italy, 1991-2004; for Germany, 1996-2000, absolute t statistics based on robust s.e. are reported below each coefficient, dependent variable: regional fixed effects from a set of first step OLS regressions with individual micro-data (for each year, wage equations with controls for region, gender, years of education, experience, experience squared, tenure and tenure squared).

Table 3: Regional Wage Curves for Italy and Germany, Quantile Regressions

ITALY									
Dep var: $\log W_t$									
Deciles:	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
<i>Model without regional fixed effects</i>									
$\log U_t$	-0.257 (11.3)	-0.175 (10.1)	-0.166 (10.4)	-0.128 (10.5)	-0.099 (8.8)	-0.086 (8.4)	-0.066 (5.7)	-0.051 (3.5)	-0.031 (1.3)
<i>Model with fixed regional effects</i>									
$\log U_t$	0.232 (2.7)	0.077 (1.4)	0.008 (0.2)	0.006 (0.1)	0.002 (0.1)	-0.03 (0.8)	0.007 (0.2)	-0.017 (0.4)	-0.009 (0.2)
Dep var: $\log W_t - \log W_{t-1}$									
<i>Error Correction Model</i>									
$\log U_{t-1}$	0.261 (2.1)	0.044 (0.6)	-0.065 (0.7)	-0.080 (1.4)	-0.102 (2.1)	-0.121 (2.7)	-0.057 (1.2)	-0.063 (1.1)	-0.073 (0.8)
DeltaU	0.243 (2.1)	0.038 (0.5)	-0.032 (0.4)	-0.050 (0.7)	-0.042 (0.7)	-0.077 (1.5)	-0.043 (0.8)	-0.022 (0.4)	-0.003 (0.1)
$\log W_{t-1}$	-1.294 (11.2)	-1.146 (8.8)	-1.093 (8.9)	-1.113 (9.6)	-1.190 (12.5)	-1.166 (10.9)	-1.164 (9.5)	-1.051 (6.9)	-1.446 (4.6)
$\eta_{w,U}$	0.202	0.038	-0.059	-0.072	-0.086	-0.104	-0.049	-0.060	-0.050
GERMANY									
Dep var: $\log W_t$									
Deciles:	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
<i>Model without regional fixed effects</i>									
$\log U_t$	-0.304 (10.27)	-0.319 (10.68)	-0.337 (11.05)	-0.334 (11.48)	-0.348 (11.34)	-0.359 (11.57)	-0.366 (11.82)	-0.376 (12.18)	-0.412 (12.64)
<i>Model with fixed regional effects</i>									
$\log U_t$	0.058 (1.93)	-0.002 (0.11)	0.059 (2.54)	-0.029 (2.06)	-0.021 (1.42)	-0.005 (0.32)	-0.005 (0.25)	0.001 (0.05)	-0.017 (0.62)
<i>Error Correction Model</i>									
$\log U_{t-1}$	0.000 (0.0)	-0.020 (0.7)	-0.007 (0.2)	-0.075 (4.8)	-0.031 (1.3)	-0.047 (2.7)	-0.048 (2.0)	-0.047 (2)	-0.031 (0.79)
DeltaU	-0.028 (-0.5)	-0.021 (-0.9)	0.018 (0.6)	-0.045 (2.8)	-0.044 (2.5)	-0.059 (2.7)	-0.039 (1.8)	-0.065 (3.35)	-0.125 (3.66)
$\log W_{t-1}$	-0.732 (-2.8)	-1.221 (6.5)	-0.582 (3.2)	-0.771 (6.6)	-0.826 (3.3)	-0.622 (4.0)	-0.891 (5.2)	-0.93 (6.67)	-1.163 (6.6)
$\eta_{w,U}$	0.000	-0.016	-0.012	-0.097	-0.038	-0.076	-0.054	-0.051	-0.027

Note: for Italy. 1991-2004; for Germany 1996-2000, absolute t statistics based on robust s.e. are reported below each coefficient, models specification as in Table 1, dependent variable: regional fixed effects from a set of first step quantile regressions with individual micro-data (for each year. wage equations with controls for region. gender. years of education. experience. experience squared. tenure and tenure squared).