Christoph Hilbert

Unemployment, Wages, and the Impact of Active Labour Market Policies in a Regional Perspective

Unemployment, Wages, and the Impact of Active Labour Market Policies in a Regional Perspective

Werkloosheid, lonen en de gevolgen van reïntegratiebeleid in een regionaal perspectief

Thesis

to obtain the degree of Doctor from Erasmus University Rotterdam
by command of rector magnificus

Prof. dr. S.W.J. Lamberts

and in accordance with the decision of the Doctorate Board
The public defence shall be held on

6 November 2008 at 11:00hrs

by

Christoph Alexander Hilbert

born in Metzingen, Germany

Doctoral Committee

Promoter(s):

Prof.dr. J. de Koning

Prof.dr. G. Schmid

Other members: *Dr. A.J. Dur*

Prof.dr. G.A. van der Knaap

Prof.dr. K. van Paridon

Preface

Now I am about to finalize my PhD and I ask myself whether this was really what I wanted to do, whether I truly enjoyed doing the research and if it has been worth the effort. These questions popped into my mind on numerous occasions during the past few years, but each time I thought it was still too soon to give a definite answer. Now it seems appropriate to decide whether I took the right decision. Although not always easy, it was definitely a fascinating and challenging ride and I would never want to miss a single experience. So yes, it was the right decision. It was, however, a far too long period to summarize in a few lines. The only thing I can do is to say a very big thank you to all those inside and outside the academia who have accompanied me during this journey.

First and foremost I would like to thank my supervisors Jaap de Koning and Günther Schmid. Their enthusiasm for doing research is infectious, their openness to new ideas and not at least their patience have been unique and are the major influence on the type of researcher that I am now. During the whole time they were always willing and available to answer my questions, share their experiences, listen to my ideas and complaints, guide me or just let me do my own thing. Having such supervisors is an absolute privilege. A special thanks also goes to the members of the small committee, Robert Dur, Bert van der Knaap and Kees van Paridon for their evaluating and comments, as well as to Klaus Schömann who was always prepared to support the project along the entire process.

This thesis has also benefited from numerous comments from seminars and discussions, and would not have been possible without the financial support from the Social Science Research Center Berlin (WZB), the Federal Ministry of Education (BMBF) through the project 'Analysis of Skill Needs', and the European Center for Analysis in Social Science (ECASS). A very special thanks goes to all my colleagues at the WZB, the members and participants of the thematic network on transitional labour markets (TLM-NET), the Berlin Network of Labour Market Researchers (BeNA), the SOEP group at German Institute for Economic Research (DIW) Berlin, the Research Centre for Education and the Labour Market (ROA), Maastricht; the Institute for Social and Economic Research (ISER), Colchester, the FreQueNz and Skillsnet networks, and the Institute of Higher Studies (IHS) Vienna.

Doing a PhD is a bit more than writing a thesis. It is also a personal challenge, with countless hurdles, and for me finalizing means to jump over these. This would not have been possible without the invaluable support from my family and my friends. The biggest thanks goes to my mother, my father and my sisters. They have laid the ground for where I

am now. And there were so many others supported me, or simply shared inimitable moments with me, I can just mention a view: there were Birgitta, Oskar and Sunna on a great day crab fishing at the seaside, Christian and Janine sharing the office opposite and always available for a talk, my grandmother sharing wonderful insights from her long life and a bottle of champagne, Ginger patiently editing my English, Joachim reminding me that in the end fun is the key, Klaus for great sailing days, Lutz asking me if I come from the beach when I was exceptionally stressed, Micha tireless listening to all my doubts that already bored myself, Thomas for sharing great running events, Valentin showing that a few minutes are enough to learn cycling, beautiful crawling on the motorway with Veronika, and countless other things I shared with Claudia, Franziska, Holm, Ilona, Joa, John, Jürgen, Karin, Kate, Katja, Klaus, Lorenz, Oliver, Peter, Rikki, Sandra, Silke, Simone, Stefan, Torsten, Ulli, …, mentioned or not, be assured, this would not have been possible without any single of you. Thanks.

Contents

List of tables

List of figures

Abbreviations and acronyms

ABM	(Temporary) Job creation measures (Arbeitsbeschaffungsmaßnahmen)
ALMP	Active labour market policies/policy
AVIG	(Swiss) Unemployment Insurance Act (Arbeitslosenversicherungsgesetz)
EU	European Union
GDP	Gross domestic product
GDR	German Democratic Republic
GLLAMM	Generalized linear latent and mixed models
GLS	Generalized least squares
GSOEP	German Socio-economic Panel
IAB	Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung)
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification of All Economic Activities
LAM	(Swiss) Logistic of Active Measures
LMP	Labour market policies
NACE	Nomenclature Générale des Activités Èconomiques dans les Communautés Européennes (Nomenclature of Economic Activities in the European Community)
NAIRU	Non-accelerating inflation rate of unemployment
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares

PES	Public employment services
RAVs	(Swiss) Regional employment bureau(s) (*regionale Arbeitsvermittlungszentren*)
SECO	(Swiss) State Secretariat for Economic Affairs (Staatssekretariat für Wirtschaft)
WS	Wage setting

1 Introduction

In a globalized world, products are highly mobile. Transportation costs are low, production is no longer determined by natural resources, and, as a result, economic activity is also mobile. Companies choose their location on the basis of multiple criteria in order to maximize their profitability. Infrastructure and geographical proximity to competitors are two important criteria; another criterion is well-educated, highly qualified, and experienced employees, particularly with the ever growing importance of knowledge in information-based economies. Because companies make decisions about their own locations on the basis of these criteria, economic activity within industrialized countries is not evenly distributed but rather characterized by a high degree of regional agglomeration disparities. These regional agglomerations are not necessarily consistent with national borders or with regions as defined by administrative bodies. Some regions are economically stronger than others, and substantial differences in economic performance can be observed within any particular country.

Consequently, labour markets also differ in their characteristics and performance. Some regions suffer from a labour shortage, particularly when it comes to jobs requiring specialized and higher skills; in some cases, observers even refer to a 'war for talent'. Other regions are faced with very low labour demand and thus with the migration of their residents – especially the well-educated – to regions with better labour market prospects. Unemployment figures vary substantially within countries; the structure and the qualifications of the respective workforce differ; and, therefore, wage patterns show diverging pictures between and within regions. The regional mobility of individuals is limited, and there is no convergence over time. Owing to these labour market imperfections, regional labour markets do not clear and instead lead to the existence of a wage curve. Stronger regions have low unemployment and relatively higher wages; weaker regions have high unemployment and relatively lower wages.

Is there nothing that can be done? In fact, active policies are needed, and regional development is already a high-priority topic on the political agenda of most countries, the European Union, and the OECD. In this respect, a widely discussed, but thus far unsolved question is the role of active labour market policies (ALMP) in this scenario. Generally speaking, the target of ALMP is to improve matching in the labour market by improving the employability of the workforce. This is easier said than done. The respective targets of ALMP differ substantially depending on the economic performance of a region, its specific

demand for labour, the structure of its workforce, and the degree and structure of its unemployment.

One main focus of ALMP is to stimulate training and therefore to improve the matching of labour supply and demand – either by reducing skill shortages or by reducing unemployment within regions. Second, ALMP should improve interregional matching by stimulating interregional mobility and commuting among the workforce. Regions that perform well and have low unemployment figures often face labour shortages basically asking for improvement of specific qualifications among the unemployed. To ease matching between labour supply and demand, the focal point should be on the development of new jobs and new opportunities for those people who are unemployed. Labour markets in poorly performing regions have quite different needs. The main task here is to promote the willingness and ability of the workforce to commute or to move to regions with prospering labour markets.

The result of these diverging targets are specific ALMP measures that work in some regions, but that do not necessarily lead to the same outcome in other regions. When ALMP measures are successful, there is a reduction of multiple imperfections in the labour market, resulting in a reduction of unemployment. With respect to wages, two counteracting effects can be expected. First, improved matching leads to an increase in the number of workers competing in the labour market for a given amount of jobs, which is expected to make wages fall. Thus, from a static view, a reduction of imperfections and therefore a reduction of unemployment result in lower wages. Second, as a dynamic (long-term) effect, improved matching helps companies find workers for their vacancies, which is expected to increase productivity and, therefore, wages. In sum, though successful ALMP are expected to reduce unemployment, the overall impact on unemployment is not clear.

The purpose of this thesis is to take up these considerations and shed more light on the interaction of unemployment and wages, as well as the impact of labour market policies. The first question is whether and how real wages differ with respect to unemployment when we take into account individual characteristics of the workforce by region. This analysis is in line with the standard wage curve model developed by Blanchflower and Oswald (1994). Beyond analyses based on the standard wage curve, the question examined here is how specific socioeconomic factors (e.g. qualifications) and institutional factors (e.g. labour market policies) have an impact on these wage-unemployment figures. The empirical analyses presented here focus on Germany, a country especially interesting in this respect because its regional differences are quite pronounced. Moreover, the great differences between eastern Germany and western Germany following reunification provides a unique, quasi-experimental research design.

For a long time in standard economic theory, the discussion of unemployment and wages focused almost exclusively on the national perspective, whereas the regional dimension often was completely neglected.[1] Classical growth theory and neoclassical trade theory, which have long been the main theoretical reference for economic analyses, conclude that regions converge over time. To make these theories applicable to regional analyses, it was usually assumed that regions within a country are like nations. There were assumptions of free trade and constant return, which would result in an equilibrium of production factors or goods. The belief that interregional migration flows would bring income levels into equilibrium in urban areas and peripheries over time consequently follows this line of thought (Fischer and Straubhaar, 1994). Empirical facts, however, tell another story, and so these models are not appropriate to explain regional labour markets.

Starting with advancements in trade theory in the early 1980s and exemplified by the important work of Porter (1990) and Krugman (1991), this perspective began to change with the development of models that were brought under the label of 'new economic geography'. According to these models, markets are to an important degree regionally organized. New economic geography shows how modern trade and growth provide a sound theoretical foundation for the location of economic activity across space. Consequently, policy and other processes can influence internal conditions. It follows that labour markets and labour market policies should also be analysed from a regional perspective. However, the disadvantage of models of regional agglomeration is that they are ambiguous when it comes to explaining unemployment and differences in wages between regions. The standard models of new economic geography assume full employment and ignore the existence of involuntary unemployment.

Until recently, theoretical economists analysing the relation between wages and unemployment have relied upon the highly influential Harris-Todaro model (1970), which assumes that in high unemployment regions, workers are compensated for a higher unemployment risk by means of higher wages. Lately, the perception of the relation between regional wages and unemployment has fundamentally shifted: a new strand of literature has evolved from the work of Blanchflower and Oswald (1994), which challenges the Harris-Todaro model. According to the new 'law of economics' of the wage curve, a constant wage curve exists whereby wages tend to decrease by 10% with a doubling of unemployment. The wage curve contradicts the neoclassical assumptions of costless mobility leading to converging wages between regions over time. The models are based on

[1] As Blien (2001) has pointed out, there was a long tradition of regional economics in some disciplines of minor importance. However, compared to such 'institutions' as macroeconomics, finance, or trade economics, this field did not play a central role in economic discussions.

imperfect competition in the labour market, and they explain the existence of involuntary unemployment and differences in real wages in equilibrium caused by regional differences in unemployment: regional mobility and commuting are limited; therefore, there is no convergence over time, and regional labour markets do not clear. These combined effects lead to the wage curve: stronger regions have low unemployment, and weaker regions have high unemployment. The unemployment situation affects the regional wage level: it is lower in regions with high unemployment, and vice versa. Südekum (2003) introduced unemployment theory by means of the wage curve model into a macroeconomic model of agglomeration, and thus addressed a weakness of former models of new economic geography.

When labour markets are characterized by imperfect competition and persistent unemployment in equilibrium, questions arise about the role of institutions and the impact of labour market policies and qualifications. As Schmid (2002) has argued, full employment in the traditional sense is no longer realistic; labour market institutions play an essential role by actively organizing the transition from one job to the next and by encouraging or even requiring employability. Schmid advances the concept of transitional labour markets, in which permanent employment (or permanent full-time employment) from an individual perspective and full employment from the macroeconomic perspective are no longer the paramount aims of labour market policy. Rather, other forms of activity, including education and the procurement of qualifications, interrupt periods of (full-time) employment. Active labour market policies play a crucial role in this process.

The standard wage curve model can be extended by integrating aggregate labour market figures; it then explains regional differences of wages caused by differences in unemployment with imperfect competition. The thesis therefore contributes to the underdeveloped topic of multilevel causalities: aggregate and individual impact analysis, the micro-foundation of macroeconomic policy and vice versa, both on a theoretical level as well as in combining individual panel data with aggregate regional data.

Beyond the standard wage curve model, the institutional dimension is a second aspect examined in this thesis through a focus on active labour market policies. The thesis presents an extension of the wage curve analysis by labour market segments according to socio-economic and regional characteristics; includes institutional factors, particularly those relating to active labour market policies; and assesses their role on the dynamics of the wage curve.

The institutional dimension issue is relevant in three ways: First, labour market policies are treated in the light of their effectiveness within regional employment offices.

To do this, a benchmarking approach is introduced which allows one to measure relative performance through the use of normative indicators of policy outcomes. This approach is based on the concept of yardstick competition discussed by Schleifer (1985); it evaluates the outcome of ALMP. Hence, the quality of ALMP measures is not evaluated by differentiating measures according to their success. The approach thus acknowledges that quality is not an absolute measure, and that ALMP success and other placement strategies depend on region-specific factors. Second, the wage curve is extended by introducing ALMP measures into the model. Third, the results from the indicator model are picked up, and unemployment is replaced with different performance indicators. The potential impact of the performance of regional public employment services (PES) on wages is measured.

If regional labour market policies improve qualifications, and matching is thereby improved, the question of the impact on wages becomes crucial. One might argue that if a greater number of people in the labour market are more highly educated, this only leads to the increased displacement of less well-educated people, without changing macro unemployment. This argument is based on the static assumption that the macro level of employment is given. However, there is convincing evidence to show that if the labour market is sufficiently flexible, the wage mechanism can bring this market closer to an equilibrium, and employment will then adjust in terms both of level and of skill structure (de Koning 2007). According to this dynamic view, this situation would then result in improved labour market performance with higher wages and a higher employment level (Layard, Nickell et al. 1991). Consequently, and in contrast to the hypothesis of the standard wage curve assuming a constant wage elasticity, the extended wage curve demonstrates that labour market policies have an impact in the following ways: Removal of labour market imperfections by means of active labour market policies reduces interregional wage differences, and successful policies remove the wage curve.

To sum up, this thesis aims to contribute to the understanding of the interdependencies of wages, unemployment, and labour market policies in a regional perspective. Its basic assumptions are that market imperfections lead to unemployment in regional labour markets, partly owing to region-specific wage structures, and that regional ALMP can alleviate this problem. These assumptions are dealt with in two veins: first, the regional wage level dependent on unemployment, qualifications, and active labour market policies; second, the performance of regional public employment services and the effects of such performance. These two lines of thought led to the following hypotheses:

(1) Real wage levels depend on differences in involuntary unemployment in regions. In part, following the wage curve, wages are low in high unemployment regions and high in low unemployment regions.

(2) These regional wage elasticities vary among qualification-based labour market subgroups. Qualifications and qualification patterns have an impact on regional wage levels.

(3) In the absence of market prices, the relative performance of regional public employment services (PES) can be adequately measured by means of a quantitative model using benchmarks to compare the relative performance of regions.

(4) By reducing the unemployment rate, active labour market policies have a positive effect in the labour market. The 'price' of lower unemployment, however, might be lower regional wages.

(5) The performance of regional PES does have an impact on individual wages. Because, however, there is a positive effect in reducing unemployment and a negative effect in increasing competition, the sign of the total effect is a priori unclear.

Methodologically, these five hypotheses have one aspect in common: the outstanding role of regions in the functioning of labour markets and wage-setting. By testing them, I examine the interdependencies of wages, unemployment, and labour market policies in a regional perspective, presenting the work as follows.

In chapter 2, the theoretical background is discussed. Starting from a macroeconomic perspective, I introduce relevant theories explaining persistent unemployment. There is a special focus on the consideration of rigidities in non-competitive models and the wage curve model. The wage curve provides a non-competitive explanation of unemployment that takes regions into consideration; it is therefore of particular importance in the empirical analyses of this work.

In chapter 3, the definition of the appropriate regional aggregation level is discussed. In general, one can differentiate between functional and administrative regions. Functional regions are based on objective criteria and indicators describing the openness of (labour) markets, for example by journey-to-work characteristics. Administrative regions, on the other hand, are explicitly defined by means of political or historical criteria and do not observe economic developments over time. They do, however, often have the advantage of better data access. Several alternatives of regional aggregation levels are described, and their applicability in the light of the following analyses is derived. Furthermore, in this chapter I discuss the main data resources relevant for the follow-up analyses, provide definitions of qualifications of relevant variables discussed in the data, and give a short introduction to active labour market policies in Germany.

Two main data resources are introduced. The aggregate data describe the economic conditions of the labour market; they are mainly derived from the Federal Employment Agency (Bundesagentur für Arbeit). To measure real wages and other job-related characteristics, alternative individual surveys containing information on income and education are introduced: the employment sample and its derivatives provided by the Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung – IAB), the German Microcensus from the Federal Statistical Office, and the German Socio-economic Panel (GSOEP). I highlight the specific advantages and disadvantages in this chapter, and argue that the GSOEP is a good alternative for further estimations.

Chapter 4 tackles the question of *how* regions matter. After giving some stylized facts from an international perspective, I then provide essential information from a German perspective: the main respective factors for different German regions are discussed; the data relevant for further analyses are introduced; and detailed descriptive facts on unemployment, income, qualifications, and active labour market policies are highlighted. The chapter is divided into two sections. Different alternatives to defining regions in Germany are discussed, and the main indicators of relevance for the econometric analyses to follow are described: unemployment, income, qualifications, and labour market policies. Regional unemployment in the European Union follows a quite distinct, transnational pattern; as will be shown, it closely resembles the core/periphery structure that is apparent in regional gross income per capita. In most countries, disparities across regions in employment and wage rates tend to coincide – high unemployment regions, for example, often have lower real wages. This pattern also holds for German regions: one can identify a significant variation of wages and unemployment, even on the level of federal states. This result is carried forward in industry segments, qualifications, and ALMP measures.

Chapter 5 focuses on the micro-founded wage curve from Blanchflower and Oswald (1994). I test hypothesis (1), which states that real wage levels depend on differences in involuntary unemployment between regions and that wages are low in high unemployment regions and high in low unemployment regions. According to the wage curve theory, a regional equilibrium with involuntary unemployment exists. This equilibrium is characterized by regional real wage levels, depending on the level of unemployment within the respective regions. Blanchflower and Oswald state that this wage elasticity has a value of –0.1, independent of institution and country. This elasticity implies that a doubling in regional unemployment would lead to a decline in wages of around 10%. In line with most empirical literature on the wage curve, and in line with the outcome of the extended wage curve developed, my results give elasticities that vary according to the sample specification, for example between men and women, or between eastern and western Germany. These

results led to the assumption that there are specific factors influencing the elasticities. These elasticities are determined by the individual characteristics of the workforce and/or the institutions in the labour market. These two results raise further research questions, which are addressed in later chapters. The impact of both the structure of qualifications and active labour market policies on regional wages is discussed.

In chapter 6, the focus is on regional qualification effects. These analyses are based on hypothesis (2), which states that wage elasticities depend on qualification level. Theoretically, this is explained by differences in shirking behaviour and variations in individual effort. Within the efficiency wage model, variation in shirking leads to differences in the location and the slope of the wage curve. There is a comparable effect with variations in effort at work. One hypothesis is that higher qualified persons expend more effort; as a result, the wage curve is steeper and located above the lower-skilled labour force. Wage curves with a high shirking probability have the same appearance. The expected probability within different qualification groups is ambiguous. On the one hand, low-skilled work is more standardized and detection is more likely. On the other hand, the intrinsic motivation in higher-skilled groups is expected to be higher. The results for labour market subgroups show somewhat weak support of the hypothesis that the wage curve differs between qualification subgroups. However, the results do not differ significantly between eastern and western Germany, which is one obvious difference from the standard wage curve estimations in the previous chapter.

A general trend can be observed: higher education results in higher wage elasticities, which is in line with the theoretical prediction of the wage curve. The results from professional-group and firm-size estimations, which are more reliable from a statistical point of view because they show a slightly better model fit, support these results, and conclusions that are somewhat more reliable are possible. Moreover, the firm size does not support the main assumptions of a bargaining approach; instead, the efficiency wage model, which is favoured in this thesis, is strongly supported. I also observed significant differences in elasticity, which are caused not only by regional differences between eastern and western Germany.

Chapter 7 focuses on hypothesis (3), testing whether the quality of labour market policy depends on general economic conditions in regions. In the absence of market prices, the relative performance of regional public employment services can be measured adequately by means of a quantitative model. A model based on the yardstick-competition approach is applied. This approach constructs artificial prices in a market with regional

monopolies with homogenous goods.[2] The chapter includes an implementation analysis of a benchmarking model in Switzerland and the main experiences drawn from it. I show that, apart from the model's theoretical attractiveness, several problems arise when it comes to implementation. Such a model becomes a highly sensitive issue in political terms as soon as direct budget allocation is linked with outcomes. The subsequent empirical analysis with data from the German employment office led to the conclusion that it is possible to develop regression models that can be used to compute reasonable indicators of the (relative) performance of employment offices. The performance indicators are also relevant for analyses in the following chapter.

In chapter 8, active labour market policies and their impact on regional wage levels are examined. The analyses are twofold: First, I test hypothesis (4), which states that active labour market policies have a positive effect in the labour market by reducing the unemployment rate. I estimate an extended wage curve model, which explicitly recognizes the impact of active labour market measures. With this model, the overall impact of ALMP as well as the impact of different ALMP measures is estimated. Second, I focus on hypothesis (5), examining whether the performance of regional employment services has an impact on regional wages. It is assumed that the real wage level is lower in regions with better-performing PES than in those with poorly performing PES, and that this outcome leads to a performance curve. Returning to the benchmarking indicators introduced in chapter 7, I replace the unemployment rate with these indicators. These estimates also show a slightly negative but significant elasticity, which can be characterized as a performance curve of regional active labour market policies. Hence, high performance of regional policy is linked with lower real wages in these regions. However, what is not measured is the positive wage effect of reduced unemployment induced by successful ALMP. In sum, the results of this chapter suggest that ALMP do matter and that they have a small but statistically significant impact on regional wages.

Chapter 9 presents a general discussion of the results; some political implications are noted, and an extended research outlook is provided. The analyses show that regional unemployment has a substantial impact on individual wages. However, deviating from the results of Blanchflower and Oswald, but in line with various empirical studies in the literature and the extended wage curve, an alleviated wage curve is identified. This implies that the variation of wages depends on further exogenous factors like active labour market

[2] The model developed by Schleifer (1985) primarily addresses regional monopolies with homogenous goods such as water or energy. The approach has been adapted for the measurement of relative efficiency in regional employment offices, and was implemented in the Swiss labour market during their reforms in the 1990s.

policies mentioned in the following analyses in more detail. First, it was shown that wages vary by qualification levels and that higher education levels show higher wage elasticities. Second, the excursion into the benchmarking field and the discussion of a model for estimating the relative performance of regional public employment services show that – despite several challenges – performance can be measured with a quantitative model. Analyses have shown that these kinds of models do give some objective data to support political processes. Third, the impact of active labour market policies on individual wages was estimated on the basis of this model, and it was found that ALMP improves matching and that wages are influenced. The first effect is a wage-reduction effect. However, as it is assumed that ALMP reduce unemployment, a positive wage effect may occur. Fourth, it is shown that the performance of regional employment offices does have an impact on wages, which supports the previous results indicating that ALMP and labour market institutions can improve labour markets. Matching is improved, while the wage effect is either positive or negative, depending on the overall effectiveness of the measures.

The thesis shows that the innovative potential of the wage curve approach is its ability to examine the micro and macro perspective of regional labour markets by measuring regional wage elasticities in imperfect labour markets. It thus enables the identification of wage differences between regional economies. This study differs in several ways from former analyses in this field. First, it makes use of innovative data material: survey data from the German Socio-economic Panel allows one to control for differentiated individual characteristics. Second, institutional variables are explicitly modelled and their impact is estimated. Third, the performance of regional employment services is measured. And, finally, this performance measure is used to estimate its impact on the regional wage level.

2 Theories of unemployment, wages, and the role of regions

Is there a relationship between wages and unemployment? If so, what is the causality behind it and how stable is it? These are a few of the most fundamental questions in economics. In this chapter, I first give an overview of theories explaining this relationship and develop the framework for the subsequent empirical analyses. I begin with a short review of macroeconomic theory (2.1), followed by the role of rigidities in modern labour market theories (2.2). I then draw a link to partial non-competitive models and demonstrate the specific relevance of regions in a globalizing world (2.3). Regions became a focus of interest with developments in new economic geography (Krugman 1991). However, the general models of economic geography do not explain regional differences in unemployment. I therefore also introduce a microeconomic perspective in order to explain unemployment from a regional perspective and argue for the specific advantages of the wage curve approach from Blanchflower and Oswald (1994).

In section 2.4, I focus on the wage curve approach and provide an overview of different models used to explain the wage curve in theoretical terms; I also examine the efficiency model more closely. In section 2.5, I introduce a formal model which explains differences in regional real wages in equilibrium caused by rigidities such as involuntary unemployment through qualification mismatch and limited regional mobility. In section 2.6, I discuss the impact of the level of qualifications of labour market subgroups on the shape of the wage curve, and in section 2.7, the impact of labour market policies is incorporated by introducing an extended wage curve model that explicitly includes ALMP. To evaluate the effectiveness of labour market policy from the perspective of outcomes, I introduce a benchmarking model in section 2.8; it describes the relative performance of regional public employment services with a system of indicators. In the final section, these indicators are combined with the efficiency wage model, and a performance-based efficiency wage model is developed.

2.1 Macroeconomic explanations of unemployment

2.1.1 The classics

Macroeconomics is the study of the entire economy in terms of aggregate quantities such as the total amount of goods and services produced, total income earned, the level of employment of productive resources, and the general behaviour of prices. The very traditional perspective in macroeconomics comes from the so-called classics, which is regarded as the first modern economic school and is strongly connected with names like Adam Smith (*The Wealth of Nations*, 1776), David Ricardo (*On the Principals of Political Economy and Taxation*, 1817) and John S. Mill (*Principals of Political Economy*, 1848). In their view, the real and monetary spheres of an economy are completely separated in their mechanisms. Inflation is interpreted as a purely monetary phenomenon, with the rate of inflation determined only by the growth rate of the money supply. The real sector, on the other hand, is seen as a system of perfectly competitive markets, which all tend to clear by means of the invisible hand of the market. It is further argued that any failure to achieve equilibrium must be solely because competition is somehow being prevented from doing its job. Disequilibrium is the result of wrong prices, and, furthermore, this state can be sustained only if competitive pressures are externally constrained. According to this view, phenomena like involuntary unemployment, which is defined as an excess supply of labour, can exist and persist if and only if prices are not adjusting to bring labour demand into equilibrium with supply.

2.1.2 Keynes and the neoclassical synthesis

With the Great Depression in the late 1920s and 1930s, this contentious approach came very much under pressure. It was not possible to explain the developments of involuntary mass unemployment and inflation with the traditional economic models at hand. It was in this period that the macroeconomic theory of John Maynard Keynes appeared. Keynes states in his general theory of employment (1937) that equilibrium prices through competition are only half of the story. The other half is what determines the level of output and employment in an economy as a whole. Almost by definition, this question is inadmissible in neoclassical economics: the setting of equilibrium prices brings demand into equilibrium with a given endowment, that is, prices and quantities are determined simultaneously. Keynes, on the other hand, argued that 'it is quantities (and not prices) that adjust to eliminate excess demands or supplies one may argue that prices also adjust, but

their role is limited to the elimination of excess profits – they have nothing to do with eliminating excess demand' (Keynes 1937, 2007).

The neoclassical synthesis formalized Keynes's ideas in the early post-war period. The centrepiece of the neo-Keynesian system was the IS-LM Model, a system of simultaneous equations first introduced by John Hicks (Hicks and Keynes 1937). Later, the Phillips curve (Phillips 1958) was added to the system in order to take account of inflation.[3] An important implication for economic policy that emerges from this model is that the government can effectively achieve increases in production and employment through demand-side policies. If taken further, an interpretation of the modified Phillips curve is based on the following logic: with a slow-adjusting nominal wage, the government can determine the price level through inflationary policies, and thus the real wage and in turn the level of employment in the economy. In other words, the government has the ability to choose a desired combination on the unemployment-inflation curve. This brief illustration shows what the Keynesian model effectively predicts: quantity adjustments were needed in this economy in order to restore equilibrium. The neoclassical synthesis was wildly successful and dominated macroeconomics in the post-war period for about twenty years.

2.1.3 Monetarism

Monetarism was the conservative response to the neoclassical synthesis and is strongly connected with the work of Milton Friedman. Friedman's main critique was that there is no rational argument for the statement that nominal wages should stay rigid with rising prices and inflation in the long term, so that real wages fall and unemployment falls to achieve a new equilibrium. This outcome would require that workers do not recognize the inflationary pressure initiated by government policy and that decisions about labour are based on nominal rather than real wages. Friedman argued that the nominal wage illusion can be true only in the short run. This can be caused through the following facts:

(1) Incomplete information

(2) That real wages will cause only temporary disequilibrium, and

(3) That, after a while, workers will restore former real wages and unemployment will move to the old level.

Consequently, all that changes are price level and nominal wages. Therefore, in the long run, there is no trade-off between unemployment and inflation, and the Phillips curve will

[3] The Phillips curve is discussed in 2.3.3 in more detail.

be vertical. According to Friedman, this leads to a 'natural rate of unemployment'. Therefore, unemployment is determined in a Walrasian system of general equilibrium equations on a competitive labour market where unemployment is either voluntary or caused by rigidities in the malfunctioning of labour market institutions in the long run. Friedman advocated a central bank policy aimed at keeping the supply and demand for money at an equilibrium, as measured by growth in productivity and demand. Policymakers can keep unemployment below this level only by steadily accelerating inflation, leading to the 'non-accelerating inflation rate of unemployment' (Friedman 1967).

2.1.4 New classical macroeconomics

In the early 1970s, major industrial countries were confronted with simultaneously rising unemployment and inflation in the aftermath of the oil crisis. This stagflation was inconsistent with the conventional Phillips curve, and even Friedman's adaptive expectations, which allowed for short-term adjustments, came under criticism. Proponents of the 'new classical macroeconomics' even rejected the adaptive expectations and therefore the possibility of short-term monetary and fiscal policy. Because the future is by definition uncertain, no agent can make predictions that are always correct, as there are always stochastic and unexpected events. On the other hand, one cannot expect that wrong predictions are systematic; thus, Friedman's adaptive expectations were replaced by rational expectations. Consequently, agents confronted with inflationary policy do not misperceive nominal and real wages. As a result, output and employment in the models of new classical macroeconomics keep permanently at the natural rate – with the possible exception of random disturbances – and there is no room for stabilization policies. The new classical macroeconomics is strongly connected with the name Robert Lucas. His introduction of the concept of rational expectations helped to decisively bury neo-Keynesian orthodoxy and inaugurated a new era of macroeconomics which relies on the neoclassical concept of supply-determined equilibrium, such as that found in 'real business cycle models'. Specifically, the new classical macroeconomics emphasizes the importance of rigorous micro-foundations. The main implication of models of new classical macroeconomics and real business cycles for the labour market is that unemployment cannot be viewed as a phenomenon whereby individuals are willing to accept jobs at going wage rates but simply do not receive job offers and thus unwillingly remain unemployed.

2.1.5 New Keynesian economics

As a response to the new classical macroeconomics, the 'new Keynesian economics' was developed. This framework provides micro foundations for Keynesian economic analysis, showing how imperfect markets can justify demand management by the government or its central bank. The main assumption of new Keynesian economics is that wages and prices do not adjust instantly, which would allow the economy to attain full employment. Thus, unemployed resources and non-clearing markets can exist and persist, even when rational expectations apply. A commonly provided explanation of why prices adjust slowly is 'menu costs': the reason firms do not change their prices immediately is that they must incur costs in doing so. As Mankiw, Romer et al. (1992) point out, a firm that lowers its prices because of a decrease in the money supply will be raising the real income of the customers of that product. This step will allow the buyers to purchase more, though they will not necessarily purchase more from the firm that lowered its prices. Consequently, firms will hesitate before taking such a step, because they do not want to assist other companies' sales.

2.1.6 The imperfect competition approach to macroeconomics

The imperfect competition approach to macroeconomics generally can be considered an approach in the new Keynesian tradition,[4] but, as Südekum (2003) has shown, it is a framework that integrates elements of the Keynesian and the classical macroeconomic models. The most important contribution from the Keynesian side is the definition of markets as imperfect. However, the model also has a non-accelerating inflation rate of unemployment and a long-run vertical Phillips curve, which is more in line with Friedman's classical model. The most important feature of these models is that additional characteristics are inherent in the labour market which are caused by rigidities. Therefore, even in the absence of union bargaining, the labour market would not return to an 'ideal' competitive market because there are additional arguments inherent to the labour market itself which prevent workers from wage-underbidding. According to Lindbeck (1992), one can distinguish four factors: social norms, union wage-setting, turnover costs, and efficiency wage considerations. In the following sections, a short introduction to the causes and explanations of rigidities is given; then the four factors are discussed. The aggregate wage-setting curve is briefly discussed on the basis of these considerations.[5]

---

[4] A comprehensive introduction to these models can be found in Layard, Nickell et al. (1991).
[5] This wage-setting curve is central when the partial equilibrium approach of the wage curve is integrated into a macroeconomic framework.

2.2 Modern theories of unemployment: Rigidities, regions, and institutions

In this section, I give an overview of modern theories based on the assumption of real rigidities, a characteristic rooted in the new Keynesian framework reflecting the micro foundation of macroeconomics. The argumentation will lead into a detailed discussion of the wage curve. The section is structured as follows: First, the role of rigidities in the labour market is discussed, and theoretical approaches to explain them are highlighted. Second, I discuss the relevance of regions in the theoretical literature concerning the explanation of the empirical fact of persistent differences in unemployment figures between them. Mentioning several approaches I emphasize the advantages of the wage curve to explain these.

2.2.1 The role of wage rigidities in the explanation of unemployment

Why have wages seldom declined during post-war recessions in most industrialized countries? In economics literature, welfare state institutions and other 'artificial' labour market rigidities are often at the heart of economists' explanation of unemployment. Siebert (1997), for example, argues along these lines in providing his explanation for high and persistent unemployment in Europe. Yet it remains unclear whether institutional rigidities actually lie at the root of European unemployment. The standard argument is that institutional environment such as unemployment insurance, employment protection laws, high taxes, and so forth, distort the wage structure and the incentives to work, thereby creating higher equilibrium unemployment in Europe than, for example, in the United States. This argument, then, is mostly deduced from the perfect market model. The debate has important political implications, as the explanation of wage formation and unemployment are directly linked with the origin of rigidities. In a 'black-and-white' framework of Keynesians against neoclassics, the former state that wage rigidities are confirmed by statistical evidence showing that pay rates almost never fall and that, therefore, labour markets do not automatically adjust in order to eliminate excess unemployment. The latter assert that wage rigidities are an illusion, that wages and salaries are flexible, and that labour markets always clear. Any actual unemployment is therefore the optimal outcome and cannot be affected by governmental policy.

Although rigidities are basically rooted in new Keynesian theory, the discussion today is much more nuanced the existence of rigidities and the fact that states and institutions matter are viewed as 'common sense'. Schettkat (2003) maintains that the relative effectiveness of institutions – not distorted incentive structures – is at the root of high

unemployment. Franz and Pfeiffer (2006) investigate institutional and economic reasons for downward wage rigidities with respect to different occupational skill groups. One can conclude that, while it is clear that functioning labour markets are a necessary condition for a dynamic economy, it is unclear how institutional features affect this functioning of actual labour markets and what the 'right level' of regulation actually is (Schettkat 2003).[6] The following brief descriptions outline some of the existing theoretical approaches which explicitly model these rigidities.

In search models, unemployment is a natural consequence of delays in matching people with open positions. In most of these search models, wage rates either are the outcome of bargaining between employers and individuals or are set unilaterally by employers and adjusted so as to ensure an adequate supply of labour. There are two types of job search models: those with downward wage rigidity in respect to job hunters' misperceptions of market wages, and the transaction type in which there are no misperceptions, wages are completely flexible, and unemployment results from adjustment to change.

According to the implicit contract theory, firms obtain labour most cheaply by guaranteeing that real wages will never decline. They provide insurance against wage decline. If real wages do fall, employers have to pay more in the future than they would have otherwise in order to obtain or retain labour. According to the insider-outsider theory of Lindbeck and Snower (1988) for example, the resistance of a group of workers within each firm is responsible for wage rigidity. This group, the insiders, consists of employees who are (implicitly) well protected from layoffs because of high seniority or special skills. In the shirking theory of Shapiro and Stiglitz (1984) is another example. Firms monitor workers randomly, firing those whose performance does not meet a (implicitly) defined standard. The higher the wages and salaries are, the greater is the cost to workers of job loss, and hence the greater is their incentive to meet that standard. Increased pay therefore makes pay discipline more effective, raises productivity, and reduces labour monitoring costs.

Experience suggests that marked differences in unemployment rates across regions can be reduced whenever two re-equilibrating factors are at work. The first is wage adjustment: if unemployment is higher in one region than in another, wages in the high-unemployment region decline in relation to wages in the low-unemployment region. This

---

[6] For a more detailed discussion of rigidities and the impact of labour market institutions, see Bewely (1999), Nickell and Layard (1999), Freeman (2005), and Blanchard (2005). Werding (2006) gives a comprehensive overview of the current discussion on the causes of structural unemployment in Europe.

development attracts investment, which leads to more jobs in regions of high unemployment. The second re-equilibrating factor is regional labour mobility: there is net migration away from the high-unemployment regions.

Centralized wage-setting institutions deter the emergence of significant regional wage differentials. At the same time, a number of factors – including state transfers to the high-unemployment regions – reduce the pressure to migrate. Thus, large regional labour market imbalances exist. The North-South divide in Italy and Spain and the West-East divide in Germany are prominent features of the European landscape. It can be concluded that the greatest problem with wage rigidities is their impact on regional and sub-regional unemployment. Koning, Layard et.al. (2002) state that much greater flexibility in wages, especially between the regions of Europe, is required because much of Europe's unemployment is concentrated in regions, for example in southern Spain, southern Italy, and eastern Germany, where relative labour costs are too high.

2.2.2 Four factors preventing the underbidding of wages

A basic assumption is that labour markets do not clear at a given price level because nominal wages do not adjust to the market-clearing level. This perspective is based on the insider-outsider approach. Those outside the labour market are involuntarily unemployed because it is not possible for them to replace the employed insiders by underbidding wages. Why is this the case? Lindbeck (1992) distinguishes four broad reasons for why employed insiders have the power to maintain wages at levels higher than market-clearing wages and thus to prevent underbidding by outsiders: social norms, union wage-setting, turnover costs, and efficiency wages.

Social norms

First, it is argued that wage-underbidding is regarded as unacceptable by society. The unemployed choose not to offer labour at lower than current wages because they fear 'social stigmatization' from having stolen jobs. Similarly, firms do not want to accept low-wage offers from outsiders because they fear negative effects on their reputation. If consumers regard a firm's recruitment behaviour as unacceptable, they might become negatively conditioned against its products. This view of human behaviour is of course inconsistent with the portrait of *homo oeconomicus*, who would have no problem with underbidding wages. Südekum (2003) points out that recent experimental economics studies show that individuals in the real world are also driven by non-selfish motives such as social norms. Nevertheless, it hardly suffices to explain nominal wage rigidities and

insider market power only through the honourable behaviour of unemployed persons who would rather suffer than cause a decrease in wages.

Union wage-setting

The idea behind this explanation is that wages are not determined by market forces, but rather are set by trade union bargaining over wages. This type of wage determination is often said to be relevant for continental Europe, where union wages apply to more than 80% of all employees (Südekum 2003). Unions represent the interests of their members and bargain on behalf of their members. It is the primary concern of unions to maximize the utility function of their members. Typically, this optimization process will lead unions to set wages above the market-clearing level (Layard, Nickell et al. 1991). But even though unions might bargain high wages for their members, non-union members have the freedom, at least in principle, to offer labour to employers at lower remuneration.

The degree of unionization is not so high that these models can fully explain mark-ups above the market-clearing level, but one should also take into consideration the power of unions as a political pressure group. Unions not only bargain for wages on behalf of their members. They also seek to prevent underbidding through political lobbying activities. In Germany, for example, it is possible to declare bargaining results as generally binding by government for all workers in a specific sector. In general, the high rates of bargaining coverage in continental Europe are much higher than union membership rates, indicating that union wages have a high compulsory power. Therefore, outsiders are both legally and realistically prevented from underbidding in many important sectors.

Turnover costs

A natural complement to union models is the insider-outsider theory already mentioned. This theory stresses the source of insider power: the resistance of a group of workers within each firm is responsible for wage rigidity. This group consists of employees who are well protected from layoffs because they have high seniority or special skills. The most direct form of turnover costs is training costs and the costs of hiring and firing. As interest groups for the insiders, unions again might lobby for various political steps to increase turnover costs and thereby the market power of employed workers, for example through advocating employment protection legislation. The existence of these costs grants insiders market power, as they can claim higher wages than outsiders can.

Efficiency wages

Firms might also consciously decide to pay wages above the market-clearing level in order to boost the productivity or profitability of their workforce. Different efficiency wage

models provide different reasons for such a motivation. Yet all of these models view labour as a very special input in the production process, one that is hardly comparable to other production factors. Because workers are human beings, they have special individual characteristics and skills. A firm might thus view its workforce as an asset portfolio that is worth retaining and developing. Moreover, workers have the ability to vary their personal work performance, with the possible range starting from zero supply with a given skill level and with given capital stock. Unlike machines, workers adjust their efforts in response to incentives from within and without the company. Firms can only incompletely monitor the performance of individual workers. Within this human environment, the wage paid by a firm becomes an instrument for governing the performance and the motivation of the workforce (Stiglitz and Walsh 2002).

For the purposes of this thesis, I have neither the intention nor the space to review the details of various efficiency wage models. However, in the context of wage underbidding, I can state that all existing models share comparable predications: because employers pay wages higher than the market-clearing level of their own free will, they will not accept lower wage offers from outsiders. They can use unemployment outside the firm as a pressure device, but motivation, fairness, or screening considerations induce the firm to continue paying higher wages. Consequently, outsiders cannot obtain jobs at these firms and remain unemployed.

The four arguments presented here are not exclusive but rather complementary. These sources of insider market-power are the quintessence of the aggregate description of the labour market under imperfect competition. It is now important to go the other way round and show how the level of unemployment influences wage-setting behaviour. Before turning to the regional wage curve in more detail, I first discuss relevant theoretical aspects for understanding the wage curve in macroeconomic terms.

Labour market supply and demand in the imperfect competitive market

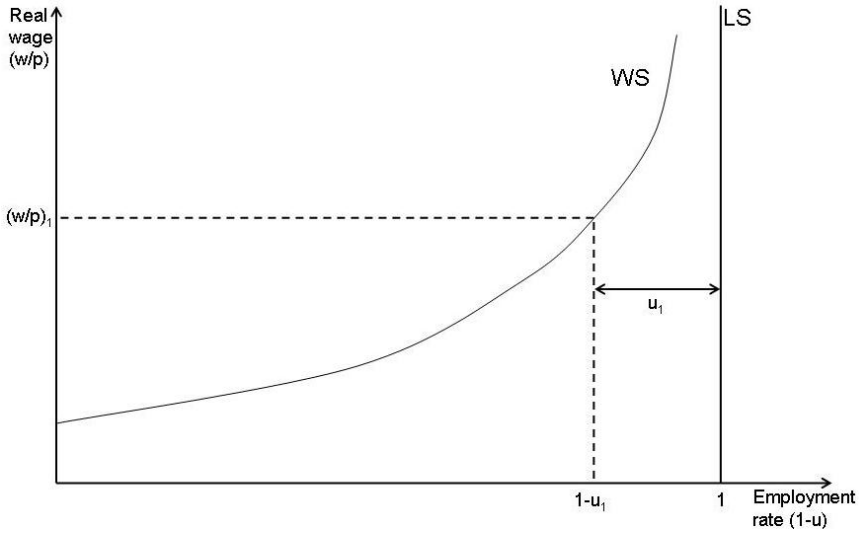
The shirking approach of Shapiro and Stiglitz (1984) is the basis for the wage curve model that is introduced in detail in the next section and that builds the basis for further estimations in subsequent chapters. This approach also can serve as the basis for the justification of a macroeconomic wage-setting curve. To draw this link, I will now describe the wage-setting curve in its basic functioning.[7] In the following, different behavioural assumptions underlying the will not be mentioned here, as the main purpose of the

[7] The illustration is based mainly on Layard, Nickell et al. (1991) and the specific discussion of the wage curve in by Südekum (2003). Further discussions of the wage-setting curve can be found in Carlin and Souskis (1990), Lindbeck (1992), and Blanchard and Katz (1999).

illustration is to show a possible link of the wage curve to general macroeconomic modelling.

The aggregate description of the labour market in this model does not consist simply of a labour supply and a labour demand curve. In fact, the central relation is a wage-setting curve, or 'WS curve'. This WS curve is an upward-sloping curve in the 'real wage-unemployment' space and shows all combinations of real wages and employment rates that are consistent with the equilibrium in a labour market with imperfect competition. The wage-setting curve represents an equilibrium combination of real wages (w/p) and unemployment u stemming from the labour market.[8] The labour supply is assumed to be perfectly elastic and above the full-employment situation for all combinations (LS=1). The unemployment rate is therefore given for all possible situations through the distance between the WS curve and the LS curve (see figure 1).

Figure 1: The wage-setting curve



Source: Layard, Nickell et al. (1991).

Two different economic intuitions behind the story of imperfections in the labour market can be identified: the union models and efficiency wage models. The assumption in union models is that a labour market is highly unionized. The unions set nominal wages in relation to the given or expected price level, which implies real wages in the short term. It is intuitive that the unions' bargaining power and thereby the bargained real wage is a positive function of the employment rate. With high unemployment, insider power is low and outsiders are willing to underbid wages more aggressively. Insiders cannot rely on turnover

[8] The second central relation in the model is the aggregate production market equilibrium, which is called the price-setting curve. For a detailed discussion, see Layard, Nickell et al. (1991) and Südekum (2003).

costs to the same extent as when unemployment is low, because the pool of outsiders is characterized to a relatively greater extent by individual characteristics and qualifications that do not fit that good to the needs of the labour market.

The second foundation of imperfect competition in the labour market and the positive slope of the WS curve is efficiency wage theories. In these models, workers also increasingly rely on efficiency wages in tight labour markets. If unemployment is high, efficiency wages act as a disciplining and motivating force for workers who fear losing their jobs. Employers need not use additional instruments. If unemployment is low, and the outflow from unemployment is high, joblessness might be perceived by workers as an inconsequential threat. Workers thus might be induced to engage in shirking behaviour, for example by showing low commitment to employers or by neglecting to invest in firm-specific human capital. If a particular employer pays above market level, the commitment and the performance of workers can be maintained through efficiency wages, because workers fear losing their privileged position. The WS curve then represents the level of real wages that firms are willing to pay in order to achieve their motivation or screening objectives for any given employment rate. In sum, there is a plausible economic explanation for the existence of a WS curve.

It has been argued that the main motivation for developing a model of imperfect labour markets has been the insight that modern labour markets should not be modelled as a perfect competitive market. As Solow (1990) has stated, 'there is something special about the labour market'. Approaches with imperfect competition are thus more suited to describing labour markets in a microeconomic framework with specific consideration of conditions related to human resources and individual 'irrationalities'. In more technical terms, the introduction of an upward-sloped WS curve is a micro foundation of the labour market, which is radically different from neoclassical approaches. The main economic arguments of the WS curve also apply to the wage curve on the basis of regions. In the following section I introduce the specific relevance of regions in economic theory.

2.2.3 Why do regions matter? New economic geography

In the economic literature, labour markets are predominantly examined on the national level. Beginning in the early 1980s, however, this view gradually changed with developments in trade theory and the important work of Porter (1990) and Krugman (1991). Since then, these developments in economic geography have gained ground and made regional analyses a central part of economic analyses. Moreover, 'agglomerations' –

well-performing, more or less independent regional economies within countries – and their relationships have been brought into focus.

What is the appropriate definition of an economic region? In general, it can be defined as an agglomeration of countries brought together through economic or political cooperation or integration; the European Union (EU) and NAFTA are examples. Although of relevance in the literature of economic geography, this definition is not the main point here. In fact, the main argument of new economic geography is that sub-national units, or so-called economic clusters, are the relevant unit of analysis. If we look at the employment figures in the European Union on the national level, we find that the unemployment rates also reveal a core/periphery structure. Large core regions – mainly in central and northern Europe – have low unemployment rates, whereas excessive mass unemployment is found predominantly in the peripheral regions at the outside borders of the EU-25.

But looking at the EU on a more disaggregated level, within each country, we find regions with high and regions with low economic performance. This geographical pattern of unemployment rates follows the pattern of GDP per capita. That is, regions with low (high) unemployment rates on average have comparatively high (low) real income levels.[9] New economic geography shows how modern trade and growth theory can be used to provide a sound theoretical foundation for the location of economic activity across space. This augmented perspective in macroeconomic trade theory has radiated to other fields in economics and political science: today, regions are increasingly viewed as independent marketplaces that are connected by means of interregional and international trade, not as administrative units incorporated in a national unit.

In theoretical terms, these models of economic geography are based on imperfect competition and economies of scale. In the simplest case, externalities emerge as a consequence of market interactions involving economies of scale at the level of individual firms. A common approach to dealing with this situation is to use a spatial version of the Dixit-Stiglitz model of monopolistic competition (Dixit, 1977), which allows for multiple locations and transport costs between different locations (Karlsson and Stough, 2002). According to the new insights from economic geography, the roots of the economic development of a country depend on specialization on the regional level, not the national level. It is assumed that the dynamic interaction between geographic market potentials and

[9] The problem of the adequate definition of sub-national regions is highly dependent on the entire analysis, as it has substantial empirical and econometric restrictions. The empirical aspects are discussed in chapter 3 with the introduction of several alternatives of aggregation of the German labour market. Econometric caveats are discussed together with econometric modelling in chapter 5.

rational firms creates the comparative advantage of regions. These comparative advantages take the form of localized increasing returns to scale, such as the formation of highly competitive and rapidly growing industrial clusters. This framework stresses the role of regions as marketplaces and as centres of specialization.

On the one hand, this perspective means that the performance of specific regions within a country is responsible for the international competitiveness of that country. Furthermore, one should expect not a whole country to have a relative advantage in a specific field but rather a region within a particular country. Moreover, within a country there may be more than one region that is competitive in a specific field. On the other hand, this perspective also puts regional policy into a new perspective. Of course, national policy can still stimulate the development of dynamic advantages through investments in enduring resources, such as infrastructure, research and development, and human capital. However, according to modern theories of endogenous regional economic growth, regional growth comes in large part from internal conditions that can be influenced by policy and other strategic activity. Internal conditions must be developed and acted on with specific local and regional knowledge.

Modern trade and growth theory provides a sound theoretical foundation for the location of economic activity across space.[10] Consequently, policy and other strategic activity can influence internal conditions.[11] It follows that labour markets and labour market policies should also be analysed regionally. However, models of regional agglomeration have the disadvantage of being ambiguous when it comes to explaining unemployment and differences in wages between regions. The standard models of new economic geography assume full employment and ignore the existence of involuntary unemployment. Another strand of literature based on the Harris-Todaro model (1970) analyses the relation between wages and unemployment; it assumes that in high unemployment regions, workers are compensated for a higher unemployment risk by means of higher wages. Recently, the perception of the relation between regional wages and unemployment has fundamentally shifted to the Blanchflower and Oswald (1994) wage curve, which contradicts the Harris-Todaro model. These models are introduced in the following sub-section.

---

[10] The seminal work of Fujita, Krugman, and Venables (1999) develops and summarizes the main elements of new economic geography.

[11] See, for example, the works of Gordon (2002) and Karlsson and Stough (2002).

2.2.4 Explaining unemployment differences between regions

There are several precursors to the idea that local unemployment rates affect wages. One strain of literature starts from the hypothesis that different locations or industries differ in their long-term probability of unemployment. As Adam Smith observed, any predictable component of the constancy of employment will require a compensation differential. Harris and Todaro (1970) used this idea to explain the persistence of high unemployment in urban areas of less developed countries.

The Harris-Todaro model is a microeconomic model applied in development economics and welfare economics to explain some of the issues in rural–urban migration. Essentially, it asserts that an equilibrium will be reached when the expected wage in urban areas, adjusted for the unemployment rate, is equal to the marginal product of an agricultural worker. Thus, migration from rural areas to urban areas will increase if any of the following three things happen: (a) an increase in wages in urban areas, (b) a reduction in unemployment in urban areas, or (c) a reduction in agricultural productivity. Rural-to-urban migration causes overcrowding in cities, with many people ending up in unproductive employment in the informal sector. The model's main assumption is risk neutrality. The model assumes potential migrants are risk-neutral. To take a job in a region or industry (or in principle even a country) with relatively high unemployment rates, the typical worker needs to be paid well. This assumption is an application of the concept of compensating differentials.

Blanchflower and Oswald point to two potential difficulties for this simple compensation differential theory of wages and unemployment. It is not altogether clear that cities of the United States – or core regions of other developed economies – actually have higher permanent unemployment than do rural regions. In Germany, for example, the federal state of Mecklenburg-Vorpommern is characterized by regions with the country's highest unemployment figures since reunification in 1990. In equilibrium, then, it should offer better pay than would a federal state with persistently low unemployment. Otherwise, workers will find the living conditions there too risky. At the level of the region or industry, therefore, the wage is a function of (regional) unemployment. In fact, depending on the years used in empirical analyses, researchers have not always found a statistically significant and positive relation between wages and long-term unemployment rates. Perhaps more fundamentally, however, the compensation differential theory pertains to the expected unemployment rates in local markets.

The wage curve relation, a concept developed and promoted by Blanchflower and Oswald in their frequently cited book (1994), concerns simultaneous unemployment. The

existence of simultaneous unemployment is explained by imperfections in the labour market, such as hysteresis, the long-term effect of short-term shocks (Franz 2003). According to Blanchflower and Oswald, in most countries it has been found that regions with higher unemployment have lower wages. One way to rationalize such a finding is to turn to non-competitive theories of the labour market – for example to the no-shirking condition or to the bargaining-power effect. According to this kind of analytical framework, higher local unemployment makes life tougher for workers (e.g. they will find it harder to obtain work if laid off by their current employer), and therefore it is not necessary for employers to remunerate those individuals as well as they might otherwise. Although verification of the wage curve is mainly driven empirically, there are four possible theoretical approaches to explain the unemployment/wage locus. This theoretical foundation is discussed in section 2.3.

Südekum (2003) introduced the wage curve into a macroeconomic model of agglomeration, and thus addressed a weakness of former models of new economic geography. According to Südekum, the majority of studies conclude that a wage curve does exist in most OECD countries. He brings together the two strands of literature, new economic geography and the wage curve, integrating a wage curve into a model of new economic geography. On this basis he shows that regional unemployment disparities are driven by the degree of regional agglomeration, as core regions exhibit low unemployment rates and high wages, whereas small (peripheral) regions have high unemployment rates and low wages.

2.2.5 The role of institutions and labour market policies

When equilibriums of labour markets are characterized by imperfect competition and persistent unemployment, questions arise about the role of institutions and the impact of labour market policies and qualifications. As Schmid (2002) argues, in modern labour markets, full employment in the traditional sense is no longer realistic. Labour market institutions play an essential role by actively organizing the transition from one job to the next and by encouraging or even requiring employability. Schmid has advanced the concept of transitional labour markets as a normative perspective. In transitional labour markets, permanent employment (or permanent full-time employment) from an individual perspective and full employment from a macroeconomic perspective are no longer the paramount aim of labour market policy. Rather, other forms of activity, including education and the procurement of qualifications, interrupt periods of (full-time) employment.

Obtaining an education and/or qualifications is only one aspect within transitional labour markets. Other types of transition analysed include those between various forms of economic activity and inactivity and between various forms of employment dependent on welfare state arrangements. Labour market institutions not only provide protection against the risks of such transitions, but also offer incentives to take on such risks: for example, to move from dependent employment to self-employment or from a full-time to a part-time job, or to combine part-time work with training for a new occupation. For a detailed discussion, see Schmid (2002); for a discussion of the risks involved, see Schmid (2006).

Active labour market policies play a crucial role in transitional labour markets because they have several policy impacts, which can be summarized as follows: unemployment is in large part a problem of a lack of skills leading to reduced productivity. Active labour market policies can mitigate this lack of productivity. By providing adequate training and other subsidies to activate the unemployed, they enhance their employability and mobility. Training, the promotion of commuting, and mobility improve interregional matching and result in improved regional labour market matching. The standard wage curve model can be extended by integrating aggregate labour market figures; it can then explain regional differences of wages caused by differences in unemployment with imperfect competition.

2.3 The wage curve – a new law in labour economics?

In this section, I introduce the wage curve approach in more detail. First, the basic concept is introduced, with discussion of empirical results since the publication of Blanchflower and Oswald's book (1994). Second, a short review of empirical studies on the wage curve is given. Third, alternatives of the microeconomic modelling of the wage curve are highlighted. Fourth, I explain the connection between the wage curve and macroeconomic modelling in a non-competitive framework. Here, the wage curve is a kind of 'mis-specified' labour supply function. In the fifth subsection, I introduce a specific efficiency wage model of the wage curve, which will be used in subsequent empirical chapters. The section concludes by drawing a link to the implications for regional labour market institutions.

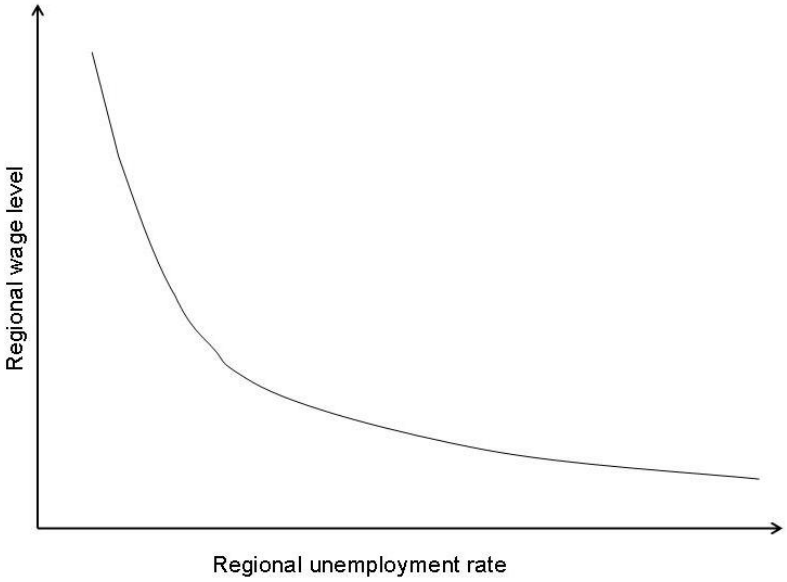
2.3.1 The basic concept of the wage curve

Since the early 1990s, Blanchflower and Oswald (1994) have published on the phenomenon that they call the 'wage curve'. According to this 'law' they have identified a negative relationship between unemployment and real wages of –0.1 independent of time

and country. Thus, a doubling in regional unemployment would lead to a decline in wages of around 10%. The analyses were widely observed in economics literature, and were followed by a huge number of empirical works for different countries and data sets. Despite the sum of this work, it remains an open question whether a wage curve exists, and, if it exists, whether the elasticity is always approximately –0.1. The authors, as well as different studies, more or less provide support to verify a significant negative wage elasticity with respect to regional unemployment. However, the '10% law' cannot be regarded as verified.

In principle, the wage curve is an examination of the role that local unemployment plays in wage determination. According to macroeconomic orthodoxy, there is a relationship between unemployment and the rate of change of wages: a region's wage level is positively related to the amount of joblessness in the region. The wage curve suggests that this relationship is incorrect. Blanchflower and Oswald (1994) argue that the stable relationship is a downward-sloping convex curve linking local unemployment and the level of pay (see figure 2). Through their exhaustive analyses, the authors systematically present evidence and possible explanations for their 'new empirical law of economics': the higher the unemployment rate in the worker's region or industry, the lower is the wage.

Figure 2: The standard wage curve



Note: Own illustration.

The empirical work of Blanchflower and Oswald is based on a sample of nearly four million people from sixteen countries. Causality is to be deduced from the amount of joblessness to the level of real wages. Based on these analyses, a tremendous boom in

empirical analyses began, which cannot be said to be over. In the following subsection, I highlight the most important empirical insights from these studies.

2.3.2 A short review of empirical studies from fifteen years of wage curve research

In this subsection, I give an overview of recent studies on the wage curve, the data used, the method, and the main outcomes. Table 1 provides an overview of the empirical literature from the last fifteen years for European countries. For most of the countries, several studies – often from different authors and based on different data sources and model specifications – have already been conducted; it would require a separate book to review them all adequately. A recent meta-analysis by Nijkamp and Poot (2005) on a sample of 208 wage elasticities concludes that the wage curve is a robust empirical phenomenon. However, they point out that there is evidence of a publication bias. There is indeed an uncorrected mean estimate of about –0.1 for the elasticity. After controlling for publication bias by means of two different methods, they estimate that the 'true' wage elasticity is a bit below the 10% level and is about –0.07.

Other analyses show that the wage equation seems to hold partly in industrialized countries that exhibit fundamental differences in unemployment figures and institutional settings, as in most cases a negative wage-unemployment relationship is found. However, apart from the results of Blanchflower and Oswald, the outcomes are not that homogeneous. Analyses of the United Kingdom, Ireland (Blanchflower and Oswald 1994), Norway (Johansen 1995; Johansen 1997; Johansen 1999), Finland (Pekkarinen 1998), Belgium (Janssens and Konings 1998), and western and eastern Germany (Baltagi and Blien, 1998; Baltagi, Blien et al., 2000; Markus Pannenberg and Schwarze, 1998) all show this pattern. However, the results are not always statistically significant, the elasticities differ, and the –.1 relationship cannot be verified as a 'law'. In their recent contribution on the wage curve, Blanchflower and Oswald (2005) come to a more nuanced conclusion. Despite their proclamation of an economic law, their most recent results are much more differentiated, and they mention that one might expect different results depending, for example, on institutional settings, individual preferences, and the degree of mobility. Nevertheless, they identify clear and statistically significant negative wage elasticities. For Germany, Gerlach and Schettkat (1995) used the GSOEP to prove the relationship for men in West Germany from 1984 to 1990, and Bellmann and Blien (1996) estimated wage curves with data from the German employment office, coming to the same conclusions of a trend without unique elasticities.

Table 1: Overview of empirical and theoretical studies on the wage curve in European countries

Austria	Blanchflower and Oswald (1994); Winter-Ebmer (1996)
Belgium	Janssens and Konings (1998)
Bulgaria	Blanchflower and Oswald (2005); Iara and Traistaru (2004)
Czech Republic	Blanchflower (2001); Huitfeldt (2001); Galuščák and Münich (2002)
Denmark	Nicolaisen and Tranaes (1996)
Estonia	Blanchflower (2001)
Finland	Pekkarinen (1998)
France	Montuenga, Garcia et al. (2003); Estevão and Nargis (2001); Gianella (2002); Glaude and L'Héritier (1993), Delteil, Pailhé et al. (2004)
Germany (West)	Blanchflower and Oswald (1994); Blanchflower and Oswald (1996); Bellmann and Blien (2001); Wagner (1994); Baltagi and Blien (1998); Büttner (1999); Longhi, Nijkamp et al. (2004); Pannenberg and Schwarze (1998); Blien, Haas et al. (2003); Rendtel and Schwarze (1996)
Germany (East)	Blanchflower (2001); Baltagi, Blien et al. (2000); Buscher (2003); Elhorst (2003); Pannenberg and Schwarze (1996)
Great Britain	Blanchflower and Oswald (1990); Blanchflower and Oswald (1994); Blanchflower and Oswald (1994); Blanchflower and Oswald (2000); Montuenga, Garcia et al. (2003) Bell, Nickell et al. (2002); Blackaby and Manning (1992); Black and FitzRoy (2000); Barth, Bratsberg et al. (2002); Barth and Lucifora (2006); Collier (2000)
Hungary	Blanchflower (2001); Kollo (1998); Kertesi and Kollo (1997); Kertesi and Kollo (1999); Delteil, Pailhé et al. (2004)
Ireland	Blanchflower and Oswald (1994)
Italy	Blanchflower and Oswald (1994); Blanchflower and Oswald (2000); Montuenga, Garcia et al. (2003); Chiarini and Piselli (1997); Canziani (1997)
Latvia	Blanchflower (2001); Adamaite (2000)
Netherlands	Blanchflower and Oswald (1994); Blanchflower and Oswald (2000); Groot and Mekkelholt (1992); Graafland (1992)
Norway	Blanchflower and Oswald (1994); Blanchflower and Oswald (2000); Johansen (1995); Johansen (1997); Johansen, Karlsson et al. (2002); Falch (2001); Bårdsen, Doornik et al. (2004); Brunstad and Dyrstad (1997); Dyrstad and Johansen (2000); Wulfsberg (1997); Johansen, Kristen et al. (2001); Barth, Bratsberg et al. (2002); Barth and Lucifora (2006)
Poland	Blanchflower (2001); Iara and Traistaru (2004); Duffy and Walsh (2000); Duffy and Walsh (2002); Beblo and Wolf (2003)
Portugal	Montuenga, Garcia et al. (2003)
Romania	Kallai and Traistaru (2001)
Slovakia	Blanchflower (2001); Basu, Estrin et al. (1995); Basu, Estrin et al. (2000); Huitfeldt (2001)
Slovenia	Simoncic, Pfajfar et al. (2004)
Spain	García-Mainar and Montuenga-Gómez (2003); Jimeno and Bentolila (1998); Canziani (1997); Sanromá and Ramos (2003); Bajo et al (1999)
Sweden	Holmlund and Skedinger (1990); Edin and Holmlund (1989); Edin, Holmlund et al. (1994)
Switzerland	Blanchflower and Oswald (1994); Blanchflower and Oswald (2000)
Turkey	Ilkkaracan (2002)

Note: Blanchflower and Oswald (2005), own illustration and extentions. For a description of other countries outside Europe, see Blanchflower and Oswald (1994, 2005)

2.3.3 Explanation of unemployment and wages in a macroeconomic framework

One might argue that the relationship of unemployment and wages is some form of mis-specified labour supply function, as mentioned in the previous section. Here, unemployment is regarded as the inverse of employment for a fixed labour force. If the wage curve is such a function, then the unemployment rate should perform statistically worse in a wage equation than do conventional labour supply variables such as the participation rate or the employment-to-population ratio. Instead of being a mis-measured labour supply curve, the wage curve might also be interpreted as a mis-specified Phillips curve. The Phillips curve is traditionally estimated by using time-series macroeconomic data. The wage curve, in contrast, is estimated by using longitudinal or pooled cross-sections of microeconomic data merged with regional macroeconomic figures. In the Phillips curve model, specification should relate a change in the regional wage level to unemployment rather than to the level of wages itself.

The wage curve represents an equilibrium locus in wage-unemployment space that is derived from microeconomic rather than macroeconomic analyses. This theoretical distinction is reinforced by econometric considerations where the distinction between the two concepts essentially rests upon wage dynamics. A significant autoregressive component in dynamic wage equations would support the Phillips curve specification. Blanchflower and Oswald find little evidence, however, to support such an outcome. Instead, their results suggest that the idea of a Phillips curve is misleading. The failure to estimate using suitable control variables, particularly those for fixed effects, results in large coefficients on lagged dependent wage variables. They assert, therefore, that the correct specification should indeed express the level of wages as a function of the unemployment level.[12]

As mentioned above the Phillips curve is 'traditionally' estimated by using time-series macroeconomic data. The wage curve, in contrast, is estimated by using longitudinal and pooled cross-sections of microeconomic data. Roberts (1997), however, presents empirical evidence suggesting that estimates of the slope of the wage curve that are taken from macroeconomic Phillips curves are close to the range of estimates that Blanchflower and Oswald obtain from macroeconomic data. These results suggest that the aggregate data may be reflecting the same phenomena that Blanchflower and Oswald describe. They

[12] See Paldam (1990) and Black and FitzRoy (2000) for a detailed discussion.

conclude that a standard Phillips curve augmented by macroeconomic expectations can be derived from micro foundations based on the wage curve.[13]

2.3.4 Alternative non-competitive micro models explaining the wage curve

The wage curve represents a non-competitive account of the labour market. Blanchflower and Oswald (1994) offer several explanations consistent with this empirical phenomenon, including a bargaining model and an efficiency wage model. Although the findings are mainly empirically based, four possible theoretical approaches to explaining the unemployment-wage locus are given, whereby the bargaining model and the efficiency wage model can be seen as the most relevant approaches. All four models are briefly presented in this subsection.

Contract model

In the contract model, observed wage and employment combinations may be points on an upward-sloping efficiency locus. The intuitive idea is that when pay is high it is a waste of resources to leave workers idle. A contract curve might therefore be expected to generate a downward-sloping curve in a diagram with wages and unemployment as axes.

Persistent disequilibrium

If the labour market adjusts sluggishly, non-equilibrium states may routinely be observed, and these may trace out a negatively inclined set of points in wage and unemployment space. Slumps, in this view, generate both depressed pay and depressed employment opportunities. Such an account is reminiscent of the Phillips curve, and overlaps somewhat with labour contract theory. Although it might be thought to confuse the distinction between low wages and falling wages, this theoretical approach must be considered.

Bargaining model

The bargaining model utilizes a conventional framework similar to that presented in Carruth and Oswald (1989). This model asserts that a high degree of joblessness might be expected to reduce the ability of workers to bargain for a share of economic rents. High unemployment serves here as a potential threat to the employee. In the event of a permanent impasse, workers may be forced to seek alternative employment. The

[13] For a more detailed discussion of the Phillips curve, see Mankiw, Romer et al. (1992). However, Dornbusch, Fischer et al. (2001), for example, speak of an 'expectations-augmented Phillips curve' when referring to an aggregate relationship between inflation, expected inflation, and the unemployment rate.

probability of re-employment decreases as local unemployment increases. Under the assumption that unions have concerns for both employed and unemployed members, rising joblessness might then shift union preferences towards the preservation of jobs rather than the share of rents. A reduced concern for rents may result in a lower level of negotiated pay. An inverse association between the level of wages and unemployment should then be observed.

Efficiency wage model

In the efficiency wage model, the role of unemployment as a motivator is stressed. In a booming labour market, firms may have to pay employees well in order to ensure that individual workers who know that there are many other jobs open to them exert enough effort at work. In a depressed labour market where workers are keen to hang on to their existing jobs, employers can pay low wages. Again, a downward-sloping curve is the result. This approach will be discussed in more detail in the subsequent section, as it builds the basis for the empirical analyses presented later in this thesis.

Further theoretical developments

Generally, theoretical developments with respect to the wage curve lack behind the empirical work in the field. In earlier literature, it is above all the shirking approach of Shapiro and Stiglitz (1984) that finds application, as will be the case here. In addition to the models discussed in Blanchflower and Oswald (1994), one serious extension of a theoretical modelling is the approach of Campbell and Orszag (1998), which introduces a simple dynamic efficiency wage model with labour turnover, in which labour is a quasi-fixed factor of production. Bellmann and Blien (2001) discuss another extension.

All these approaches have in common that they have the potential to be interpreted as an alternative to the labour supply function commonly found in the standard macro models developed by Layard, Nickell et al. (1991) and Carlin and Soskice (1990).[14] One advantage of the incorporation of regional labour markets into the analysis of wages is that it provides empirical researchers with variance, for they are then able to study many small (regional) economies instead of only a single large one (Krugman 1991).[15]

As Card (1995) points out, the models do address a number of interesting caveats. For example, it is argued that efficiency wage models can explain differences in the slope of the wage curve across groups of workers. He further argues that for such models, wages of a

[14] An example was discussed in the previous section. For more detailed modelling, see Südekum (2003).
[15] For a detailed discussion of the other approaches, see Blanchflower and Oswald (1994), Card (1995), and Blanchflower and Oswald (2005).

particular group of workers are related to the group-specific unemployment rate. High unemployment for one group of workers should thus have no effect on another group. This implication is interesting, especially with regard to the identification of unemployment elasticities across disaggregated curves.[16] More important, however, is the implication that the models replace the conventional labour supply curve with a wage-fixing function, a function that lies flatter and to the left of the true Marshallian labour supply. This function is compatible with such macroeconomic models as those discussed in the previous section. The wage curve thus provides the empirical foundation for such models.

Because the wage curve approach is an integration of the micro and the macro levels, the analysis is also in line with the neoclassical argument about the importance of individual decisions. However, in contrast to the neoclassical approach individual preferences (and therefore utility functions) are no longer in question and thus invariable across societies (Becker 1975). One avenue of criticism of this radical perspective is the question of why preferences should not be influenced by society.

One example which is popular in economics at the moment and which has important implications for the functioning of labour markets, as well as for differences related to 'impersonal' product markets, stems from the bounded rationality approach in behavioural economics.[17] A prominent example from an experimental analysis comes from Güth (1995), who examined the so-called *Ultimatumspiel* across fifteen societies. He came to the conclusion that different outcomes between individuals with identical characteristics can be observed. Differences within society result in differences in preferences, and these preferences determine behaviour. Daniel Kahneman, the famous Nobel Prize winner of 2003, proposes bounded rationality as a model for overcoming some of the limitations of the rational-agent models in economics literature (Kahnemann 2003). With this theoretical background, in the following section I introduce a model of the wage curve that is based on the shirking model of Shapiro and Stiglitz (1984). This model illustrates its main functioning and bridges from the macroeconomics and the further impact for labour market institutions.

---

[16] These elasticities are identified in chapter 5.

[17] Bounded rationality is based on the work of Simon, who argued that economic agents employ the use of heuristics to make decisions rather than a strict, rigid rule of optimization. Agents do this because of the complexity of their overall situation and because of their inability to process and compute all alternatives. Deliberation costs might be high, and there are often other economic activities in which similar decision-making is required (Simon, 1957, Williamson, 1988).

2.4 An efficiency wage model explaining wage curves

2.4.1 The standard model

As mentioned, wage curve analyses are mainly empirical, and there are different theories to explain the phenomenon. The model depicted here is an efficiency wage model based on the shirking model of Shapiro and Stiglitz (1984) and adapted by Blanchflower and Oswald (1994). Firms set pay in a working environment where the wage influences productivity. Workers are risk-neutral and choose between exerting effort or shirking. Utility is derived from wages and disutility from work. Regional equilibrium prevails if firms offer pay packages of equal expected utility across regions. A non-shirking constraint necessitates, however, that firms offer a net wage greater than the value of unemployment. Workers caught shirking are fired. The expected utility when fired depends on the level of unemployment insurance and the probability of re-employment. The probability of re-employment decreases with higher levels of unemployment. Increases in unemployment serve thus to discipline workers into expending greater effort, which in turn ensures that the non-shirking condition requires a lower wage at higher unemployment. An efficiency wage is thus also consistent with a negative locus in wage-unemployment space.

The first assumption is that workers are identical and risk-neutral. They get utility from income and disutility from effort. Real wage is defined as w and the level of on-the-job effort as e. It is further assumed that a worker's utility equals the simple difference between income and effort, so that utility is

$$u = w - e \tag{2.1}$$

The second assumption is that effort at work e is a fixed number determined by technology, but that individual employees can decide to exert zero effort. If undetected by the firm, these individuals earn wage w and have $e = 0$, so that $u = w$. They are then better off than employees who expend effort.

Third, an individual who shirks runs the risk of being detected. δ is the probability of successful shirking, which means escaping detection. It is assumed that anyone who is caught shirking will be fired, and will then have to find work elsewhere providing the same effort e. The expected utility of a fired worker is $\hat{w}$.

$$\hat{w} = (w - e)\alpha(U) + b\left[1 - (U)\right] \tag{2.2}$$

This is a convex combination of w–e, the utility from working at the required effort level, and of b, which is defined as the income value of unemployment benefit plus leisure. The

function $\alpha(U)$ measures the probability of finding work and how this is affected by the level of unemployment U in the local labour market.

It is further assumed that there is a constant rate of ongoing layoffs r of firms. In steady-state equilibrium, total new hires in the local economy are $\alpha[l - n]$, where l is the working population and n is employment, and

$$rn = \alpha(l - n). \tag{2.3}$$

Unemployment is by definition:

$$U \equiv 1 - n/l \ , \tag{2.4}$$

so that

$$\alpha = r/U - r \tag{2.5}$$

This implicitly defines a function $\alpha(U)$, where

$$\alpha'(U) = r/U^2 < 0 \tag{2.6}$$

and

$$\alpha''(U) = 2r/U^3 > 0 \tag{2.7}$$

Thus, the probability of finding a job α is a convex function of the unemployment rate U. It is further assumed that the equations hold in the second region with a wage v, an unemployment benefit c, and an unemployment rate P. The second region differs from the first in that both workers and non-workers enjoy a non-pecuniary benefit ϕ from living in the region. Their utility is $u = v - e + \phi$ when they are working, and $u = c + \phi$ when they are unemployed.

Each region is affected by shocks to the demand for labour s in region 1 with a density function $g(s)$. There is an equivalent shock variable in region 2 with density $h(.)$. These shocks are, for example, exogenous movements in real input prices. Workers are free to choose to live in whichever region they prefer between work periods, which means that they cannot migrate during a work period. The model's key characteristic is that employers must pay a wage that is high enough to induce employees not to shirk. In equilibrium, workers must behave optimally in their decisions about expending effort, and firms must behave optimally in their wage-setting. Regions differ in their non-pecuniary attractions – that is, one of the two is a 'nicer' place to live. To ensure equilibrium, each region must offer workers the same level of expected utility, which is a zero-migration equilibrium.

2.4.2 Main implications

Convexity

Given these assumptions, and if both regions have a non-shirking equilibrium, the expected utility from not shirking must equal that from shirking in region 1, with:

$$w - e = \delta w + (1-\delta)\left[(w-e)\alpha(U) + b(1-\alpha(U))\right] \tag{2.8}$$

which can be simplified to

$$w = b + e + \frac{e\delta}{(1-\delta)\left[1-\alpha(U)\right]} \tag{2.9}$$

In region 2 the wage curve has the following form:

$$v - e + \phi = \delta(v+\phi) + (1-\delta)\left[(v-e+\phi)\alpha(P) + c + \phi(1-\alpha(P))\right] \tag{2.10}$$

resulting in:

$$v = c + e + \frac{e\delta}{(1-\delta)\left[1-\alpha(P)\right]} \tag{2.11}$$

Along the curve definition of (9) and (11), it is straightforward that each region has a downward-sloping convex wage curve. The convexity of the wage curve follows from the convexity of the $\alpha(U)$ in region 1 and $\alpha(P)$ in region 2. If $b = c$, equations (3) and (4) are identical.

Involuntary unemployment

In equilibrium, the non-shirking condition (3) must be satisfied. To establish contradiction, involuntary unemployment is assumed to be 0, and full employment in this case is $\alpha(U) = 1$, which in turn means that the probability of being rehired is 1. This further implies that equation (3) collapses to the requirement of $\delta e = 0$. This is a contradiction, because both δ and e, which are parameters of the detection technology and effort, are strictly positive, and thus establish the required result.

Moreover, intuitively one can see that if unemployment U rises, firms realize that their employees are more frightened of losing their jobs, and that they can therefore pay lower wage levels while maintaining the necessary degree of effort from workers. The second region's non-pecuniary attractions are available for both employed and unemployed

persons, and therefore the condition of shirking is independent of ϕ. Thus, as long as there is no difference in unemployment benefits (which is assumed), each region has the same equation for its non-shirking equation. A consequence is that there is involuntary unemployment in equilibrium.

Zero migration

For a zero migration equilibrium – and again assuming that both regions have the same level of unemployment benefit – the regions must face different distributions of demand shocks and exhibit different wage/unemployment patterns. Moreover, region 1 has a higher expected wage than region 2.[18]

This basic theoretical framework is used for the wage curve analyses in subsequent chapters. It provides an explanation of differences in unemployment between regions, leading to a downward-sloping curve. It also provides an explanation of how wages are above market-clearing level and involuntary unemployment exists. Migration to other regions does not occur, as non-pecuniary benefits are equally available for employed and unemployed persons. In the following section, I discuss further implications of the wage curve; specifically, implications of the structure of qualifications and the impact of labour market policies. I thus address differences in effort and shirking, and present an extension of the wage curve model which explicitly considers the impact of active labour market policies.

2.5 Implications of qualifications on the wage curve

In the framework developed above, unemployment acts as a disciplinary instrument that dissuades employees from shirking. The efficiency wage model assumes a specific set of parameters, namely, that workers' utility is defined by the difference between income and effort. There are at least five factors in which regions can differ within the framework:

(1) Different required effort levels at work

(2) Different shirking detection rates

(3) Different non-pecuniary utility levels

[18] The wage curve presented here is only one half of the equilibrium analogous to the wage-setting curve. For a full model, it needs to be determined exactly where on the wage curve the single regions end up, and this depends on the equilibrium on the goods market. However, because the following analyses do not mention this, the full model will not be presented here in detail. For a detailed discussion of this issue, see Blien (2001) and Südekum (2003).

(4) Different unemployment benefit levels

(5) Differences in the matching functions.

I extend the model for the analysis of aspects of qualifications by mentioning the first two factors: shirking and effort are assumed to differ by qualification-specific subgroup.[19] The implications of these two changes in the model are discussed in the following two subsections.

2.5.1 Variation in effort

First, differences or changes in the effort e are assumed to occur within regions. In the standard model, e is assumed to be exogenous and determined by technology. Here it is assumed that e is also determined by individual preferences such as motivation and social norms, which differ between labour market subgroups. In the case of a two-region model, workers must be compensated either implicitly or explicitly for working in a high-effort region, and in turn must be willing to expend great effort. Therefore, two different regions are introduced, the good-effort region *G* and the bad-effort region *B*. Within each of the two regions, the non-shirking condition must be satisfied. Therefore, the equilibrium requires that

$$w^G = b + e^G + \frac{e^G \delta}{(1-\delta)\left[1-\alpha(U^G)\right]} \tag{2.12}$$

and

$$w^B = b + e^B + \frac{e^B \delta}{(1-\delta)\left[1-\alpha(U^B)\right]}. \tag{2.13}$$

The first equation states that the wage ensures zero shirking in the good region, in which effort e^G is low relative to less attractive regions with a high effort e^B. There must also be a condition requiring that the wage and unemployment level in region *G* are sufficiently unattractive to counterbalance exactly the low-effort advantage of living in region *G*.

High-effort region *B* must have a non-shirking curve that lies consistently above that for region *G*, where work is less exhausting. They have different slopes, because the derivation of non-shirking wage equations are

$$\frac{\partial w}{\partial e} = 1\frac{\delta}{(1-\delta)\left[1-\alpha(U\ )\right]} > 0 \tag{2.14}$$

---

[19] The other three factors will be discussed in section 2.6 when a extended wage curve model is developed.

and

$$\frac{\partial^2 w}{\partial U \partial e} = \left(\frac{\delta}{(1-\delta)} \right) (1-\alpha(U))^{-2} \alpha'(U) < 0 \qquad (2.15)$$

It is clear that the greater the effort level, the greater is the responsiveness of pay in absolute terms to unemployment, and the steeper is the slope of the wage curve. Three main arguments for greater effort can be identified: First, higher-skilled individuals are expected to be more motivated, both because of greater intrinsic motivation and because of more favourable career opportunities. Second, better career opportunities also imply that the 'competition' is not to prevent shirking (not in the first stage). The main motivation for expending a high degree of effort could be assumed to result from competition between individuals with the same formal qualifications who are competing along the same career path.[20] Therefore, effort is expected to be higher in better-qualified subgroups. Third, one (dynamic) implication for the entire labour market[21] of a rising proportion of qualified work in a national labour market is that, with a rising share of highly skilled workers, the wage curve would shift upward with a steeper slope.

2.5.2 Variation in shirking

The second aspect causing variations in the slope and the location of the wage curve is the variation in the shirking detection rate. In principle, the implications are similar to those for variation in effort. Individuals who choose to shirk, and therefore provide effort $e = 0$, could possibly avoid detection. Their probability of avoiding detection and their probability of successful shirking is therefore δ, and their probability of being detected is $(1 - \delta)$. If this detection rate varies, the familiar form of integral analysis can be modified again. Differentiating the appropriate wage equation gives

$$\frac{\partial w}{\partial \delta} = 1 \frac{e}{(1-\delta)^2 \left[1-\alpha(U\ ) \right]} > 0 \qquad (2.16)$$

and the second partial deviation results in

$$\frac{\partial^2 w}{\partial \delta \partial U} = \frac{e}{1-\delta} (1-\alpha(U))^{-2} \alpha'(U) + \frac{e\delta}{(1-\delta)^2} (1-\alpha(U))^{-2} \alpha'(U) < 0 \qquad (2.17)$$

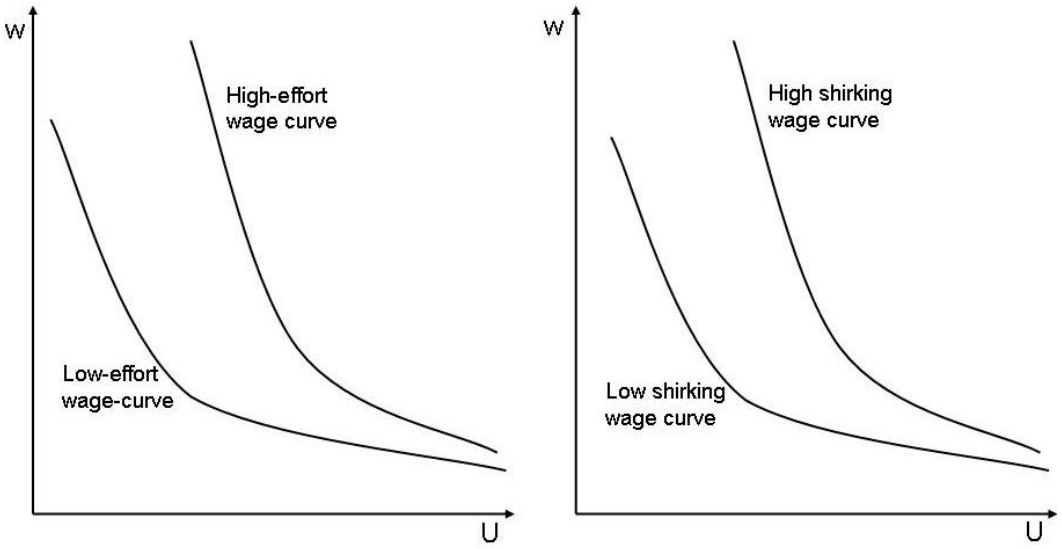
[20] This aspect is not modelled explicitly here; it is, however, expected that the effort is higher.
[21] The previous arguments were related to subgroups.

This results in a wage curve which is above the low-shirking curve and which is steeper than the latter. Three qualification-related issues can cause differences in shirking detection: First, overall unemployment is higher in low-skilled sub-labour markets. Therefore, shirking is to be expected to be lower compared to shirking of high-skilled workers, and the wage curve is expected to be below the 'average' wage curve, as wages are lower in regions with the same unemployment, shirking, and effort parameters. Second, lower-skilled work is more standardized because the output is more standardized. It is thus easier to be observed in these kinds of jobs, and shirking becomes more difficult. Hence, the attractiveness of shirking increases with the qualification level. Third, shirking is less attractive for higher-skilled workers with more career opportunities. Because these workers can be assumed to be more strategic – anticipating future income, for example – it can be assumed that remuneration will be higher with continued career development. Consequently, shirking becomes less attractive, and the effect is the same as in the effort hypothesis. Again, career opportunities can be of relevance, either within a firm or within a region. An opportunity to advance in one's career – which also implies a raise in income – will be less likely if one engages in shirking.

Table 1 depicts the impact of different levels of shirking and effort on the location and slope of the wage curve. High-effort wage curves are expected for higher-skilled labour market subgroups; labour markets with higher skill levels, or better career opportunities in general, are expected to produce higher effort and therefore higher wages at a constant unemployment rate. A low shirking detection level – that is, a low risk of being detected – makes the slope flatter, and the location of the curve is closer to the origin. The risk of being detected is higher for low-skilled workers, making the wage curve steeper. On the other hand, the wage curve is closer to the origin because there is higher unemployment in this subgroup.

These hypotheses are tested in chapter 6. Moreover, there is increased relevance of shirking and effort when active labour market policies come into play. I discuss this outcome in the next section, after introducing the extended wage curve model.

Figure 3: Regions differing in shirking and effort



2.6 An extended wage curve model with improved matching by active labour market policies

In this section, an extended efficiency wage model is introduced which explicitly takes into consideration active labour market policies.[22] In its extended version, the probability of finding a new job α depends not only on the registered unemployment rate *U* but also on an extended measure of all jobseekers *J*. *J* is defined as the amount of unemployed persons in a region plus the participants in ALMP measures, divided by the amount of employees plus unemployed persons plus labour market policy participants. Comparable to α(*U*), the function α(*J*) is convex in *J*. Additionally, α(*J*) depends on a matching parameter *k*, with

$$\alpha = k\frac{r}{U} - r\,, \tag{2.18}$$

and *k*>*U*. Equation 2.18 has the same characteristics as equation 2.5, namely, $\alpha' < 0$ and $\alpha'' > 0$. This indicates that ALMP has a positive impact on matching, and therefore the probability of finding a job α rises with a rising in *k* and therefore the quality of active measures. Given an individual is unemployed, the probability of being unemployed is *p* and the probability of being a participant in active measures is therefore *(p-1)*. Moreover, the unemployment benefit of an unemployed person b_U differs from the subsistence payment of a labour market policy participant $b_{AM.}$.

---

[22] The model is based on a contribution by Pannenberg and Schwarze (1996) and is extended by introducing a matching parameter that describes the impact of ALMP on the probability of finding a job α.

As mentioned, *b* is defined by monetary unemployment benefit plus non-monetary utility. This is defined as leisure in the standard model. However, now the additional benefit is not only defined as leisure, but it is assumed that the non-pecuniary benefit of individuals participating in ALMP measures such as work programmes and/or training is improved social status. Alternatively, one can argue that with on-the-job training (i.e. job creation schemes) and through training measures, they improve their qualifications and therefore their employability. The expected utility *(ŵ)* of a fired worker is then

$$\hat{w} = (w - e)\alpha(J) + b\left[b_U p + b_{AM}(1-p)\right]\left[1 - \alpha(J)\right] \tag{2.19}$$

The regions differ in two ways: Workers and employers receive a non-pecuniary benefit ϕ from living in region 2, and both regions are affected by stochastic shocks to the demand for labour with a known density function. Workers are able to migrate between the two regions. The non-shirking equilibrium condition for region 1 is

$$w - e = \delta w + (1-\delta)\left\{(w-e)\alpha(J) + \left[b_U p + b_{AM}(1-p)\right]\left[1-\alpha(J)\right]\right\} \tag{2.20}$$

with δ as the probability of successfully shirking. This equation implies that for non-shirking equilibrium, the expected utility from non-shirking $w-e$ must be equal to that from shirking. The latter is the weighted sum of successful shirking δw and the expected utility of the fired worker. Equation (2) can be simplified to

$$w = e + \left[b_J p + b_{AM}(1-p)\right] + \frac{e\delta}{(1-\delta)(1-\alpha(J))} \tag{2.21}$$

$$\text{with } \frac{\delta w}{(\delta J)} < 0\,; \quad \frac{\delta w^2}{(\delta J)^2} > 0$$

This function is convex in *J*, because $\alpha(J)$ is convex in *J*. In region 2, the non-shirking equilibrium condition is given by

$$\begin{aligned} &v - e + \phi = \delta(v + \phi) + (1-\delta) \\ &\left[(v-e+\phi)\alpha(J) + \left[(c_U + \phi)\pi + c_{AM} + \phi(1-q)\right]\left[1-\alpha(J)\right]\right] \end{aligned} \tag{2.22}$$

with v: wage in region r(2); J as the rate of jobseekers in r(2); and π as the probability of unemployment (versus participation in training) in r(2). This can be simplified to

$$v = e + \left[c_U \pi + c_{AM}(1-\pi)\right] + \frac{e\delta}{(1-\delta)(1-\alpha(J))} \tag{2.23}$$

$$\text{with } \frac{\delta w}{(\delta J)} < 0\,; \quad \frac{\delta v^2}{(\delta J)^2} > 0$$

This equation is also convex in *J*. Therefore, if $b_U = c_U$, $b_{AM} = c_{AM}$ and $p = q$ are identical in both regions, they also have the same wage equation. These conditions are likely to be satisfied, as the participation conditions for individuals in ALMP measures in Germany are identical for all regions. Therefore, we can estimate

$$w = (e + b_{AM}) + (b_U + b_{AM})p + \frac{e\delta}{(1-\delta)(1-\alpha(J))}, \qquad (2.24)$$

which is both a nonlinear function of $\alpha(J)$ and a function of the conditional probability of being unemployed versus participation in training. The extended model has three main effects: a benefit effect, a matching effect and a (more or less technical) effect of rising unemployment.[23] First I examine the effect of higher benefits for measure participants b_{AM}. In principle, this has the same implications as the increased expended effort discussed in the previous section. High-benefit region *B* must have a non-shirking curve that lies consistently above that for region *G*, where work is less exhausting. They have different slopes, because the derivations of non-shirking wage equations are

$$\frac{\partial w}{\partial b_{AM}} => 0 \text{ and } \frac{\partial^2 w}{\partial U \partial b_{AM}} =< 0.$$

Therefore, three economic and one technical effect is expected:

(1) The greater the benefit level, the greater is the responsiveness of pay in absolute terms to unemployment, and the steeper is the slope of the wage curve.

(2) If one additionally assumes that ALMP improves matching, then the probability of finding a job rises. It is clear from equation (2.24) that a higher α implies an overall downward shift of the wage curve, indicating that higher competition on the labour market increases the wage pressure. On the other hand expected lower levels of unemployment again results in a inward shift along the wage curve implicating rising wages.

(3) By definition, *J* is larger than *U* because measure participants are added to the number of registered unemployed and the overall wage curve shifts outward without a wage effect. However, this is not an economic, but only a measurement effect as only the definition of the unemployment rate changes by adding (existing) measure participants to the unemployed.

---

[23] The effect is technical in nature because, in the absence of any measures, the potential participants would be counted in unemployment rate *U*. For an economy with ALMP measures, one could argue that it is more accurate to count ALMP participants along with the unemployed. On the other hand, one could argue that these people do not seek employment actively, as they are 'employed' in their measure and not unemployed. This issue is discussed in more detail in the empirical part of this thesis.

Summarizing the effects we get the following picture: The matching effect implies lower wages by shifting the wage curve downward. The improved matching reduces unemployment and wages rise along the wage curve. If the improvement in matching is higher than the increased number of unemployed persons through the addition of ALMP participants, then the overall effect of ALMP on wages is neutral. This would mean that all participants are integrated into the first labour market, which is almost impossible. In sum the matching effect on is therefore a reduction of unemployment to the price of a negative effect on wages. However, as the benefit effect results in a steeper, outward shifted wage curve, higher wages with reduced unemployment are also a possible outcome.

This outcome results in the following hypothesis: ALMP has a positive effect as it reduces unemployment in regional labour markets to the price of lower wages. The extended model predicts a steeper wage curve indicated by higher elasticities with higher intercepts. The overall wage effect cannot be predicted. Resulting from the matching effect, it is expected to be lower caused by improved competition in the labour market. However the benefit increase wages.

Having discussed the individual side with an emphasis on wage-setting, I shall now concentrate on regional labour market institutions: a model is developed to measure relative differences in the performance of regional employment offices by indicators measuring specific targets. These indicators will then used to model a performance-based wage curve in section 2.8.

2.7 Management by objectives in regional public employment services

So far, regional wage-setting and unemployment have been at the centre of interest. In the previous section, the impact of institutions and policy was addressed by explicitly mentioning the impact of active labour market policies in the wage curve model. In this section, the institutional side is examined more closely by focusing on the performance of regional public employment services. In the next section I return to the wage curve framework and incorporate performance indicators which are introduced now. The focus is on an effective and efficient public employment service, or 'performance management'. I introduce a model measuring the output of public employment services in the absence of market prices. This model leads to an indicator system, which enables the ranking of

employment services according to their relative performance. The approach was developed and partly implemented in Switzerland.[24]

2.7.1 Theoretical background

Performance management in government has drawn increasing interest since the late 1980s, particularly in the United States and the United Kingdom, and much has been written about the theory. However, less is known about how it works in practice – particularly in the public sector. Only a few studies have examined whether or not performance measures achieve their intended goals. In chapter 7, I discuss this issue as well as the experiences gathered in implementing such a model in Switzerland. Generally, to permit efficient resource allocation, a clear formulation of objectives and a well-designed tool to measure the efficiency of regional policies are needed. Kravchuk and Schack (1996) have identified general principles for the design of a performance measurement system (see table 2). These nine principles are the framework for the development and evaluation of a benchmarking instrument. There are different approaches in the literature to achieving efficient resource allocation, ranging from centralized, administrative distribution via basic controlling measures up to different causality analyses and market simulations.[25] The underlying instrument, yardstick competition, is a principal-agent approach. As in the case of profit-oriented firms, the management problem in public employment services can be formulated as a principal-agent problem.

The model utilizes the idea of management by objectives by assuming that there is a principal who wants a specific task to be performed and, owing to efficiency reasons, it decides to hire somebody (the agent) to do this task. The central issue is how the principal can best motivate the agent to perform as the principal would prefer, taking into account the difficulties in monitoring the agent's activities. Developed by Schleifer (1985), the concept of yardstick competition implies that the principal reimburses agents according to their relative performance: Their efficiency is compared to that of other agents offering similar products or services, and their revenues – and thereby their profits or budgets – are directly related to comparative outcomes. In short, yardstick competition is a theory of market regulation with a sufficiently high number of firms acting in regional monopolistic markets. Because of these regional monopolies, direct competition is not possible.

---

[24] The implementation of such a model is discussed in a later chapter.

[25] For a discussion of impact-oriented active labour market policy in Switzerland and Germany, see Lechner (2002). This system was chosen for Switzerland and includes specific market features.

Table 2: General principles for the design of performance measures and how they are mentioned in the discussed model

	Principle	Fulfilled?
1	Formulate clear, coherent mission, strategies, objectives	Yes, through agreement on objectives (Zielvereinbarung)
2	Develop an explicit measurement strategy	Yes, yardstick competition model
3	Involve key users	Yes, cantons, social partners, SECO
4	Rationalize the programmatic structure	Yes, modelling
5	Develop multiple sets of measures for multiple users	Conditionally yes: Formulation of four objectives
6	Consider the customer	Yes, focus on output
7	Provide sufficient performance details	Conditionally yes: Four indicators is not very much detail
8	Periodically review and revise system	Through two-year agreements
9	Take account of complexities	Yes, through multivariate model
10	Avoid excessive aggregation of information	Conditionally yes: Through four indicators

Source: Principles by Kravchuk and Schack (1996), own evaluation.

The central idea is that, because the principal cannot observe the cost functions and efforts of the firms, he compensates the full costs claimed by the firms (cost-of-service regulation). This arrangement is in itself not efficient, as some firms are better at cost reduction than are others. One possible way to regulate the costs is for the principal to reimburse only the average costs of all firms. He thus compares the costs of firm *i* with the costs of all other firms and reimburses firm *i* only

$$\bar{c}_i = \frac{1}{N-1}\sum_{j \neq i} c_j \ . \qquad (2.24)$$

Here, c_j represents the costs of all firms and N denotes the number of firms. It can be shown that such cost benchmarking is favourable for a 'pure' cost-compensation scheme. Schleifer (1985) has shown that the resulting dominant firm strategy in equilibrium is the choice of an optimal cost level although it is a monopolistic firm. Moreover, this yardstick competition (or cost-benchmarking) helps reduce information asymmetries between the principal and the agent.

Although the concept of yardstick competition was originally defined for cost competition it can be transposed, however, to the measurement of output or impact by defining 'prices' through adequate indicators. This approach was taken in the case of the Swiss public employment services: a modification of the model was made through the use of output measures with normatively defined objectives, taking into consideration social policy and equity aspects. These objectives are the formulated task of the public employment services and represent the main difference from private, profit-oriented placement activities.

Because the public employment service in every region works under specific economic preconditions which cannot be influenced by the public employment service, these environmental or exogenous factors must be taken into account. The yardstick competition model can be extended and then does not only hold for identical firms. Precondition for this is that the average costs can be controlled for these exogenous factors. As in the modified model, the output of the firms – not cost – is the relevant factor, and the factors to be corrected for are not firm-specific, but rather specific to the environment in which the PES agency operates. This correction is derived via a multivariate model.

Generally, one can state that the two objectives, efficiency on the one hand and equity on the other, represent a clear trade-off. The evaluation of efficiency with specific measures assumes that the agents act under some kind of market conditions. Efficiency means both quick placements independent of the prerequisites of the clientele. Equity on the other hand focuses on the social responsibility to integrate disadvantaged persons into regular work and there is a trade-off between effectivity in terms of improving overall labour market conditions by bringing more with diverging background into the labour market and efficiency on the other hand, where the focal point is market clearing in terms of the need of the demand side.

This trade-off between efficiency and equity is addressed through the specification of four strategic objectives based on the output. Within the benchmarking model, not only rate of placement is chosen as an objective: through four independent indicators, aspects of efficiency and equity also are addressed. On the other hand, by focusing on output, the cost side is accepted as a given: the placement activities are financed through the national employment office. To sum up the approach with reference to the nine principles (see table 2), one can state that, in line with most of these principles and in line with the shift from input- to output-controlling, a quantitative benchmarking model is provided.[26] With the transformation of the yardstick competition concept from cost-benchmarking to output-benchmarking, only output indicators are given, not relative costs.

2.7.2 Design of the performance indicator

To benchmark the objectives of the principal, four individual impact indicators are defined in an agreement (see table 3). Because the regional offices act under regionally specific conditions, the goals must be corrected for regional factors that have an impact on the outcomes but that are beyond the control of the respective regional office. This correction

[26] For a detailed description of fulfilment, see column 3 of table 1.

is made by carrying out multivariate cross-section regression analyses for each of the four indicators.

Table 3: Definition of impact indicators

	Specification	Objective	Weight
Indicator 1	Percentage of benefit recipients who enter and leave the benefit situation within the same period	Quick reintegration	50%
Indicator 2	Number of transitions from unemployment to long-term unemployment in relation to total unemployment	Avoidance of long-term unemployment > 6 months	20%
Indicator 3	Number of *Aussteuerung*[27] of benefit recipients in relation to all benefit recipients of a regional employment bureau (RAV)	Avoidance of long-term unemployment > 24 months	20%
Indicator 4	Number of re-registrations of benefit recipients in relation to all benefit recipients of a RAV	Sustainability of reintegration	10%

Source: Imboden, Baumann et al. (1999).

The indicators are estimated in a four-step procedure. In the first step, a cross-sectional linear regression with the following structure is used for every impact indicator:

$$Y_{ijc} = \beta_0 + \beta_1 X_{1,ic} + \beta_1 X_{2,ic} + ... + \beta_K X_{K,ic} + \varepsilon_{ic} \qquad (2.25)$$

In this equation, Y_{ijc} denotes indicator j (j=1,..4) for employment office i (i=1,....I) in canton c,[28] and X_{ikc} (k=1, ...K) denotes the exogenous variables, β_k (k=0, 1, ...K) the unknown coefficients that must be estimated, and ε_{ic} the error terms. The errors denote the unexplained part of the variation in the objective indicators and are supposed to reflect the factors that regional offices can influence. Therefore, the error terms are supposed to indicate performance: they are equal to the objective indicator after controlling for the exogenous factors that are beyond the control of the regional offices.[29] Therefore, as Lenz, Egger et al. (2001) point out, equation (25) can be interpreted as a kind of production function that shows up in Shleifer's yardstick model.

Lenz et al. (2001) state that there are two important criteria for the exogenous variables that possibly reflect a trade-off. The first is that they should produce a good fit in

[27] *Aussteuerung* is identical with termination of the right to receive unemployment benefit and pertains to long-term unemployment of more than 24 months.

[28] This description is based on the approach applied in Switzerland. It is a two-stage approach with small labour market regions and political units called 'cantons', which are federal states within Switzerland. In the following, labour market regions are called 'regions' and sub-national units are called 'cantons'.

[29] One could, of course, argue that the error terms may partly reflect unobserved factors that cannot be influenced by the employment offices. This point is discussed in Donk and DeKoning (2007) and Müller and Mosley (2007).

the sense of an efficient estimation. The second criterion, which is inherent to the definition of exogenous variables, is that the region cannot directly influence the variables used. Obviously, this is necessary to avoid manipulation of the results, but it is not sufficient. Therefore, estimations are based on indicators that are assumed to be under little or no influence from the employment offices.

Because the independent variables are defined as exogenous, the residual measures the deviation between the expected and the realized result of the dependent variable, which is the responsibility of the agency. Residuals are defined as the difference between observed value Y and estimated value $\hat{Y}$. Therefore, an indicator reflecting the per-cent deviation between expected and observed value is defined as the relative deviation:

$$I_i = \hat{Y}_i \Big/ Y_i \times 100 \tag{2.26}$$

Whereas in the first and second steps the four indicators are calculated individually for each regional office, in the third step a weighted average of the four is calculated

$$\hat{I}_{ic} = \sum_{i=1}^{4} w_j \hat{I}_{jic} \tag{2.27}$$

where w_j stands for the weight given to indicator j, while $\hat{I}_{jic}$ denotes the residual (or 'estimated' error term) regarding indicator j for employment office i in canton c. $\hat{I}_{ic}$ denotes the composite indicator for office i.[30] This combined indicator forms the basis for benchmarking of the relative performance of the different employment offices. The levels of the weights cannot, of course, be determined empirically: they reflect the priorities of the principal and are strictly normative.

Because the canton is the institutional level for operative decisions about labour market policies, these regional indicators are aggregated to the cantonal level in a fourth step using the following weighting scheme[31]

$$\hat{I}_c = \sum_{i=1}^{Nc} s_i \hat{I}_{ic} \tag{2.28}$$

where s_i is the share of the benefit recipients in region i among the total number of benefit recipients in the canton, while N_c denotes the number of offices in a region c. A remuneration system can be deduced connected on the basis of these cantonal indicators.[32] In addition, performance indicators are estimated by using data for German public

[30] The weighting scheme used in the Swiss case is normatively set and documented in column 4 of table 2.
[31] This holds with respect to the remuneration system and the financial consequences. Independent of this, the benchmarks of the single RAVs can be used for inner-cantonal purposes to improve efficiency and effectiveness. As will be discussed later, this step will not be introduced in the German case because the principal-agent relationship differs.
[32] This issue is discussed in more detail in chapter 7.

agencies. In the next section, I introduce a model, which combines the efficiency wage model and the performance measures.

2.8 An efficiency model of performance-based wage curves

In this section, a theoretical link is drawn between the efficiency wage model introduced in section 2.4 and the performance model described in the previous section. The basic idea is that efficient and effective labour market policies have an impact on regional economic performance. Further assumptions are that labour market policies matter, and that wages are – at least partly – determined regionally, as assumed in the efficiency wage model of the wage curve. Finally, it is assumed that better-performing regions lead to higher real wages than those found in poorly performing regions.

The model assumptions are basically the same as those of the standard wage curve model introduced in section 2.4. Workers are identical and risk-neutral, they get utility from income and disutility from effort, and the wage is defined as w and the level of on-the-job effort as e. Effort at work e is a fixed number determined by technology. An individual who shirks runs the risk of being detected with a probability of (1–δ). Anyone who is caught shirking will be fired, and then must find work elsewhere, providing the same effort e. The expected utility of a fired worker is $\hat{w}$. The utility of a fired worker is a convex combination of (w–e) and unemployment benefits b, which is defined as the income value of unemployment benefits plus leisure.

The function $\gamma(I)$ measures the probability of finding work and how this is affected by the relative performance of the regional public employment office. Keeping all other assumptions constant and replacing unemployment variable U with the performance indicator I of equations (2.2) to (2.11), this leads to a performance-based wage curve specified by

$$w = b + e + \frac{e\delta}{(1-\delta)[1-\gamma(I)]}\,, \tag{2.29}$$

which basically has the same features as the wage curve, namely a downward-sloping convex performance curve following the convexity of $\gamma(I)$. This equation implies that the regional real wage level depends on the performance of the regional public employment service. Two effects are expected: first the wages are lowered by improved performance $\gamma(I)$. However, as Ihiger overall wages are expected caused by the unemployment reduction effect of ALMP as discussed above, an upward shift of the performance curve is possible and the overall wage level is perhaps higher than without ALMP.

2.9 Conclusion

In this chapter, I discussed theories explaining unemployment, wages, emphasized the role of regions in modern labour markets and the resulting parameters to be treated with a successful labour market policy. Starting with an overview of macroeconomic theories, I discussed the role of rigidities and emphasized the relevance of regions. I then introduced the wage curve from Blanchflower and Oswald (1994), which describes a negative relationship between unemployment and wages as an appropriate approach to analyse the hypotheses raised.

On the basis of this approach, I discussed several alternatives to model the empirical phenomenon; the efficiency wage model was examined in detail. I have outlined theoretically that this model fits well with the questions pursued and the hypotheses developed in this thesis: namely, I showed that it is possible to describe the impact of qualifications and active labour market policies on regional wage levels. Qualification-specific effects were discussed within the standard framework, taking into consideration the variation in the effort and the shirking behaviour within different labour market subgroups.

Regional labour market policies were then brought into focus with respect to three dimensions. First, I developed an extended wage curve model which explicitly recognizes ALMP in the form of additional benefits for the individual, on the one hand, and improved matching in the regional labour market, on the other. I have shown that the assumed ALMP have a positive effect on overall unemployment, that the location of the wage curve is above the standard wage curve, and that the wage elasticity is higher than in cases in which there is less or no ALMP. The latter indicates that the regional labour market adjustment improves. In a final stage, the efficiency wage model and the performance model were integrated, and an efficiency model for a performance-based wage curve was developed. On the assumption that the relative performance of public employment services can be measured adequately, I identify a performance-based wage curve with features comparable to those of the wage curve – namely, a downward-sloping convex curve showing higher wages in regions with better-performing public employment services and lower wages in regions that do not perform as well.

Before the hypotheses are tested econometrically, the following two chapters introduce the empirical part of this thesis. In the next chapter, I focus on the sub-national level, discuss alternatives to defining regions, and introduce the data used in later chapters. In chapter 4, descriptive evidence is given to outline my hypotheses.

3 Design and definitions

In the previous chapter, I discussed the theoretical background in order to provide a framework for my hypotheses on the interdependencies of wages, unemployment, and labour market policies. Before testing these hypotheses, I will first introduce the technical background, dividing this section into four parts. When regions rather than national boundaries become the centre of interest, the question of how regional boundaries should be defined becomes pertinent. In general, one can differentiate between functional and administrative regions. Functional regions are based on objective criteria and indicators. Administrative regions, on the other hand, are explicitly defined through political or historical criteria and do not observe economic developments over time. Several alternatives of regional aggregation levels are described, and their usability in the light of the following analyses is derived.

In the second section, alternative data resources are described. Two main data resources are utilized: aggregate and individual data. The aggregate data describe the economic conditions of the labour market; they are mainly derived from the German Federal Employment Agency. To measure real wages and other job-related characteristics, alternative individual surveys with information on income and education are introduced; these are provided by the Federal Employment Agency (BA), the Federal Statistical Office, and the German Institute for Economic Research (DIW). The latter is the GSOEP, which substantially differs from the other data. A household panel, the GSOEP is a wide-ranging representative longitudinal study of private households in Germany. I highlight its specific advantages and disadvantages, and argue that the GSOEP is a good alternative for further estimations.

In the third section, I present the definition of qualifications within the GSOEP. At the same time, I show that there is no one-dimensional definition of qualifications: depending on the question asked, several alternative definitions are plausible. In the fourth section, the main characteristics of German labour market policies, and particularly of various active labour market policy measures, are described.

3.1 What defines the borders of a region? Labour markets in Germany

A question often ignored in studies on regional labour markets is that of the most suitable definition of the regional aggregation level. Yet it is important to define the size of regions, as variance within regions directly depends upon this task. The classification of 'relevant labour markets' is an important question at the sub-national level. Theoretical criteria for a classification are, for example, relative homogeneity in the context of supply and demand on the labour market and the relative low level of commuting between border regions. There is a trade-off between these two criteria, as preferences differ between firms and individuals. Employers prefer to locate firms in clusters, which causes a rise in housing prices, and thus induces people to move to border regions. Consequently, depending on the statistics used, individuals are assigned to the region of their workplace or the region of their residence. These kinds of problems in localization can also soften potential relationships.[33]

Administrative versus functional regions

Regions can be distinguished in terms of functional or administrative characteristics. Functional regions are based on objective criteria and indicators for the regional structure. Examples are economic clusters defined by region-specific concentrations in diverging branches. Administrative regions, on the other hand, are defined through political or historical criteria and do not explicitly take into consideration economic developments over time. However, they often have the technical advantage of better data access, for official data from statistical offices are provided on the basis of these structures.

On the administrative level, Germany has 16 federal states, 394 districts, and 4,844 communities.[34] Potential functional clusters can be defined according to their size and their regional homogeneity. The two most important examples of functional units in Germany are the labour market districts used by the Federal Employment Agency and the 'area planning regions' (*Raumordnungsregionen*) from the Federal Office for Building and Regional Planning.[35] In this analysis, both types of regional clusters are used; I describe the two concepts in the following sections. In the context of mobility, differences in the regional

[33] For a more detailed discussion, see Blien (2001) and Büttner and Prey (1998). Elhorst, Blien et al. (2003) discuss the methodological consequences of the trade-off between accuracy about the economic conditions, assignment to the relevant labour market, and availability of data. Moreover, an article by Suedekum and Blien Südekum (2004) intensively examines the consequences of different aggregations in the context of long-term wage and employment growth.

[34] Source: Federal Statistical Office.

[35] Labour market districts are called 'agency regions'; *Raumordungsregionen* is translated as 'area planning regions'.

culture can also be a significant criterion. For example, commuting, as well as changing residence for a new workplace, is much easier and therefore much more likely within smaller geographical units on the sub-national level. Nevertheless – especially, for example, when we look at the mid- to long-term perspective – the level of the federal states could be a relevant unit.

Federal state level

Germany is a federal republic with 16 *Länder*, or 'federal states'.[36] Three cities – Berlin, Hamburg, and Bremen – are states in their own right. The remaining 13 states are referred to as *Flächenländer*, or 'territorial states'. After the end of the Second World War, the Länder in the western part of the former Deutsches Reich were constituted as administrative regions first and then federated into the *Bund*, or Federal Republic of Germany. Table 4 gives information on the size of the federal states and their main regional labour market indicators. Bavaria, which was a classic agricultural region until the end of the 1960s, is the largest federal state in size. Its economic structure has changed substantially. When Bavaria is spoken of nowadays, many think of its economically strong regions, with Munich in first position, followed by Ingolstadt and Augsburg. However, Bavaria also has regions that are less industrially developed, and this fact in part explains the relatively low gross hourly wage of 15.52 euros compared to the second 'rich' territorial state Baden-Württemberg with 16.67 euros.

The leaders in hourly income are the two city-states in western Germany, Hamburg (17.70 euros) and Bremen (17.94 euros). Obviously, in the city-states the overall picture is totally different, as the unemployment rates are also high – even Bremen has an unemployment rate of 16.8%. The highest unemployment rates are found in the eastern German states Saxony (18.3%), Saxony-Anhalt (20.3%), Brandenburg (18.3%), Thuringia (17.1%), and Mecklenburg-West Pomerania (20.3%), which also have – in contrast to the city-states – a low wage level. In sum, the states differ widely, and it is obvious that a proper economic region should be structured on a more disaggregated level. For this purpose, we first look at the administrative sub-regions within the federal states.[37] Politics at the federal state level often introduces implications for federal politics. Within the

[36] Because *Land* is also the German word for 'country', the term *Bundesländer* (federal states) is commonly used in German in order to be more precise.

[37] The city-states Berlin, Bremen, and Hamburg are governed slightly differently. In each of these cities, the executive branch consists of a senate of approximately eight individuals selected by the Land's parliament. The city-states Berlin and Hamburg are divided into boroughs. The city-state Bremen consists of two urban districts, Bremen and Bremerhaven, which are not contiguous.

territorial federal states, the following subdivisions are defined:[38] Federal states ("*Laender*"), governmental districts ("*Regierungsbezirke*"), districts ("*Kreise*"), municipalities ("*Gemeinden*")

Table 4: German federal states

	Inhabitants	Inhabitants per square kilometre	Unemployment rate	Gross hourly earning
Baden-Württemberg	10.717	300	7.0	16.67
Bavaria	12.444	177	7.8	15.52
Berlin	3.388	3.807	19.0	15.47
Brandenburg	2.568	87	18.3	11.96
Bremen	663	1.641	16.8	17.94
Hamburg	1.735	2.309	11.3	17.7
Hesse	6.098	289	9.7	15.98
Mecklenburg-West Pomerania	1.72	74	20.3	11.39
Lower Saxony	8.001	168	11.6	16.47
North Rhine-Westphalia	18.075	530	12.0	15.89
Rhineland-Palatinate	4.061	204	8.8	15.7
Saarland	1.056	409	10.7	16.6
Saxony	4.296	232	18.3	11.11
Saxony-Anhalt	2.494	121	20.3	11.52
Schleswig-Holstein	2.829	179	11.6	15.24
Thuringia	2.355	144	17.1	10.84
Germany (total)	82.501	231	11.7	15.45

Source: Federal Statistical Office.

Governmental districts (*Regierungsbezirke*) are administrative divisions of the large states Baden-Württemberg, Bavaria, Hesse, North Rhine-Westphalia, and Saxony. The governmental districts were dissolved in Rhineland-Palatinate on 1 January 2000, in Saxony-Anhalt on 1 January 2004, and in Lower Saxony on 1 January 2005.

One level below is the administrative district level (*Kreise*). Every state, except the city-states Berlin, Hamburg, and Bremen, consists of rural districts (*Landkreise*) and urban districts (*Stadtkreise* or *Kreisfreie Städte*). There are 323 rural districts and 116 urban districts, making 439 districts in total. Each district has administrative functions in specific regions, such as roadwork, hospitals, and public utilities – but not labour market policies (these are organized differently and discussed separately below).

Moreover, every rural district is subdivided into municipalities (*Gemeinden*), whereas every urban district is also a municipality. As of 1 March 2006, there were 12,320

[38] In North Rhine-Westphalia there are the additional 'area associations' (*Landschaftsverbände*) of Rhineland and Westphalia-Lippe. This subdivision was introduced to ease the friction caused by uniting the two culturally quite different regions into a single federal state after the Second World War. Today, these area associations are of minor relevance.

municipalities, which are the smallest administrative units in Germany.[39] The constitution for the municipalities is created by the federal states and is uniform throughout a federal state.[40] Municipalities have administer programmes authorized by the government of the federal state. Such programmes typically relate to youth, schools, public health, and social assistance. Local governments can justify a wide range of activities. For instance, many municipalities develop the economic infrastructure of their communities through the development of industrial parks.

The different administrative levels are relevant because, first, economic development policies and therefore economic performance can actively be influenced on different administrative levels, thereby encouraging economic clustering. Second, administrative data are provided by the Federal Statistical Office.[41] In further analyses, the administrative level of federal states will be directly applied. However, as mentioned above, this is a very rough level of aggregation. Therefore, there is additional emphasis on two functional definitions: 97 area planning regions are aggregated based on municipalities, and 176 'employment agency regions' are relevant for labour market policies. The relevant data are thus based on these definitions.

Area planning regions

The area planning regions are a concept implemented by the Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung).[42] The main purpose of the definition is to address the widespread argument in economics literature that administrative units do not map the real economic conditions of a region. Therefore, statistical analyses do not properly portray economic reality. In order to address the need for a more functional unit, so-called area planning regions (*Raumordnungsregionen*) have been provided since 1981 as a regional unit. Their purpose is to provide unique data for regional analyses.

These regions are not programme regions of the federation. They are an intermediate stage between the governmental districts and the districts, and provide a sort of spatial raster for comparative countrywide regional analyses. They have found broad use in

[39] Cities are municipalities as well, which have 'city rights' (*Stadtrechte*). Nowadays, these rights mostly just involve the right to be called a city; however, in former times it included many privileges, such as the right to impose taxes or to allow industry within cities only.
[40] Except for Bremen, which allows Bremerhaven to have its own constitution.
[41] The disaggregation is not unique. Further information on official regional data is available from the Federal Statistical Office (www.destatis.de/statistik-regional).
[42] On the one hand, the Federal Office for Building and Regional Planning supports the federal government with sectoral scientific consultation in the political areas of spatial planning, urban development, housing, and construction. On the other hand, it supervises the most important federal buildings in Germany and abroad.

regional economic research. In the states of former West Germany, the area planning regions in general referred to sub-urban 'catchments areas' (*Einzugsgebiete*), to the extent that they could be illustrated on the level of cities and districts. The existing planning regions of the federal states are considered as far as possible. In 1991, a similar spatial raster was sketched for the five new Länder, though at this time no appropriate regional planning specifications were defined. In response both to the regional reorganization of the five new Länder and to structural changes in the 'old' federal states, the German government substantially revised the system of the area planning regions in 1996. Since then, the main definitions have been relatively stable, and yearly comparative analysis is possible without substantial difficulties.

As the number of units indicates, this aggregation level is between the district and the federal state level and does not represent administrative units, although the basic statistical information is based mainly on administrative data. On the basis of the commuting data of individuals in jobs with social security insurance, these planning regions have been examined in order to detect coherent countrywide standards for the definition of regions. Through empirical analyses and the adjustment with the federal states, there is a system of 97 area planning regions, which corresponds to a large extent to the requirements of countrywide comparative issues.

For three main reasons the economic planning regions are an attractive functional level. The main reason is that federal states represent quite rough levels of aggregation. On the other hand, the disaggregation level of the district or even municipality is high and does not represent feasible regional definitions for labour market purposes. Apart from this technical argument, two other points made this level most favourable. The first is quite trivial and stems from data protection law: the regional information for the individual data used in the following analyses, the GSOEP, is disaggregated on the federal state level in its basic form; however, disaggregation on the level of economic regions is also fairly easy to access. Therefore, at the beginning of the project, this was the only way to estimate wage curves in a more disaggregated way than was possible with federal states.[43] The second argument for this level is the availability of a wide variety of indicators, including important labour market figures available from the Federal Office for Building and Regional Planning.

---

[43] Further disaggregated data are not available. However, under specific protection terms at the German Institute for Economic Research in Berlin, it is possible to conduct analyses that are further disaggregated. This has been the done, for example, with analyses on the agency level. As will be shown, I have been able to carry out comparative analyses with these two levels. For the opportunity to run the analyses in the data pool, I give special thanks to the German Institute for Economic Research (DIW) and Katharina Spiess.

Employment agency level

The second functional unit which has special importance in the context of labour market policies in Germany is the 'employment agency regions'. This regional definition is based on the structure of the German Federal Employment Agency. The structure has been changed since the implementation of the substantial reforms introduced by the Hartz Commission in 2002. However, these changes have been based mostly on the competences and the responsibilities of the different levels in the public employment administration. The Federal Employment Agency is structured into three regional levels: The first level is the national headquarter in Nuremberg (Hauptstelle der Bundesagentur für Arbeit). Its main task is to define the strategic targets and to formulate the political goals related to labour market policies. These targets are based on directives from the Federal Ministry of Labour and Social Affairs.

The national level is divided into ten regional authorities (*Regionaldirektionen*), which are linked to the federal states. They are not, however, identical.[44] The tasks of the regional authorities have changed substantially in line with the Hartz reforms. Today, one main task is to negotiate bilateral target directives with the agencies and to monitor how these targets are achieved. Some substantial changes have been implemented at the second level of the regional authorities, which have changed in number. These changes are of minor importance in the following discussions and analyses.[45] The third level of aggregation is the above-mentioned employment agency level (*Arbeitsagenturen*). Employment agency regions are structured into 176 (171) units.[46] As the level of implementation for active labour market policies, it is relevant for the analysis of regional labour markets.

Although it is often stated that agency regions are administrative definitions, in fact their basic definition is not directly linked to the federal structure described above. Based on functional criteria, the target of the agency regions is to define relevant labour markets. The main criterion for their definition is the extent of commuting. In the first stage, labour market centres must be defined. One criterion is if the number of workplaces is higher than the number of workers living in a specific region. In a second stage, these labour market

---

[44] The city-states, in particular, no longer have an independent authority. The following regions are matched: Berlin and Brandenburg; Lower Saxony and Bremen; Schleswig-Holstein, Hamburg, and Mecklenburg-West Pomerania (the so-called Region Nord).

[45] The starting point for the establishment of the Hartz Commission was the placement scandal and the urgent need to reform the organization of the public employment services. The traditional public employment service was seen as a large, lethargic, and inefficient public bureaucracy restricted by laws and regulations and a lack of performance measurements and competitive incentives. The Hartz reforms were thus designed to increase the efficiency of the organization and the effectiveness of labour market policy. For more detailed information on the reform and its implications, see Kemmerling and Bruttel (2006).

[46] The city-state Berlin is divided into five separate employment agency regions. These regions are aggregated into one unit in the following analyses.

centres are linked with surrounding regions according to commuting activity between the centres and the peripheral regions. Apart from the criterion of commuting, a second indicator based on reasonability (*Zumutbarkeit*) is taken into account.[47] In actuality, approximately two-thirds of the labour market regions are congruent with administrative districts. The remaining labour market regions enclose several administrative districts.[48] In practice, the boundaries of agency regions do not differ that much from the boundaries of administrative regions on the district level (*Kreise*). However, like the regional authorities, the number of regions is significantly smaller, with 176 regions compared to 439 districts, because a substantial number of the districts are merged into one agency region.

In sum, in this section, definitions of regional aggregation levels in Germany were given. There are three alternatives: the highest aggregation level of 16 federal states, the 97 economic regions defined by main economic clusters, and the 176 (171) functional employment agency regions defined by relevant labour markets. Obviously, the federal state level is quite rough, as the differences in size and other figures are significant. However, as will be seen in later sections, each aggregation level has its specific advantages. The functional regions seem to fit better with regional economic delimitation, as they explicitly mention regional economic factors apart from administrative arguments. The question of the 'most suitable' functional region will be part of later analyses. In the following sections, I present some general descriptive statistics on regional economic performance and highlight specific labour market figures.

3.2 Data

In this section, I describe the main data resources which are relevant for the analyses presented later in this thesis. Two main data resources are utilized: First, regionally aggregated economic data are used. These data mainly describe the regional labour markets through unemployment figures and participants in ALMP measures. The data are relevant for all subsequent chapters. In chapter 7 the performance indicators of the regional public employment offices are produced solely through the use of this data. In the estimations on the wage curve, aggregate data are merged with individual survey data. In chapter 8, additional labour market policy figures also play an important role.

---

[47] This is based on the assumption that commuting is reasonable if a workplace can be reached within 45 minutes.

[48] A detailed definition of agency regions can be found in Blien (2001).

Generally, the Federal Statistical Office is the main provider of administrative data in Germany. However, for labour market issues, only a few key variables like unemployment figures are provided.[49] If more information is needed, the data comes from the Federal Employment Agency, as this institution generates and originally provides these data. Therefore, the main supplier of aggregate data applied in the following analyses is the Federal Employment Agency. However, in some cases, additional information from the Federal Statistical Office is needed. In general, there is no substantial problem in matching these two resources. However, because of the different regional definitions discussed above (administrative versus agency regions), some conflicts might occur at the regional level.

For the survey data, three different sources provide individual information on dependent employed persons with respect to income and other relevant indicators: the employment sample and its derivatives, such as the employer-employee data file, provided by the Institute for Employment Research (IAB); the German Microcensus from the Federal Statistical Office; and the GSOEP, a household panel conducted by the German Institute for Economic Research.

The IAB employment sample

The IAB employment sample (*Beschäftigtenstichprobe*) is a 1% sample of all dependently employed persons; it includes the historical development of their employment careers. The basis of the employment sample is the integrated reporting proceedings to the health, pension, and unemployment insurances. Since 1991, eastern Germany also has been included. The IAB sample requests reports from employers for all employees subject to social insurance contributions. The beginning of a job is documented by an initial report, the completion by an 'end message'. Each year of an existing job relationship with an employee represents at least one record. The main advantage of this data set is its large sample size of approximately two hundred thousand individuals in each cross-section. The main advantage of the employment survey is its sample size. Especially when regional aspects are taken into account, this can be of great value. On the other hand, there are two main disadvantages. First, higher income is not represented in the sample, as it is limited to the contribution assessment ceiling (*Beitragsbemessungsgrenze*).[50] As a consequence of this

[49] They are basically generated at the Federal Employment Agency and reported to the Federal Statistical Office. Data from the Federal Employment Agency are thus more up to date.

[50] This contribution assessment ceiling follows from a specific rule in the German social security system. For income obtained above this level, additional contributions to the social security system are voluntary. In 2004, this ceiling was set at a monthly gross income of 5,150 euros in western Germany and 4,350 euros in eastern Germany.

ceiling and the resulting non-consideration of higher income, the income distribution in the panel is left-censored. The second disadvantage of the data is the relatively modest information on individual characteristics in comparison with other panel surveys.[51]

The IAB Establishment Panel data

The IAB Establishment Panel has conducted annual surveys in western Germany since 1993 and in eastern Germany since 1996, and comprises altogether 16,000 establishments. Since March 1999, the IAB Establishment Panel Data Service, financed by the Federal Ministry for Education and Research, has carried out analyses for external researchers with the data of the IAB Establishment Panel. Both the larger number of units and the growing number of panel waves have extended the possibilities for analysis, such that advanced analytical methods also can be adopted. Furthermore, the IAB has linked the IAB Establishment Panel data with information from the employment statistics register of the Federal Employment Services (Bellmann 2002). The restrictions on the income variable and the relatively weak individual information are the same as for the IAB employment sample.

The German Microcensus

The German Microcensus is a rotating panel in which the units stay in the survey for four observations. Because of the large sample size and the requirement of mandatory participation, it is a valuable database for short-term analysis. The microcensus also has the advantage of having a sample size as large as the IAB Establishment Panel data. In addition, the information on the individual level is much better, as a huge set of individual- and household-specific items are included. On the other hand, there are two main disadvantages: First, the microcensus is not a 'real' panel, because the individuals are followed a maximum of five years. Second, and this is of particular importance for my analysis, wages are not reported continuously but rather only documented by means of relatively rough income classes.

The German Socio-economic Panel

The main data providing the individual information used in this study are from the GSOEP of the German Institute for Economic Research. The GSOEP is a wide-ranging, representative longitudinal study of private households in Germany. The same private households, persons, and families have been surveyed annually since 1984. As early as June 1990 – before the monetary, economic, and social unification of the two Germanies – the

[51] For a detailed discussion, see Kölling (2000).

survey was extended to include the territory of the former German Democratic Republic (GDR). The GSOEP has a high degree of stability. In 1984, 5,921 households containing 12,290 people participated in the 'GSOEP West'; in 1990, 2,179 households with 4,453 people were surveyed in the GDR for the 'GSOEP East' sample. The most recent wave of data mentioned in this thesis (2004) includes nearly four thousand households with over seven thousand people for the GSOEP West sample, and three and a half thousand people in nearly two thousand households in the GSOEP East sample. The retention rates of the 1994/95 Immigrant Sample of about one thousand persons in about five hundred households have also been good. In 1998, the GSOEP was extended to include a supplementary sample.[52] A major extension of the GSOEP was drawn in the year 2000: sample F included over ten thousand persons in over six thousand households.

For regional analyses, the standard GSOEP data set (public file) includes a variable for the 16 federal states in Germany. Additionally, the GSOEP provides two more disaggregated alternatives, each with its own availability restrictions. First, the data can be enhanced with the so-called GSOEP geocode,[53] which consists of 97 area planning regions of the Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung[54]), to which every GSOEP household is assigned. This information is available for all waves. Regional macro indicators also provided by the Federal Office for Building and Regional Planning can therefore be linked to the individual data from the GSOEP (DIW 2003).

The second alternative for a regional non-public disaggregation is information on the postal code of the households, which is available at the German Institute for Economic Research under a special data protection requirement. When the postal code is added, it is possible to aggregate to different aggregation levels.[55] In the following analyses, this information is used to construct a regional variable at the agency level in order to draw a link to the aggregate labour market variables from the Federal Employment Agency.

---

[52] Sample E with 1,923 people in 1,067 households, from whom two years later 1,373 persons in 773 households were surveyed successfully, increased the possibility of analysis of small societal groups significantly. The last refreshment of the GSOEP was drawn in 2000: a random sample of households with high income, Sample G. It contained 1,224 households with 2,671 persons (DIW 2004).

[53] In principle, it is possible to get regional information down to the postal code, and therefore municipality or district differentiation is in principle possible. Two arguments in particular favour this approach, one practical and one technical: first, access is much easier, and, second, the regional planning regions (should) reflect economic areas or clusters.

[54] Formerly the Bundesforschungsanstalt für Landeskunde und Raumordnung, which no longer exists. Since 1 January 1998, it became the Bundesamt für Bauwesen und Raumordnung.

[55] A special thanks goes to Silke Anger, who provided me with codes for the aggregation of agency regions, saving an invaluable amount of time retrieving the data.

The majority of German analyses on the wage curve are based on IAB Establishment Panel data. This data set has the advantage of larger sample sizes, which is particularly advantageous for region-specific analyses. An alternative is the *Beschäftigtenstichprobe* described above. The employment statistics from the IAB (the firm-specific data set) do not permit consideration of individual characteristics such as skill levels, duration of employment, experience, and so forth. Alternatively, firm-specific characteristics, such as the obligation to pay in line with collective pay agreements, wages above the collectively agreed wage rate, and the share of female employees, are included. With its sample size of 24,000 individuals, the GSOEP brings with it potential sample-size problems when the regional level is taken into account. On the other hand, this data resource has the advantage of a real panel structure, and the array of individual information on the personal and household levels allows one to control for factors that are more detailed than administrative data. This fact is important for the analyses in later chapters. Analyses based on the wage curve are estimated with data from the GSOEP and regional macroeconomic figures.

Two main data resources are utilized. The aggregate data describe the economic conditions of the labour market; they are derived mainly from the Federal Employment Agency. To measure real wages and other job-related characteristics, alternative individual surveys including information on income and education are also introduced: the employment sample and its derivatives provided by the IAB, the German Microcensus from the Federal Statistical Office, and the GSOEP. The latter differs substantially from the other data. A household panel provided by the German Institute for Economic Research, it is a wide-ranging, representative longitudinal study of private households in Germany. Not limited to the labour force, the data include a sample of individuals starting from their eighteenth year. Having highlighted the specific advantages and disadvantages of the data, I argue that the GSOEP is a good alternative for further estimations.

3.3 On the definition of qualifications

Qualifications and skills are not one-dimensional. Their definition depends on different individual and institutional components, such as those defining hard skills and soft skills. Hard skills are easier to measure, as they can be compared by means of certificates. In this section, I sketch out the main alternatives to classifying qualifications on the basis of the GSOEP, and show that each alternative has its own advantage. In general, one can distinguish between demand-specific and supply-specific classification. The former classifies the formal qualifications held by individuals, whereas the latter characterizes an

individual's current employment situation. This form of differentiation is somewhat artificial: in a way, qualifications are always an individual characteristic. On the other hand, when mobility is limited, the employers, and consequently the demand-side characteristics, do have an impact on decisions about qualifications. The relevant variables are described in table 5.

School degree and vocational position are variables describing region-independent individual qualification factors. One can argue that there are factors other than individual preferences influencing decisions about schooling. Especially from a sociological perspective, the argument of specific path dependencies – for example caused by the structure of the labour force and the supply of educational institutions – could be relevant. On the other hand, individuals have substantial influence over the characteristic (e.g. schooling, vocational degree), or the characteristic is directly linked to the individuals (e.g. age). Hence, these categories differ from employer-specific factors: employment in specific occupations and industries and the firm size are not variables from which individuals can directly choose.[56] The industry classification of employed persons, and, even more obviously, that one of the firm size, depends on the employer and therefore on the supply side.

Table 5: Variables describing individual qualification patterns

Qualification characteristic	Qualification category	N	Mean	Standard deviation	Categories/ range
Demand-specific	School degree	52,691	2.98	1.11	4
	Vocational position	53,588	3.77	1.1	5
	Occupation (ISCO-88)	51,972	4.73	2.36	9
Supply-specific	Industry (NACE9)	53,596	5.77	2.11	9
	Firm size	54,765	3.47	1.16	5
	Unemployment	53,599	3.55	1.55	6

Sources: GSOEP; occupation: ISCO-88 (International Standard Classification of Occupations); NACE (Nomenclature of Economic Activities in the European Community).

School degree

The most transparent hard skill is the school degree, as it is the most standardized form of education in all countries. Generally, 'years of education' is a common way to classify qualifications.[57] For example, studying for a specific profession within the dual system of education often takes three years; study at a college of higher education (*Fachhochschule*) takes about four years; and university studies last about five years. Yet this form of

[56] To be sure, when individuals have the option of deciding between two or more employers, they can choose. The main input, however, comes from the company.
[57] This is also the standard classification used in Mincerian income equations.

classification is not that clear and has several weaknesses. The classification system does not include all forms of professional education: the health-care sector, for example, has its own system, and professional education for the creative professions is hardly measurable. Moreover, the usability of these classifications is reduced when one considers that additional qualifications obtained through further education during one's professional career become more and more important relative to one's primary education. These qualifications are difficult to measure, however, because they often are not certificated.

Vocational position

Whereas the schooling degree indicates a person's basic endowment with human capital when he or she enters in secondary education and/or the labour market, the vocational position gives information about the current position and thus implicitly conveys information about the current qualifications applied or required in the current job. It therefore indicates additional formal and informal qualifications and skills (soft skills).

Occupational classification

The International Standard Classification of Occupations (ISCO) is the third individual-based qualification-relevant variable in our framework, providing an international classification of tasks and formal skills within jobs into a clearly defined set of professional groups according to the tasks and duties undertaken in the job. Many national occupational classification systems are based on one of three ISCO versions, depending on the timeframe in which they were developed. In the following analyses, I use the one-digit ISCO-88, which classifies professions into ten major groups. Each group is further organized into sub-major, minor, and unit groups. With the exception of the units (four digits), these sublevels are shown in table A1 in the appendix. The units are somewhat important for gaining an understanding of the skill requirements in these groups, but for the analyses presented here, the disaggregation level would be too high: too many degrees of freedom would be lost.

The third column indicates the corresponding skill level of any ISCO category. These skill levels are the basis for the International Standard Classification of Education (ISCED), which is a universal education classification system whose main task is to enable comparison of different educational systems on an international basis. It is a framework for the compilation and presentation of national and international education statistics and indicators, and covers all organized and sustained learning activities for children, youth, and adults, including those with special educational needs. The classification system provides a sound basis for statistical comparisons between different educational systems. The system is based on a combination of school and professional education. I do not use this

classification system in this analysis, as I have already accounted for these factors with the schooling variable. However, for comparative reasons, it seems appropriate to have the information in the following analyses on the ISCO subgroups.

The one-digit ISCO classes are defined as follows: The first group of legislators, senior officials, and managers includes occupations whose main tasks consist of determining and formulating government policies, laws, and public regulations; of overseeing their implementation; of representing governments and acting on their behalf; or of planning, directing, and coordinating the policies and activities of enterprises, organizations, or departments. The scope of this major group is not defined through reference to a particular skill level.

Table 6: ISCO-88 major groups and skill levels

Group	Professions included	Skill level
1	Legislators, senior state officials, and managers	–
2	Professionals (e.g. architects, doctors, university and secondary-school teachers, lawyers, economists)	4th
3	Technicians and associate professionals (e.g. electrical engineering specialists, building specialists, nurses, primary school teachers, civil servants, police inspectors)	3rd
4	Clerks	2nd
5	Service workers and shop and market sales workers	2nd
6	Skilled agricultural and fishery workers	2nd
7	Craft and related trades workers	2nd
8	Plant and machine operators and assemblers	2nd
9	Elementary occupations	1st
10	Armed forces (not included in analyses)	–

Source: www.warwick.ac.uk/ier/isco/brit/btext2.html.

The category 'professionals' comprises occupations whose main tasks require a high level of professional knowledge and experience in the fields of physical and life sciences, social sciences, or the humanities. The main tasks consist of increasing the existing stock of knowledge, applying scientific and artistic concepts and theories to the solution of problems, and teaching about the foregoing in a systematic manner. Most occupations in this major group require skills at the fourth ISCO skill level.

The 'technicians and associate professionals' have occupations whose main tasks require technical knowledge and experience in one or more of the fields of physical and life sciences, social sciences, or the humanities. The main tasks consist of carrying out technical work connected with the application of concepts and operational methods in the above-mentioned fields, and in teaching at certain educational levels. Most occupations in this major group require skills at the third ISCO skill level.

The category 'clerks' includes occupations whose main tasks require the knowledge and experience necessary to organize, store, compute, and retrieve information. The main tasks consist of performing secretarial duties, operating word processors and other office machines, recording and computing numerical data, and performing a number of customer-oriented clerical duties, mostly in connection with mail services, money-handling operations, and appointments. Most occupations in this major group require skills at the second ISCO skill level.

The main qualifications of 'service workers and shop and market sales workers' are knowledge and experience in providing personal and protective services and in selling goods in shops or at markets. The main tasks consist of providing services related to travel, housekeeping, catering, personal care, protection of individuals and property; of maintaining law and order; or of selling goods in shops or at markets. Most occupations in this major group require skills at the second ISCO skill level.

'Skilled agricultural and fishery workers' comprises occupations whose tasks require the knowledge and experience needed to produce farm, forestry, and fishery products. The main tasks consist of growing crops, breeding or hunting animals, catching or cultivating fish, conserving and exploiting forests, and, especially in the case of market-oriented agricultural and fishery workers, selling products to purchasers, marketing organizations, or buyers at markets. Most occupations in this major group require skills at the second ISCO skill level.

'Craft and related trades workers' includes occupations whose tasks require the knowledge and experience of skilled trades or handicrafts, which, among other things, involves an understanding of the materials and tools to be used as well as of all stages of the production process, including the characteristics and the intended use of the final product. The main tasks consist of extracting raw materials, constructing buildings and other structures, and making various products as well as handicraft goods. Most occupations in this major group require skills at the second ISCO skill level.

The main qualifications and experience of 'plant and machine operators and assemblers' comprise the operation and monitoring of large-scale, and often highly automated, industrial machinery and equipment. The main tasks consist of operating and monitoring mining, processing, and production machinery and equipment, as well as driving vehicles or assembling products from component parts. Most occupations in this major group require skills at the second ISCO skill level.

'Elementary occupations' cover occupations that require the knowledge and experience necessary to perform mostly simple and routine tasks involving the use of hand-

held tools and in some cases considerable physical effort, and, with few exceptions, only limited personal initiative or judgement. The main tasks consist of selling goods on the street, door keeping, and property watching, as well as cleaning, washing, pressing, and working as labourers in mining, agriculture and fishing, construction, or manufacturing. Most occupations in this major group require skills at the first ISCO skill level.

Finally, the category 'armed forces' includes personnel currently serving in the armed forces, including auxiliary services, whether on a voluntary or compulsory basis, who are not free to accept civilian employment. In the following analyses, this group is excluded by virtue of three reasons: First, the wages are set on a national level. Second, demand is driven mainly by political decisions and necessity; therefore, one can expect that variations are insignificant. Third, this group is very small in our sample, making a detailed analysis impossible.

Firm size

The size of firms is often interpreted as a qualification-specific indicator. This indirect link is based on the argument that larger firms normally have more hierarchies. Therefore, for any given career, starting with a specific formal education, different career paths are possible, and, particularly in later phases of the career, higher income can possibly be obtained. Second, from an employer's point of view, larger firms have the possibility for a more transparent and formalized selection process of their employees. Because a job in larger firms is often viewed as more attractive, employers are confronted with a larger number of applicants. As a result, they have the opportunity to select the candidates with better certificates or those who better suit particular career paths for other reasons. In the end, one can expect higher average wages in these firms. Moreover, because unionization is more likely in these firms, collective agreements aimed at all regions are more likely to be in place, and thus wage-unemployment elasticities should be significantly lower.

Branches

Introduced in 1970, the NACE code system is based on the European standard for industry classifications. In 1990, a revised version became applicable (NACE Rev. 1).58 The NACE Rev. 1 regulation was amended by a Commission regulation in 1993, which modified the classification; a corrigendum was published in 1995. The main groups of the NACE code are divided into several subgroups, which structure the NACE in a way comparable to the ISCO code. The first digit comprises 17 sections with letters from A to

[58] NACE stands for 'Nomenclature Generale des Activites Economiques dans I'Union Europeenne' (Nomenclature of Economic Activities in the European Community).

Q and is further disaggregated in some areas into subsections indicated by two-digit alphabetical codes. The second level of ISIC Rev. 3 (divisions) is carried over to NACE Rev. 1 without any changes, and the third and fourth levels (groups and classes) are subdivided to reflect European needs.59

The first four digits of the code are the same in all European countries. The fifth digit might vary from country to country, and suppliers of databases sometimes introduce further digits. 59 principal groups have been given two-digit NACE codes, which can then be subdivided into 640 individual groups (four-digit NACE codes). The classification of economic activities is designed to categorize data that can be related only to the unit of activity, for example an individual plant or group of plants comprising an economic entity such as an enterprise. I use a reduced form of one-digit NACE classification (table 7), which best suits the needs of this study in both sample composition and sample size. Above all because of the regional perspective of this work, it is not feasible to use a more detailed classification. The reduced form is based on the one-digit NACE groups, whereby the most underrepresented groups are aggregated; these groups are A and B, G–I, J and K and L–P.60

The category 'exterritorial services' is excluded because remuneration of work in this category is not comparable to that in other branches due to substantial differences in contraction specifications and tax laws as well as bilateral or multilateral diplomatic reasons. The categories A and B also are excluded. As can be seen from the descriptive statistics in table 17, these branches are hardly represented in the sample. Further analyses, even on a regional basis, would not bring reliable results; moreover, in the multivariate case, collinearity problems will hinder reliable results.

Table 7: Reduced one-digit NACE classification (2004)

	Freq.	Per cent
A, B Agriculture, hunting, forestry, and fishing	64	0.9
C Mining and quarrying	27	0.4
D Manufacturing	1,918	26.8
E Electricity, gas, and water supply	94	1.3
F Construction	356	4.9
G–I Wholesale and retail trade, catering, transport, and communication	1,305	18.2
J, K Financial intermediation, real estate	810	11.3
L–P Public and private services	2,589	36.1
Q Exterritorial organizations	7	0.1
Total	7,170	100.0

Source: GSOEP 2004.

59 ISIC stands for 'International Standard Industrial Classification of all Economic Activities'.
60 A more detailed list of the main NACE classification system is documented in the appendix (table A2).

The sample sizes of the categories C, E, and F are also characterized by low case numbers. I thus proceed as follows: First, category C ('mining and quarrying') is added to category D ('manufacturing'). The category 'mining and quarrying' is used in a broad sense, encompassing the extraction of minerals occurring naturally as solids, such as coal and ores; liquids, such as crude petroleum; and gases, such as natural gas. Underground or surface mining, well operation, and all supplemental activities aimed at preparing the crude materials for marketing, generally done near or at the mine site, such as milling, dressing, and beneficiating, are also included in this classification. Mining activities are classified into divisions, groups, and classes based on the principal mineral produced. 'Manufacturing' is defined here as the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold wholesale or retail. I thus aggregate two main groups of the value chain, one following the next. Second, the categories E (electricity, gas, and water supply) and F (construction) are aggregated to another group. This procedure results in five main NACE groups.

Although the classification of qualifications is crucial for income analyses, several alternative statistical definitions are available, all with their specific advantages and disadvantages. Generally, two classifications are specifiable: demand-specific and supply-specific characteristics. Demand-specific characteristics represent direct individual information on school degree, vocational position, and occupation. They are more standardized and comparison is easier. Their main disadvantage is that they tend to mention hard skills only. In the supply-specific variables on industry, firm size, and unemployment, it is possible to deduce related soft skills. Their disadvantage, however, is that their individual-specific information is less standardized. In later analyses, and especially in chapter 6, the definitions are used to identify qualification-specific subgroups in order to examine whether regional wage elasticities are influenced by qualification levels.

3.4 ALMP instruments

Targets

According to the German Social Security Code (SGB III), active measures can be divided into three main groups and five subgroups. The first target of the first main group is the improvement of human capital endowment; the central measures are the promotion of apprenticeship and other specific training measures. The second group comprises job creation schemes and structural employment measures; their main target is direct job creation. The third group is monetary and non-monetary measures for improving

incentives to bring people into employment or to support their self-employment via integration subsidies and self-employment subsidies. The main targets and measures are listed in table 8.

Improve human capital endowment

Conceptually, the main argument for active measures improving human capital endowment is the empirical fact that the risk of unemployment is much higher in the low-skilled sector. Therefore, the target of these measures is to maintain or achieve employability and to reduce the qualification mismatch in the labour market. They include both short-term and long-term measures: the promotion of apprenticeship and professional training are long-term in orientation, whereas training measures are short-term in nature. The main target group of the measures promoting apprenticeship is young people entering the labour market who are not able to find a regular training position (§§ 61ff, SGB III). The measures to promote further training are dedicated to unemployed persons or persons in dependent employment without an apprenticeship (§77, (1), SGB III).

Table 8: ALMP measures in Germany

Target	Instrument
Improve human capital endowment	1. Promotion of apprenticeships 2. Specific training measures
Job creation	1. Temporary public job creation schemes 2. Structural employment measures
Improve incentives	1. Integration subsidies 2. Ease self-employment

Source: Based on SGB III.

Job creation

Temporary job creation measures (*Arbeitsbeschaffungsmaßnahmen*, or 'ABM') aim at creating intermediate jobs for workers in need of assistance, particularly for the long-term unemployed (more than 12 months) entitled to unemployment assistance. The work offered must be 'additional' and 'useful to the community', which means that the jobs would not have existed without the support of the programme. Promoters in both the private and the public sectors can claim a subsidy ranging from 30% to 75% – and in exceptional cases, 100% – of the wage. Non-profit organizations, intermediate employment or training agencies, and municipal governments are the main providers of ABM jobs.

Formerly based on the wage level set by collective agreements, the subsidy is now limited to jobs with a remuneration of 80% of that of subsidized employees. The jobs are temporary, lasting between nine and twelve months, or in exceptional cases up to two years. ABM programmes are designed to stimulate the creation of permanent jobs, prepare

measures for structural improvements, improve infrastructure and the environment, and provide work experience for very long-term unemployed persons. ABM are highly dependent on various local bodies, which determine the standards for 'usefulness' for the community and offer suitable employment opportunities, often with co-financing.

Significant variation between regions in design and implementation, and corresponding differences in the effectiveness of labour market policies, can be expected. Because the initiative, cooperation, and co-financing of local authorities are crucial to programme success, the effectiveness of ABM appears to vary more strongly across regions than does that of training measures.[61]

Improve incentives

Two kinds of subsidies to improve incentive can be distinguished: demand-oriented incentives and supply-oriented incentives. Wage subsidies provide money to the demand side, whereas promotion of self-employment is dedicated to the unemployed and therefore to the supply side of the labour market. A range of cost subsidies for the demand side is intended to support the reintegration of hard-to-place unemployed persons. Recruitment subsidies (*Eingliederungsbeihilfen*) provide subsidies of 30–50% for the hard-to-place unemployed for up to one year. Additionally, a special federal aid programme (*Bundesbeihilfenprogramm*) financed by the federal government offers subsidies in the same range for the recruitment of long-term unemployed persons. Moreover, long-term and digressive subsidies are available to stimulate the recruitment of elderly long-term unemployed persons.

Finally, structural adjustment measures (*Strukturanpassungsmaßnahmen*) have been available as an instrument in eastern Germany; in the 1990s, they were extended with some changes to western Germany. These measures offer a lump-sum subsidy equivalent to an average unemployment benefit. It is designed for small firms and to non-profit organizations or private firms, which create additional jobs for the unemployed in the areas of environmental protection, social services, youth aid, and some elements of urban renewal. Because these subsidies cover only 25 to 40% of the costs for a new job, co-financiers are required. Again, these programmes give placement managers of regional employment agencies considerable room to operate, resulting in sizeable regional variations in the programme portfolio.

[61] Koning and Mosley (2001) discuss several studies on the aggregate impact of active labour market policies in selected European countries.

Since the reform process initiated by the Hartz Commission, several experiments in supply-side subsidies have been made in the last five years. Two programmes are available: The first is 'bridge money' (*Überbrückungsgeld*); the second is the so-called *Ich-AG*.[62] Both measures have the same target (i.e. to ease self-employment); they differ primarily in their target group. Bridge money provides six months of financial support to start a business and is linked to the previous salary. The target group has been higher-qualified unemployed persons. The Ich-AG, on the other hand, tends to support small businesses and freelance activities in the lower income bracket. The demand-side measures involve wage subsidies: employers receive subsidies when they create new jobs. Wage subsidies are a particularly important instrument in eastern Germany.

With regard to their main objective, active labour market policy measures can be divided into three groups: measures to directly improve human capital endowment through short-term or long-term training measures, job creation schemes to support the demand side in creating new jobs, and schemes that ease self-employment or that improve incentives by means of integration subsidies. Each of these measures, as well as the overall extent of active measures, is examined in chapter 8, which investigates the impact of these measures on the individual wage level of persons in dependent employment according to regions.

3.5 Conclusion

In this chapter, I presented the technical background for subsequent analyses. I introduced several alternatives for defining regions, and discussed how three main aggregation levels are relevant for further analyses. The federal state level, although quite rough in its delimitation, has several advantages. Moreover, two functional aggregation levels are utilized: 97 economic regions and 171 agency regions. Whereas the definition of the first focuses on the general economic structure, the latter specifically mentions aspects of the labour force. I refer to both in later analyses. For some analyses, the issue of data availability renders the decision straightforward. When this is not the case, both definitions are mentioned and checked for usability.

---

[62] Translated literally, *Ich-AG* means 'Me Inc.' The press and the public are perhaps most responsible for coining the term. The Ich-AG was part of important political discussions until June 2006. In response to these discussions, and in the absence of signs of medium-term effects, the measure was revoked. Self-employment subsidies have been integrated into a single measure since July 2006.

Furthermore, I discussed several data resources and explained that, because of its specific advantages, the GSOEP is favoured in subsequent analyses when individual data are used. The definition of qualifications is a difficult task. I presented several alternatives and the main definitions, which become particularly relevant in chapters 4 and 6. Finally, I provided definitions of and a brief introduction to active labour market measures in Germany. These definitions are of specific relevance in chapters 4, 7, and 8.

4 Do regions matter? Descriptive evidence

In this chapter, I present empirical evidence on the question of whether regions matter. I begin by outlining some stylized facts on main characteristics of the European labour market, and then recount detailed facts on regions in Germany. What is the suitable definition of a region? As described in 3.1 the specification of regional borders is essential for the empirical analysis. I present three alternatives for Germany. After discussing the administrative level of federal states, I highlight two functional regions, which means that labour markets are not defined by administrative boarders but according to real factors like general openness, commuting, and homogeneity, the 97 economic regions and the 171 agency regions. In the third section, I focus on qualifications, and introduce and describe different definitions of qualifications in the GSOEP. In the fourth section, active labour market policies are described, and their distributions over time and by unemployment region are analysed.[63]

4.1 Stylized facts on regions

4.1.1 The regional pattern in Europe

Regional unemployment in the European Union follows a quite distinct, transnational pattern that closely resembles the core/periphery structure apparent for regional gross income per capita. Regional inequalities in unemployment and employment rates are especially pronounced in Italy, Belgium, Germany, Spain, Turkey, and central and eastern Europe. In low-unemployment regions, an unemployment rate of about 3% to 5% is very similar across these countries. By contrast, the unemployment rate in high-unemployment regions varies considerably across countries, ranging from 4% up to 27%.

Across Europe, unemployment rates reveal a core/periphery structure. Low unemployment rates take the form of a 'European banana', namely, they circumscribe southern United Kingdom, the Netherlands, Flanders, southern Germany, and northern Italy. All of the regions with mass unemployment belong to the poor peripheral parts of

[63] The former is particularly important here, as the time period 1999 to 2004 was chosen. On the one hand, this choice gives an up-to-date view; on the other, during this period, and especially following the Hartz Commission of 2002, comprehensive changes in the structure of labour market policy were undertaken.

the European Union, the so-called Objective 1 regions. This means that large 'core' regions – mainly in central and northern Europe – have low unemployment rates, whereas mass unemployment predominantly is found in the peripheral regions towards the borders of the EU-25. However, there is a divergence not only between the 'core' and 'peripheral' regions as defined by central and northern European countries versus border countries. This pattern is only one part of the story. By looking at the European Union in a more disaggregated way, one can see that the patterns of the landscape differ dramatically within countries. In nearly every country there are regions with high economic performance and regions with low economic performance.

Moreover, employment problems and success seem to be anchored in particular regions, for the relative position of individual regions did not change much between 1993 and 2003. On average, 80% of European regions with very high unemployment rates in 1993 were in the same position in 2003. Employment problems also tend to cluster in space, because the labour market performance of any individual region is often linked more to the performance of neighbouring regions, including foreign ones, than to the performance of non-neighbouring regions within a particular country (OECD 2005).

Table 9 depicts the unemployment rates and gross domestic product (GDP) figures for the 25 EU member states on the basis of a NUTS-3 classification providing statistical information for 1,221 regions.[64] The national average, the spread between national regions in per cent, and the derivation of the national average from the EU-25 average are indicated.

The enlarged European Union shows considerable differences in unemployment rates. Three of the new member states, Bulgaria, Poland, and Slovakia, have rates more than 200% above the EU-25 average. On the other end, Luxembourg has the top position with only 29.2% of the EU average followed by the Netherlands with 31.5%. In wealth, Romania has the lowest figures with only 23.0% GDP per capita compared to the EU average, followed by Bulgaria with 26.3%. Within the European Union, GDP per capita ranged from 23.0% of the EU average in Romania to 181.0% in Luxembourg. Denmark is the second most prosperous country, with a GDP that is 114.6% of the EU average. In all of the new member states, GDP per capita is less than 90% of the EU-25 average; in Bulgaria, Estonia, Latvia, Lithuania, Poland, and Romania it is less than half of this level.

[64] The Nomenclature of Territorial Units for Statistics (NUTS) is a standard for referencing the administrative division of countries for statistical purposes. The standard was developed by the European Union and thus covers only the member states of the European Union in detail.

Table 9: Dispersion of unemployment and GDP per capita in EU member state regions (NUTS-3), 2003

	Unemployment rate			GDP per capita (PPP)		
Country	Average	Spread	Derivation	Average	Spread	Derivation
EU-27	8.9	306.7	100.0	22,144	191.4	100.0
Austria	4.0	130.0	44.9	23,926	72.0	108.0
Belgium	7.5	142.7	84.3	23,129	12.0	104.4
Bulgaria	18.2	74.7	204.5	23,130	47.7	26.3
Czech Republic	7.3	134.2	82.0	12,473	128.7	56.3
Cyprus	3.3	–	37.1	17,077	–	77.1
Denmark	4.6	–	51.7	25,379	–	114.6
Estonia	10.3	–	115.7	14,462	50.4	65.3
Finland	9.1	114.3	102.2	8,404	0.0	38.0
France	9.2	248.9	103.4	21,839	64.8	98.6
Germany	8.7	200.0	97.8	21,370	80.3	96.5
Greece	10.0	74.0	112.4	22,737	110.9	102.7
Ireland	4.5	33.3	50.6	23,816	36.6	107.6
Italy	9.0	243.3	101.1	22,010	72.8	99.4
Latvia	12.1	–	136.0	6,251	–	28.2
Lithuania	13.7	–	153.9	7,581	–	34.2
Luxembourg	2.6	–	29.2	40,073	–	181.0
Malta	6.9	–	77.5	–	–	–
Netherlands	2.8	71.4	31.5	24,287	53.4	109.7
Poland	19.9	50.8	223.6	8,271	78.9	37.4
Portugal	5.0	100.0	56.2	15,107	59.2	68.2
Romania	8.4	46.4	94.4	5,101	95.0	23.0
Slovenia	5.7	–	70.8	14,398	–	65.0
Slovakia	22.2	89.6	249.4	10,330	125.5	46.6
Spain	11.4	123.7	128.1	17,375	70.1	78.5
Sweden	5.1	47.1	57.3	22,588	48.6	102.0
Hungary	5.8	84.5	65.2	10,441	85.5	47.2
UK	5.1	109.8	57.3	21,684	176.6	97.9

Source: European Commission; own calculations. PPP – purchasing power parities.

So far, the focus has been on national differences within the European Union. The 'spread' figure shows how nations vary in their unemployment figures between NUTS-3 regions; in other words, the unemployment spread indicates the per-cent difference between the region with the highest and the region with the lowest unemployment. The 'leader' in this spread is Italy with 249.4%, followed by Poland (223.6%) and Bulgaria (204.5%). Germany, however, is in fourth place for high variation with 200.0%. As in Italy with its North-South differences, this circumstance can be attributed to specific differences between the labour market conditions of eastern Germany and those of western Germany.

On the other end, Ireland is the best performer with a difference between the high-unemployment region and the low-unemployment region of only 33.3%, followed by Romania (46.4%) and Sweden (47.1%). Yet, while it is clear that the spread in small

countries is smaller, it is also clear that regions play an important role, particularly in Germany. In terms of GDP per capita, a counterintuitive result is obtained.

Here, the United Kingdom – which already has a high unemployment spread above 100% – is the worst-performing country in the GDP spread (indicating differences in wealth); with 176.6%, it scores worse than all new member states. However, this result is surely attributable to the extremely high income levels in London, which are induced by the global banking cluster. In this respect, variation within Germany is much lower, with only 80.3%. Thus, although Germany is faced with very significant differences in unemployment, variation in income levels is not that strong.

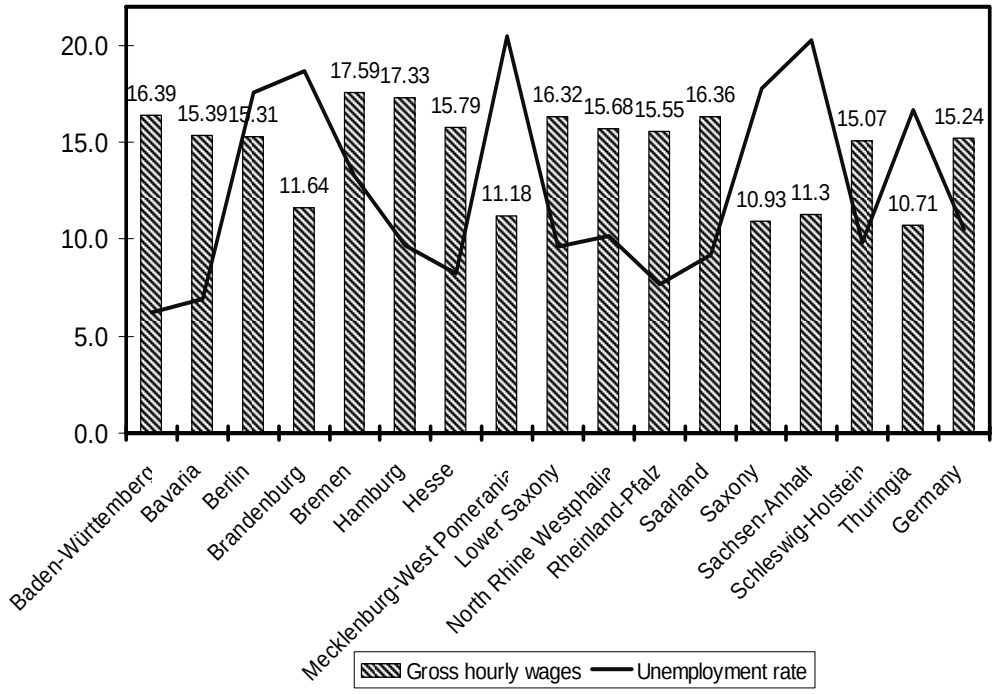
4.1.2 How does Germany compete interregionally?

In 2004, the unemployment rate in Germany remained high at 8.7%. More than half of the unemployed had been looking for a job for longer than one year; by comparison, the time frame was less than half a year on average in the OECD area. However, the picture is not uniform on a regional level and conceals important disparities in labour market performance. Whereas the region of Upper Bavaria has an unemployment rate of around 5%, the region of Dessau suffers from mass joblessness, with an unemployment rate exceeding 22%. The OECD maintains that regional disparities in employment outcomes are driven mainly by the capacity of regional labour markets to generate new jobs. This, in turn, can be explained to some extent by the sectoral specialization of regional economies. Additionally, a relatively small proportion of the working population moves to other regions, and these migration flows are in large part mutually offsetting. Thus, the effective redistribution of workers from depressed regions towards booming regions is quite limited, and geographical mobility contributes little to reducing regional labour market imbalances (OECD 2005).

Figure 4 depicts unemployment and hourly wage data on the federal state level. The large differences between eastern and western Germany are apparent. The eastern German states Brandenburg, Mecklenburg-West Pomerania, Saxony, Saxony-Anhalt, and Thuringia are all characterized by high unemployment rates indicated by the red line which is above the overall German average. However, the East-West gap is only one part of the story. A clear pattern is evident in the way that federal states with relatively low unemployment rates, such as Bavaria and Baden-Württemberg, are characterized by a higher average wage level. On the other hand, Mecklenburg-West Pomerania and Brandenburg, with unemployment rates above 18%, have much lower wages. This view of German regions is quite broad, but one can already identify diverging regional patterns, even though neither a

more disaggregated economic structure on the demand side nor the qualification structure on the supply side is taken into consideration. In addition, the federal state level is highly aggregated: urban and rural areas belong to one region, and potential differences within states are harmonized.

Figure 4: Unemployment and wages in Germany's federal states (average 2004)



Source: Federal Statistical Office.

However, on the other hand regions with the same or comparable unemployment rates are larger than the district level. As an extreme, Mecklenburg-West Pomerania has very high overall unemployment in this state due to differences on a very high level. Regional differences are not obvious. The picture in southern Germany is the other way round with its low-unemployment regions. In the western part of the country, such as North-Rhine Westphalia with its mid-level unemployment, regional difference is most obvious.

For the following analyses, one administrative classification – namely, the federal state level – and two concepts of functional regions are applied. The first kind of functional region is 171 agency regions,[65] and the second is 97 economic regions. Table 10 depicts the summary statistics of the unemployment figures on the basis of these two functional regions. It shows the number of regions, the minimum, the maximum, and the standard deviation in regional unemployment within the federal state level. The first column shows

[65] As mentioned earlier, the five agencies of Berlin are aggregated into one agency region.

the unemployment rate in the federal state and is followed by the summary statistics on 171 agency regions and 97 economic regions. In both cases, ample variation can be observed within the 16 federal states. The highest variation is in Mecklenburg-West Pomerania, which has a minimum of 13.3% and a maximum of 29.9%. In general, eastern Germany, with its higher overall unemployment, shows higher variation, but the well-performing federal states also show respectable variation. Bavaria, in particular, with its high-tech region around Munich, is characterized by high variance.

The most obvious finding from a comparison of agency regions and economic regions is that, although economic regions have a higher level of aggregation, the standard deviation between the regions is higher than that for agency regions in six cases. In four cases it is approximately the same, and only in two remaining cases is the standard deviation in economic regions lower. One possible hypothesis to explain this outcome is that economic regions are a 'better' aggregation level, as they show variance in a more salient way.[66] On the other hand, this result indicates that regions with very high and very low unemployment and regions with very low unemployment are identified. In many cases, the high-unemployment regions are characterized by low industrialization; it is reasonable to expect – although unemployment is high – that a significant portion of the labour force commutes. Agency regions, on the other hand, take into account even this commuting; thus, it may be that the latter provides a better fit and therefore more precise results. The question requires more detailed analysis. For now, one can conclude that, first, there is high variation within federal states, indicating that a more disaggregated view is justifiable, and, second, variation differs significantly between different aggregation levels. Therefore, one can expect that differences in the regional wage-unemployment pattern can be identified.

A study by Blien, Hirschauer et al. (2004) discusses the problem of defining the 'best' region. They suggest a regional weight matrix based on commuting flows to test for regional correlation errors, and thus use regional definitions according to the so-called *Regionaltypen* (regional types), which have been developed for the analysis of (active) labour market policies according to unemployment classes. This system was implemented in 2003 and is under continuous revision. The regional types encompass two different systematics – one with five and one with twelve classes – which characterize the performance of labour market districts.[67] The twelve-category systematic is an alternative to the relative

[66] The question of the appropriate aggregation level is discussed in section 5.4 in more detail.

[67] These regional types are the alternative to a ranking system of the Swiss type, which is introduced and applied with German data in chapter 7. One systematics has five, the other twelve categories. The five-category systematics is used to develop labour market policy strategies, and the twelve-category systematics is used to compare the performance of the districts. The categories are based on causality analyses of exogenous determinants of the success of labour market policies. For more details, see Blien and Hirschenauer (2005).

performance measurement introduced in chapter 7, with the main difference that the IAB approach uses categories, and the model introduced here is based on continuous indicators.

Table 10: Regional unemployment rates: Federal states, economic regions, and agency regions, 2004

	Federal state	Agency (171)				Economic region (97)			
	UE rate	Obs.	Min	Max	Std	Obs.	Min	Max	Std
Schleswig-Holstein	11.1	7	8.9	13.1	1.6	5	7.6	14.7	2.5
Hamburg	11.0	1	11.0	11.0	–	1	11.2	11.2	0
Lower Saxony	10.6	21	7.6	15.1	2.1	13	5.9	16.1	2.2
Bremen	14.4	1	14.4	14.4	–	1	14.4	14.4	.
North Rhine-Westphalia	11.2	33	7.8	17.6	2.4	13	7.1	18.2	2.4
Hesse	9.1	13	8.0	11.7	1.1	5	5.6	16.3	2.2
Rhineland-Palatinate	8.6	13	7.2	12.4	1.4	5	5.6	17.5	2.3
Saarland	10.0	2	8.4	11.6	2.3	1	7.2	12.7	2.1
Baden-Württemberg	7.9	27	4.7	12.5	1.9	12	5.2	11.9	1.5
Bavaria	6.9	23	5.4	9.9	1.0	17	3.9	15.5	2.4
Berlin	14.4	1	19.8	19.8	–	1	19.8	19.8	0
Mecklenburg-West Pomerania	20.4	4	16.7	27.2	4.5	4	13.5	29.5	4.5
Brandenburg	22.1	5	15.5	23.6	3.3	5	13.3	25.9	3.7
Saxony-Anhalt	19.4	10	15.4	23.2	2.2	4	14.4	26.3	3.3
Thuringia	21.7	8	19.5	26.7	2.4	4	14.5	17.5	1.2
Saxony	18.1	7	15.5	23.3	2.9	5	15.2	26.5	2.8

Sources: Federal Office for Building and Regional Planning and Federal Employment Agency.

To sum up the results: there is significant variation in wages and unemployment between German regions, even on the level of federal states. Second, it is difficult to explain the variation with that kind of aggregate data, and it is not possible to say anything about causality. In the following chapters, these two regional definitions are particularly important. Two criteria are possible for the decision about the level of aggregation. First, data on labour market policies are available only for agency regions, as this is the relevant aggregation level used by the Federal Employment Agency. Chapter 7, which covers the performance measurement of regional public employment services, therefore utilizes this level. The same is the case for chapter 8, –which addresses labour-market-policy-corrected wage curves and performance curves. In chapters 5 and 6, both definitions are applicable. Chapter 5 includes a more detailed analysis using both aggregation levels. From there a decision about the most suitable level of aggregation can be made.

4.2 Qualifications, income, and regions

4.2.1 School degree

The significant differences in the distribution of school degrees between eastern and western Germany are depicted in table 11, which shows the relative distribution differentiated by schooling classification and by gender. We can see that for both men and women the share of persons in dependent employment who have no form of school degree is much higher in western Germany, at 3.2% (3.1%), than in eastern Germany, with its more or less negligible share of 0.5%. Basic schooling is also less than half of that in western Germany, with 49.9% versus 18.9% for dependently employed men and 39.7% versus 11.6% for women in dependent employment. In the category 'secondary school education' the picture is, although not that high varied with differences of around 50%, the other way round. When the figures are summed up into two main categories – the first with up to ten years' schooling and the second with more than ten years' schooling and the entrance qualification needed for university attendance – the differences between eastern and western Germany are not considerable. The share of persons in dependent employment with a 'university entrance qualification' is 23.9% in western Germany and 23.2% in eastern Germany. For women in dependent employment, the shares are slightly lower (22.2% versus 22.0%).

These results suggest that, in its basic structure, differences in schooling are not very great between the dependent employed in eastern Germany and those in western Germany. The results also point to significant differences in institutional structure. In fact, these differences are apparent when one looks at the situation before unification in 1990. The schooling system in the former GDR was quite different from that in the Federal Republic of Germany. Whereas in the Federal Republic the first degree of basic schooling has a long tradition as a precondition for an apprenticeship in, for example, technical and handicraft professions, the school system of the former GDR differentiated its degrees in a different way.

The most important schooling institution in the GDR was the 'polytechnic school' (*polytechnische Oberschule*). The standard graduate degree at the polytechnic school is comparable to the secondary school degree (*Realschule*) in western Germany. However, one important difference is that there was no standardized lower school degree. One left school one or even two years earlier only upon special request of the parents. In connection with

special certificates, school-leavers were allowed to start an apprenticeship in specific professions in industry, handicraft, or agriculture.[68]

Table 11: Distribution of school degrees of dependent employed (2004)

	West		East	
School degree	M	F	M	F
No degree	3.2	3.1	0.5	0.5
Basic school	39.8	39.7	18.9	11.6
Secondary school	33.1	35.0	57.5	66.0
Polytechnic[69]	7.1	4.9	1.4	2.5
High school (*Abitur*)	16.8	17.3	21.8	19.5
Total	100.0	100.0	100.0	100.0

Source: GSOEP.

This less formal route to lower-level certification helps explain the significant difference between western and eastern Germany in the numbers of school-leavers in basic school and secondary school. Another reason may stem from differences in the regional unemployment figures. This issue is discussed in chapter 8, which addresses the effect of labour market policies on unemployment. Unemployment, especially long-term unemployment, is more serious in the low-skilled sectors. If unemployment is high in a region, one can expect that the share of low-skilled labour is higher here than in regions with a relatively low unemployment rate.

Table 12 shows the distribution of school degrees by federal states and compares them with two macro figures, the gross hourly wage and the unemployment rate. At first glance, there is a clear pattern of higher wages, lower unemployment rates, and the schooling of persons in dependent employment. However, when one looks at the data in more detail, some counterintuitive facts emerge. For example, the city-states Hamburg, Bremen, and Berlin constitute one exception. The city-state Bremen is the absolute leader in gross hourly wage with 17.59 euros, and it ranks number three in the share of high school degrees, yet it has a remarkable unemployment rate of 13.3%.

[68] For a more detailed description of the schooling systems in eastern and western Germany, see Führ (1998).
[69] The term 'polytechnic' describes an advanced technical college entrance qualification. It is a high school degree allowing the individual to study at a 'polytecnic college' or a 'college of higher education' (*Fachhochschule*).

Table 12: School degrees by federal states (row percentage) and comparative macro figures, 2004

Federal state	No school degree	Basic school	Secondary school	High school	Gross hourly wage (€)	UE rate (%)
Schleswig-Holstein	1.6	40.9	37.8	19.8	15.07	9.8
Hamburg	1.2	31.0	29.9	38.0	17.33	9.7
Lower Saxony	2.5	42.1	33.9	21.4	16.32	9.6
Bremen	2.7	39.2	30.7	27.4	17.59	13.3
North Rhine-Westphalia	3.4	42.8	26.8	27.0	15.68	10.2
Hesse	3.1	41.7	30.7	24.5	15.79	8.2
Rhineland-Palatinate	2.6	55.2	26.2	15.9	15.55	7.7
Saarland	2.3	51.0	27.8	18.9	16.36	9.2
Baden-Württemberg	4.6	51.0	24.6	19.8	16.39	6.2
Bavaria	2.4	49.7	28.3	19.6	15.39	6.9
Berlin	1.6	21.4	45.5	31.6	15.31	17.6
Mecklenburg-West Pomerania	0.2	13.1	67.5	19.2	11.18	20.5
Brandenburg	0.1	13.2	64.4	22.3	11.64	18.7
Saxony-Anhalt	0.5	15.8	60.8	22.9	11.3	20.3
Thuringia	0.3	17.0	64.6	18.1	10.71	16.7
Saxony	0.3	12.0	65.5	22.2	10.93	17.8
Total	2.4	37.6	37.4	22.6	15.24	10.5

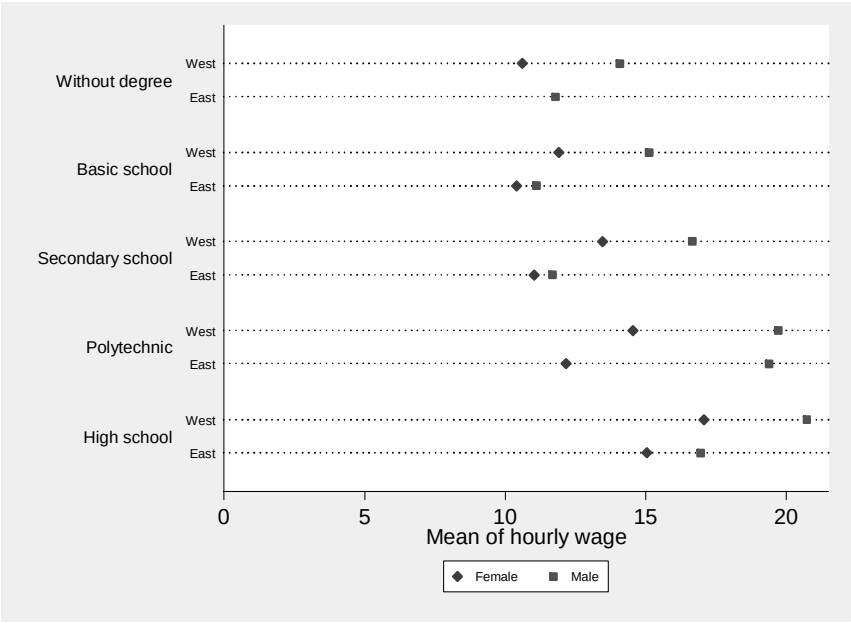
Sources: GSOEP, Federal Statistical Office.

Hamburg takes the absolute lead in share of high school degrees (38.0%), followed by Berlin (31.6%). The exceptional position of the city-states in this regard can be explained by taking into consideration the lack of rural areas, as these areas belong to the surrounding federal states Schleswig-Holstein (Hamburg), North Rhine-Westphalia (Bremen), and Brandenburg (Berlin). However, the picture is a bit more complex. For example, there is a significant difference in the gross hourly wage of Hamburg and Bremen, on the one hand, and Berlin, on the other. With a gross hourly wage of 15.31 euros, Berlin is more in line with the poorly performing eastern German states. And here, too, one does not find a clear pattern of higher wage with higher-level school degree with low unemployment. First, there is the general difference between eastern and western Germany with respect to the low- and mid-level degrees 'basic school' and 'secondary school', which cannot be directly linked to the wage and unemployment figures. Second, in Baden-Württemberg and Bavaria, the strong economic performers to the south, the share of basic school degrees is above the western German average. Baden-Württemberg even has the highest share of dependently employed persons with no school degree (4.6%). Saarland also shows high numbers in 'basic school' (51.0%) and 'no school degree' (2.3% linked with a mid-level unemployment rate of 9.2%).

Figure 5 gives an impression of the income conditions for different schooling categories. Because hourly wages are used as a measure of income, both full-time and part-time workers are taken into consideration. Moreover, the figure displays differences with

respect to three dimensions: the x-axis represents the real hourly wage, the y-axis the different schooling levels. The diamonds show the real hourly wage for women in dependent employment, the squares that for male dependent employees. For regional differentiation between eastern and western Germany, each dot line represents a region per schooling category. In general, greater wage differences in nearly all schooling categories can be observed for eastern Germany in comparison with western Germany. The only exception is the polytechnic, where the difference in income between men and women is even higher in eastern Germany. However, as discussed above, the category of polytechnic must be used with caution. A second obvious pattern is the well-known difference in income between eastern and western Germany. In the categories with a lower-level school degree, male dependent employees earn less than their female counterparts in western Germany. This pattern does not hold, however, for higher-level education.

Figure 5: Mean hourly wage by school degree (2004)



Source: GSOEP; own calculations.

For the wage curve analyses in chapter 5, I aggregate the school degrees into three main categories: the first includes those with 'no school degree' or a 'basic degree', the second includes those with a 'secondary degree', and the third those with a 'polytechnic degree' or a 'high school degree'.[70]

[70] The term 'polytechnic' is not clearly defined and therefore somewhat ambiguous. It is important to differentiate between the formal degree, on the one hand, and the polytechnic school as the main schooling institution in the former GDR, on the other hand. Whereas the polytechnic school (*polytechnische Oberschule*) is the name of a specific institution in the former GDR system, the 'polytechnic degree' is not directly connected to the polytechnic school. The term describes a graduate level that allows one to study at advanced

4.2.2 Vocational position

Table 13 lists the regional distribution of vocational positions across the 16 federal states. In the sixth and seventh columns additional macro measures on gross hourly wage and regional unemployment are shown for comparative reasons. For all territorial states in eastern Germany, the share of unskilled dependent employees lies above the total average of 25.6%. However, the two southern states Baden-Württemberg (27.6%) and Bavaria (23.9%), with their comparatively low unemployment rates, do not have a significantly lower share of unskilled employees, and the figure for Baden-Württemberg is even above the German average.

Table 13: Vocational position by federal state (row percentage) and comparative macro figures

Federal state	Unskilled	Skilled blue collar	White collar	Specialists	Gross hourly wage (€)	UE rate (%)
Schleswig-Holstein	20.3	52.72	9.7	17.31	15.07	9.8
Hamburg	12.4	56.03	6.26	25.35	17.33	9.7
Lower Saxony	24.1	48.03	10.03	17.89	16.32	9.6
Bremen	26.6	42.76	12.12	18.52	17.59	13.3
North Rhine-Westphalia	21.9	48.64	8.95	20.54	15.68	10.2
Hesse	19.4	51.51	9.66	19.46	15.79	8.2
Rhineland-Palatinate	31.8	43.02	8.77	16.4	15.55	7.7
Saarland	21.3	49.35	9.43	19.96	16.36	9.2
Baden-Württemberg	27.6	44.99	6.89	20.5	16.39	6.2
Bavaria	23.9	47.72	8.38	20.03	15.39	6.9
Berlin	19.6	47.44	8.66	24.32	15.31	17.6
Mecklenburg-West Pomerania	28.3	47.01	7.9	16.76	11.18	20.5
Brandenburg	27.4	48.06	5.28	19.24	11.64	18.7
Saxony-Anhalt	32.3	43.64	3.52	20.57	11.3	20.3
Thuringia	35.7	42.55	3.75	18.03	10.71	16.7
Saxony	35.0	41.35	3.34	20.34	10.93	17.8
Total	25.6	46.94	7.61	19.81	15.24	10.5

Sources: GSOEP, Federal Statistical Office.

For the category of white-collar workers, Saxony-Anhalt, Thuringia, and Saxony have dramatically low shares, whereas the other two eastern German states have slightly higher values. As I show in later analyses of economic branches, this somewhat better result for the two eastern German states is mainly due to the tourism industry. For the highest vocational category, that of specialists, city-states do not have a significantly larger share, as

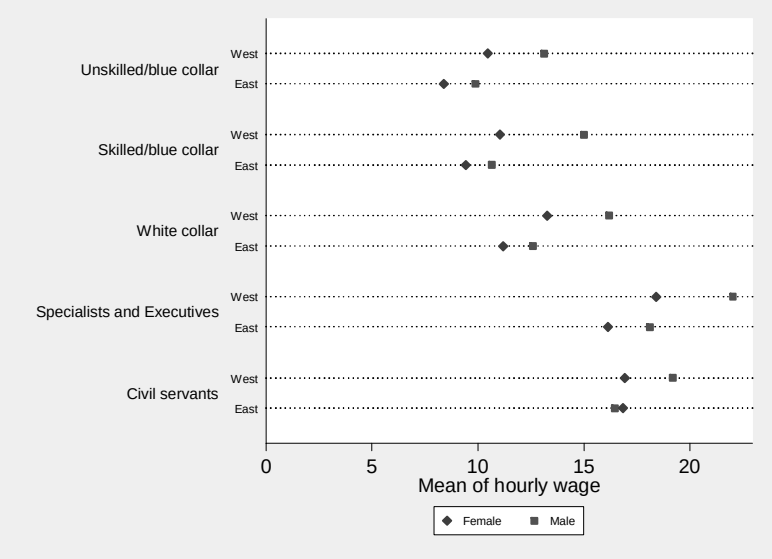
technical schools or, for some specific fields, at universities. Although the differences are not straightforward – there are some differences between the federal states, for example – this aggregation makes sense because one main difference from the secondary school degree according to this definition is that the polytechnic degree allows one (in a somewhat reduced form) to pursue further academic studies.

was the case for the schooling variable. Moreover, the overall pattern in comparison with the wage figure, as well as with unemployment, is not as obvious as in the schooling case.

Figure 6 depicts the mean hourly wage differentiated by vocational position, gender, and location in eastern or western Germany.[71] One interesting insight is that while there is a difference in income between male and female civil servants in western Germany, there is no such difference in eastern Germany. One possible explanation is that the public sector's collective agreements do not differentiate between men and women. Therefore, individuals with the same qualifications are equally remunerated, regardless of whether they are working part time or full time. The private sector, on the other hand, is still characterized by wage discrimination between men and women, particularly in the domain of part-time work, which is still dominated by women. Another possible explanation is that the qualifications and jobs held by women in the public sector in eastern Germany are not much different from those held by men in dependent employment.

When one looks at qualification-specific vocational positions, excluding consideration of the undifferentiated qualification-specific civil servants, one finds a pattern similar to that found for school degrees: there is a significant income gap between eastern and western Germany, and the income gap between men and women is higher in the West than in the East, regardless of vocational position.

Figure 6: Vocational position, 2004



Source: GSOEP; own calculations.

[71] Unlike in the following analyses, in this figure I also have included civil servants. Comparison with other categories is difficult, as there is no differentiation of qualifications; this category thus includes all qualification levels.

Table 14 documents the interaction of the supply-side factors schooling and vocational position. The row percentages are differentiated by gender and by location (eastern or western Germany). As one might expect, a clear pattern emerges: a higher-level school degree results in a higher vocational position. For the category of specialists and executives, the high school degree plays a more important role for women in dependent employment than for men: in western Germany, the share of men with this degree is 41%, while for women it is 11 percentage points higher. In comparison with western Germany, in eastern Germany a high school degree is more important for both men (60.6%) and women (49.8%) in dependent employment.

Table 14: School degree and vocational positions of dependently employed, row percentages

	No school degree		Basic school		Secondary school		Polytechnic		High school	
	M	F	M	F	M	F	M	F	M	F
West										
Unskilled/blue collar	2.5	1.3	72.2	65.6	22.1	28.1	1.6	2.0	1.7	3.1
Skilled/blue collar	1.3	1.3	37.4	36	36.4	45.2	8.7	5.6	16.2	11.9
White collar	0.5	0.6	19.0	4.5	34.5	20.4	9.1	6.5	37.0	68.1
Specialists and executives	0.6	0.7	18.7	14.3	21.7	24.5	18.1	8.6	41.0	52.0
East										
Unskilled/blue collar	0.4	1.4	22.9	16.0	71.5	78.1	0.4	0.1	4.9	4.3
Skilled/blue collar	0.1	0.3	15.4	9.8	58.4	72.0	2.6	2.7	23.6	15.2
White collar	0.0	0.0	4.8	4.6	52.4	37.8	0.5	7.3	42.2	50.4
Specialists and executives	0.1	0.0	6.2	2.9	29.7	43.9	3.5	3.5	60.6	49.8

Source: GSOEP; own calculations.

As shown in previous analyses, there are substantial differences between eastern and western Germany, particularly with respect to low- and mid-level school degrees (basic school and secondary school). Secondary school plays a much greater role in eastern Germany, particularly for mid-level vocational positions. For low-skilled work, this difference is even more pronounced. In western Germany, 72.2% of male unskilled blue-collar workers have finished basic school only; in eastern Germany, this figure is only 22.9%. For women, this pattern and scale are much the same: 65.5% in western Germany and 16.0% in eastern Germany. Even if it is substantially lower, the pattern also holds for the other vocational positions. One possible explanation for this difference is higher unemployment rates in eastern Germany. Because unemployment is in large part a problem of low qualifications, one can expect a crowding-out effect: in these regions, those without

a school degree and even those with a basic school degree are not competitive in the labour market.[72]

4.2.3 Occupation

Table 15 shows the relative distribution of dependently employed persons with their ISCO classification. The figures indicate the share of each professional group within a federal state. The armed forces and civil servants are excluded, as their classification in the ISCO code is somewhat unclear. With the exception of Mecklenburg West-Pommeria, Schleswig-Holstein and Bremen, one finds a relatively even distribution of managers across the federal states. Moreover, the distribution is relatively independent of the regional unemployment rate. This is in a way astonishing: one might expect the city-states, especially Berlin, to once again have significantly higher shares, as this category includes occupations whose main tasks consist of determining and formulating government policies. These professions are expected to be greater in number in city-states, particularly in the capital Berlin. One explanation for the relatively even distribution might be that within the German federal structure, where every federal state has its own cabinet and administration – not to mention districts and communes on the more disaggregated levels – every federal state has its provincial capital and, further down, a disaggregated structure of administration. It is thus reasonable to expect a kind of averaging effect.

The second and third categories (professionals and technicians) are those with the highest ISCED ranking, indicating that the highest qualification levels are represented within these two classes. Two city-states, Berlin and Hamburg, take the lead in overall share of professionals and technicians: Berlin has 18.9% and 28.4%, respectively, and Hamburg has 18.4% and 30.1%. Bremen is also in the upper third with 16.5% and 19.7%, respectively. Excluding the city-states with their particular structure (e.g. a negligible agricultural sector, fewer large industrial production plants), one finds that the states with the highest gross hourly wage – Baden-Württemberg with 16.39 euros, Saarland with 16.36 euros, and Lower Saxony with 16.32 euros – are not those with strong showing for the higher-qualified employees in the higher-qualified professions. Baden-Württemberg, for example, is the 'leader' in elementary occupations, with 8.4%, followed by Lower Saxony (7.1%) and Bavaria (7.1%).

[72] However, it is also important to keep in mind the differences between the two regions' schooling systems before reunification in 1990.

Table 15: Professional groups by federal states

	Professional group					Gross hourly wage (€)	UE rate (%)
	(1)	(2)	(3)	(4)	(5)		
Schleswig-Holstein	2.5	13.5	28.4	13.9	12.0	15.07	9.8
Hamburg	6.1	18.4	30.1	16.1	8.8	17.33	9.7
Lower Saxony	4.3	12.5	25.2	12.4	8.9	16.32	9.6
Bremen	1.8	16.5	19.7	13.5	12.4	17.59	13.3
North Rhine-Westphalia	4.0	15.4	24.3	14.1	8.9	15.68	10.2
Hesse	4.6	14.8	24.5	15.9	8.5	15.79	8.2
Rhineland-Palatinate	3.5	12.4	21.6	12.0	9.8	15.55	7.7
Saarland	4.4	13.6	22.7	10.7	11.6	16.36	9.2
Baden-Württemberg	3.9	11.7	19.9	13.0	7.8	16.39	6.2
Bavaria	4.4	13.4	23.3	14.4	9.2	15.39	6.9
Berlin	4.2	18.9	28.4	13.8	8.7	15.31	17.6
Mecklenburg-West Pomerania	2.1	17.5	25.3	13.3	10.4	11.18	20.5
Brandenburg	3.5	17.2	26.0	12.5	8.3	11.64	18.7
Saxony-Anhalt	4.2	14.3	25.2	11.6	9.3	11.3	20.3
Thuringia	4.2	13.9	21.2	9.1	9.4	10.71	16.7
Saxony	3.8	15.7	21.7	11.1	11.6	10.93	17.8
Germany (total)	4.0	14.4	23.7	13.2	9.2	15.24	10.5
	(6)	(7)	(8)	(9)		(€)	%
Schleswig-Holstein	0.8	14.4	9.5	5.0		15.07	9.8
Hamburg	0.6	10.7	5.1	4.2		17.33	9.7
Lower Saxony	0.7	18.0	10.6	7.5		16.32	9.6
Bremen	0.0	16.8	12.9	6.5		17.59	13.3
North Rhine-Westphalia	0.4	17.7	9.8	5.4		15.68	10.2
Hesse	0.2	14.1	10.6	6.8		15.79	8.2
Rhineland-Palatinate	1.6	19.6	12.3	7.2		15.55	7.7
Saarland	0.6	21.2	7.4	7.8		16.36	9.2
Baden-Württemberg	0.6	24.0	10.7	8.4		16.39	6.2
Bavaria	0.6	18.4	9.3	7.1		15.39	6.9
Berlin	0.6	13.6	5.8	6.1		15.31	17.6
Mecklenburg-West Pomerania	0.5	17.7	8.6	4.6		11.18	20.5
Brandenburg	1.3	17.8	8.6	4.8		11.64	18.7
Saxony-Anhalt	1.5	18.4	9.9	5.7		11.3	20.3
Thuringia	1.7	23.5	11.0	6.1		10.71	16.7
Saxony	0.8	23.0	7.3	5.0		10.93	17.8
Germany (total)	0.7	18.9	9.7	6.4		15.24	10.5

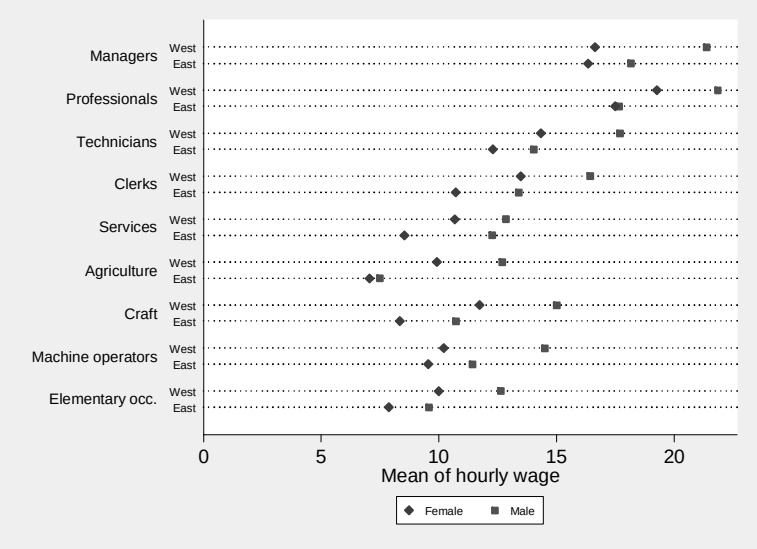
Sources: GSOEP, Federal Statistical Office; own calculations. ISCO classification: (1) Legislators, senior officials, and managers; (2) Professionals; (3) Technicians and associate professionals; (4) Clerks; (5) Service workers and shop and market sales workers; (6) Skilled agricultural and fishery workers; (7) Craft and related trades workers; (8) Plant and machine operators and assemblers; (9) Elementary occupations.

The states in eastern Germany with the relatively lowest unemployment rates, Thuringia (16.7%) and Saxony (17.8%), lead in shares of 'craft and related trades workers'. These professions involve an understanding of materials and all stages of the production process,

and have been relatively more in demand in the production industry newly developed in the areas around Leipzig and Jena in the last 16 years since reunification. On the other hand, as the small numbers show, the agricultural sector obviously does not play a significant role and thus is not mentioned in further analyses.

Figure 7 is based on individual data from the GSOEP.[73] It shows the mean hourly wage of persons in dependent employment in 2004. The figure reveals that, although the category (1) 'legislators, senior officials, and managers' has no specific qualification level according to the ISCED classifications, this professional group enjoys quite high income levels. For the western German male, it is nearly as high as for professionals. This result indicates that, for the most part, highly qualified individuals with high incomes are included in this category. The high income also follows in part from the exclusion of civil services from the sample.

Figure 7: Hourly wages by occupational classification (2004)



Source: German Socio-economic Panel 1997–2004; own calculations. ISCO classification: (1) Legislators, senior officials, and managers; (2) Professionals; (3) Technicians and associate professionals; (4) Clerks; (5) Service workers and shop and market sales workers; (6) Skilled agricultural and fishery workers; (7) Craft and related trades workers; (8) Plant and machine operators and assemblers; (9) Elementary occupations.

Apart from a few large gaps, a clear pattern for all categories from high to low income can be identified, including for the formally identical ISCED categories of clerks, agricultural workers, craft workers, and machine operators. For the category of professionals in eastern Germany, there appears to be no significant difference in income between male and female employees. This pattern can also be observed for the agricultural sector, which is not very

[73] Although I have weighted the descriptive analyses, minor variations from the data from the Federal Statistical Office are possible.

reliable because the number of cases is relatively small. For all other occupations, a significant difference between men and women in paid employment can be observed.

4.2.4 Firm size

Table 16 shows the shares of firm size in respective federal states as well as the macro figures on unemployment and the average hourly wage. In the federal states in eastern Germany, the share of dependent employees in the two lower categories of fewer than 5 and fewer than 20 employees is continuously above the German average of 5.2% and 14.7%, respectively, and the correlated average wage in these states is quite low, as might be expected. These states are also confronted with the highest unemployment rates. At the other end of the spectrum, Hamburg has the second-highest average income figure and the highest share of dependent employees in large firms with over two thousand employees (34.2%). Yet the picture is not always that clear on this end of the spectrum. Hesse, for example, has a relatively low average hourly wage at 15.79 euros, while its share of firms with over two thousand employees is second highest with 30.9%. Baden-Württemberg, a state with large traditional firms in the automotive sector such as DaimlerChrysler, which traditionally offer higher incomes, and with a well-developed structure of small and medium-sized enterprises in the technology sector, also shows that size need not automatically translate into higher income structures.

For the category of firms with more than two thousand employees, the eastern German states with very high unemployment have very low shares. One exception is Berlin, which has a high unemployment rate of 17.6% and, at 35.7%, a high share of employees in large firms. One explanation could be related to Berlin's role as Germany's capital. Many offices of large firms such as Debis, which is part of DaimlerChrysler, are located here, as are offices of multinational companies. But because these companies do not carry out a large share of their production in the city itself, there is no properly developed structure in ancillary industries, which normally are characterized by small and medium-sized enterprises with fewer employees. Consequently, the relatively high average wage falls in line with what one might expect from such an economic structure.

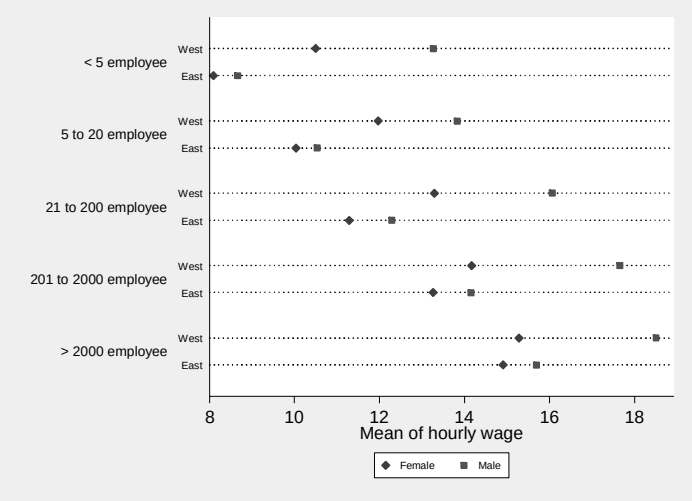
Table 16: Share of firm size by federal state (row percentages)

	Firm classes by size					Gross hourly wage (€)	UE rate (%)
	(1)	(2)	(3)	(4)	(5)		
Schleswig-Holstein	6.0	15.0	31.6	26.9	20.5	15.07	9.8
Hamburg	4.6	13.3	25.5	22.5	34.2	17.33	9.7
Lower Saxony	4.2	13.6	31.8	24.9	25.5	16.32	9.6
Bremen	2.9	16.8	29.3	21.7	29.3	17.59	13.3
North Rhine-Westphalia	4.8	12.6	29.7	27.7	25.2	15.68	10.2
Hesse	4.1	12.3	27.4	25.3	30.9	15.79	8.2
Rhineland-Palatinate	5.0	18.6	30.7	22.9	22.7	15.55	7.7
Saarland	4.3	14.1	20.9	29.6	31.1	16.36	9.2
Baden-Württemberg	4.7	13.6	29.0	28.0	24.7	16.39	6.2
Bavaria	4.4	13.5	26.9	27.6	27.6	15.39	6.9
Berlin	4.4	12.3	25.4	22.3	35.7	15.31	17.6
Mecklenburg-West Pomerania	4.7	20.8	39.4	20.8	14.3	11.18	20.5
Brandenburg	6.9	16.3	30.9	24.1	22.0	11.64	18.7
Saxony-Anhalt	5.7	19.7	38.6	23.0	13.1	11.3	20.3
Thuringia	6.7	15.7	43.1	21.2	13.3	10.71	16.7
Saxony	9.0	20.2	35.8	18.6	16.5	10.93	17.8
Total	5.2	14.7	30.7	25.3	24.1	15.24	10.5

Source: GSOEP; own calculations. (1) Fewer than 5 employees; (2) 5 to 20 employees; (3) 21 to 200 employees; (4) 201 to 2,000 employees; (5) More than 2,000 employees.

In figure 8, average hourly wages are plotted by firm size in a dot chart. This graph shows a clear pattern of income in all plotted categories. For eastern and western Germany, a significant linear income growth by firm size is observed. This holds for men and women respectively. The lowest hourly wages are paid to female employees in small eastern German companies with fewer than five employees. On the basis of these figures, one finds both an obvious correlation between the regional impact of firm sizes, income, and wages and a clear downward trend in income for companies with fewer employees. I therefore expect differences in the elasticity of income on the basis of regional unemployment figures. Chapter 6 focuses on this question.

Figure 8: Firm size, 2004



Source: GSOEP; own calculations.

4.2.5 The role of economic branches

Table 17 shows the distribution of the five reduced NACE groups by federal state (distribution within a state) for 2004. For the first category (C, D), the table shows that, with the exception of Hamburg, a high share in the branches of mining, quarrying, and manufacturing is connected with high gross hourly wages; the federal states of Bremen, Baden-Württemberg, and Saarland have a gross hourly wage of 17.59, 16.39, and 16.36 euros, respectively, ranking number two to four among the federal states. Hamburg has its highest share in the third category (G–I), which includes trade and transport. These branches are strongly connected with the harbour. Bremen also has a traditional harbour, but it differs from Hamburg in two ways:

First, the Hamburg harbour is the largest in Germany and, after Rotterdam, the second largest in Europe; it has shown high growth rates in the last decade. Bremen, on the other hand, plays an important role in specific fields, but is not that large as in Hamburg's harbour. Second, the harbour is not in Bremen directly, but in Bremerhaven, which belongs to the Free Hanseatic City of Bremen. As a consequence, a large share of the workforce lives outside Bremen; because the GSOEP is an individual data file, a person's residence, not his or her workplace, is relevant for regional assignment.

Table 17: Branch distribution among dependent employees by federal state, 2004 (row percentages)

	C, D	E, F	G–I	J, K	L–P	Gross hourly wage (€)	UE rate (%)
Schleswig-Holstein	25.6	5.8	38.0	10.2	20.4	15.07	9.8
Hamburg	15.6	7.8	32.5	27.3	16.9	17.33	9.7
Lower Saxony	43.4	7.8	25.5	10.3	13.0	16.32	9.6
Bremen	46.9	3.1	21.9	9.4	18.8	17.59	13.3
North Rhine-Westphalia	42.0	7.1	23.8	12.9	14.1	15.68	10.2
Hesse	37.0	5.7	24.2	17.7	15.4	15.79	8.2
Rhineland-Palatinate	48.6	8.2	20.2	9.1	13.9	15.55	7.7
Saarland	46.7	6.7	22.2	8.9	15.6	16.36	9.2
Baden-Württemberg	50.9	6.6	18.4	13.7	10.4	16.39	6.2
Bavaria	41.9	6.2	22.4	16.1	13.4	15.39	6.9
Berlin	22.6	7.7	20.0	23.2	26.5	15.31	17.6
Mecklenburg-West Pomerania	23.1	15.4	30.8	13.5	17.3	11.18	20.5
Brandenburg	21.3	14.0	31.7	11.0	22.0	11.64	18.7
Saxony-Anhalt	27.2	16.2	27.8	10.0	18.9	11.3	20.3
Thuringia	39.6	7.3	23.6	9.1	20.5	10.71	16.7
Saxony	29.9	10.9	23.6	12.6	23.0	10.93	17.8
Total	39.3	7.9	23.8	13.5	15.6	15.24	10.5

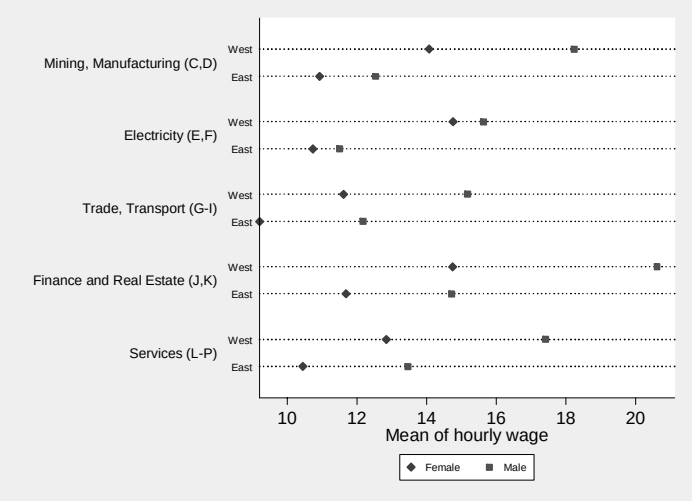
Source: GSOEP 2004. Reduced NACE classification: C Mining and quarrying; D Manufacturing; E Electricity, gas, and water supply; F Construction; G–I Wholesale and retail trade, catering, transport, and communication; J, K Financial intermediation, real estate; L–P Public and private services.

Baden-Württemberg and Bavaria (the latter, with 41.9%, also has a relatively high share in NACE categories C and D) are the states with the lowest unemployment rates. This fact is perhaps a bit astonishing at first, as one might expect that these sectors traditionally require high shares of low- and mid-skilled qualifications.[74] In line with previous analyses of subgroups, I have identified an East-West pattern in my analyses for most categories. In the second category (electricity, gas, and water supply and construction), the share in eastern Germany is clearly above the German average of 7.9%, with the exception of Thuringia (7.3%). The share of the third category, which encompasses wholesale and retail trade, catering, transport, and communication, is above the overall German average among all sectors (23.8%) in all federal states. Parts of these branches are characterized by comparatively low wages, as the rate of unionization is much lower than, for example, in the first category.

[74] It is important to remember, however, that the unemployed are not included in these statistics; hence, unemployed persons qualified in these sectors are not counted. In order to calculate more detailed aspects of qualifications in a region, one should incorporate these numbers, perhaps, for example, by introducing branch-specific unemployment rates. Unfortunately, these figures were not available at the time these analyses were carried out. There is thus a clear potential for improvement through the application of more detailed data.

In figure 9, the mean of the hourly wage is plotted against the main NACE categories and further differentiated by a regional category (eastern and western Germany), and by gender. In western Germany there is a huge wage gap of over 4 euros per hour between male and female employees in the mining and manufacturing category (C, D); the finance and real estate category (J, K) shows a gap of even 6 euros. As we have seen in previous cases, the wage gaps in eastern Germany are not as high as those in western Germany; on the other hand, all average wage levels are significantly lower in the East.

Figure 9: Hourly wages by branch category (NACE), 2004



Source: GSOEP 2004; own calculations.

In the case of mining, manufacturing, and electricity, remuneration of men in eastern Germany even is lower than that of women in western Germany. At over 20 euros, the finance and real estate sector in western Germany has by far the highest average hourly wage. The differences in gaps between men and women is not as pronounced as in the professional sub-samples, indicating that the variance of professional structure is lower in respect to the fact that professions with higher incomes are more often held by men. Although there are significant differences in the mean income between economic branches, it is difficult to draw a clear picture. The relatively rough categories do not allow for differentiation between categories. The multivariate analyses in later chapters, which control for aspects of qualifications (e.g. school degree, profession, vocational position), can perhaps shed more light on the branch-specific relation between unemployment and wages.

To sum up the results from the descriptive statistics, it is possible to observe specific patterns of distribution among regions and by gender for the different categories of qualifications under consideration: variation can be observed within the categories as well

as on the basis of regional specification. There is also a correlation observable between wage, unemployment, and region. Having identified these correlations, I turn to the question of causality. On the basis of these results, the impact of qualifications on individual wage levels is analysed in chapter 6 through the construction of labour market subgroups.

4.3 Active labour market policies and unemployment in regions

In this section, I discuss regional variations of active labour market measures, focusing mainly on the importance of ALMP measures during the period 2000–2005. [75] In line with the substantial labour market reforms of the five years since the introduction of the Hartz reforms, substantial changes in the structure, specification, and importance of active labour market measures have taken place. These changed processes are part of a broad evaluation programme initiated by the Federal Ministry of Labour and Social Affairs.[76] Of course, these developments cannot be discussed in detail here, though I do cover the main developments. Although the organization and the focal point of the measure mix have changed, the principal definitions have not changed substantially. I describe the size and structure of active measure portfolios. The two hierarchical levels (see section 3.4) are aggregated into four main groups with different targets.

4.3.1 Regional variation of ALMP measures

In this subsection table 18 depicts descriptive statistics for participants in all measures (1) and the four main groups (2)–(5) in a five-year perspective from 2000 to 2004. The measures are calculated by dividing participants with persons in extended unemployment.[77] The overall share of measures has diminished gradually from 18.5% in 2000 to 15.0% in 2005, and the standard deviation is significantly lower. The decline was significant especially between 2002 and 2003, and the level also has been lowered: in 2000, the minimum was 11.2%; in 2005, it was only 9.2%. However, the reduction in the high-share

[75] The measures and their classification were discussed in section 3.4.
[76] For detailed information about different evaluation issues, see www.wipol.de. Several projects at the WZB research unit Labour Market Policy and Employment (www.wz-berlin.de/ars/ab) specifically handle the question of the effectiveness of the reorganization of the PES service model.
[77] Unemployed persons plus participants in active measures defines the extended unemployment measure. By adding participants to the officially unemployed, this figure takes into consideration that participants of measures are part of the active employment force.

regions has been more significant, with a decline from 35.7% to 29.3%. Job creation schemes have been reduced to approximately one-third of the share in 2000, and now stand at only 1.1%, and the share of further training measures has been reduced from 8.9% in 2000 to 5.7% in 2005. The very low minimum values in job creation schemes or the fact that some regions show a value of 0.0% indicates that these regions have no participants.

Table 18: Share of measure participation in ALMP with respect to the extended unemployment rate in Germany2, 2000-2004

	Year	Mean	Std.	Min	Max
(1) Share of active measures	2000	18.5	5.3	11.2	35.7
	2001	17.9	4.7	11.2	34.6
	2002	16.6	4.6	10.3	32.6
	2003	14.6	3.3	10.2	29.8
	2004	15.0	2.9	9.2	29.3
(2) Share of job creation	2000	3.8	4.4	0.2	20.3
	2001	2.9	3.0	0.2	13.8
	2002	2.0	2.2	0.1	9.7
	2003	1.3	1.4	0.0	6.6
	2004	1.1	1.3	0.0	5.7
(3) Share of further training	2000	8.9	1.5	6.0	14.4
	2001	8.9	1.4	6.1	13.3
	2002	8.6	1.3	6.0	14.4
	2003	7.1	1.2	4.6	12.0
	2004	5.7	1.2	3.0	10.7
(4) Share of self-employment subsidy	2000	1.0	0.3	0.5	2.3
	2001	1.1	0.3	0.4	2.2
	2002	1.3	0.4	0.5	2.6
	2003	2.6	0.8	1.1	5.6
	2004	5.1	1.6	2.0	10.1
(5) Share of wage subsidy	2000	1.1	0.3	0.4	1.8
	2001	1.1	0.3	0.4	2.6
	2002	0.9	0.3	0.2	2.3
	2003	0.4	0.2	0.1	1.2
	2004	0.3	0.1	0.1	0.7
Number of regions	176				

Source: Federal Employment Agency, own calculations. The participation rate is calculated by dividing the stock of programme participants in the target-group-oriented schemes by the regional extended unemployment rate. The regional extended unemployment rate is the unemployment rate plus participants in different active measures.

As mentioned, job creation is mainly a measure applied in regions with relatively high structural unemployment, particularly in eastern Germany. Self-employment subsidies became popular during the reform process. The overall share was fivefold with 5.7%, compared to 1.0% in 2000. Especially the standard deviation with 1.6% compared to 0.8%

one year before, and the doubling in the maximum from 5.6% to 10.1%, shows that these schemes became very popular.[78]

4.3.2 The east-west pattern

Table 19 compares the variation of active measures between eastern and western Germany for 2004. For all figures, participation in labour market measures in eastern Germany is higher because unemployment is much higher. Extended unemployment in eastern Germany is more than double compared to that in western Germany, and nearly one-quarter of all unemployed persons in eastern German have been out of work for more than 24 months. Western Germany has a significantly lower share of very long-term unemployed (15.9%).

Table 19: Participation in ALMP programmes in eastern and western Germany, 2004

		Mean	Std.	Min	Max	N
Extended unemployment	West	11.0	2.7	5.8	19.6	141
	East	24.9	3.3	18.5	31.8	35
Share of LTU (> 6 months)	West	53.4	6.1	35.1	66.6	141
	East	61.7	2.8	56.2	66.6	35
Share of LTU (> 12 months)	West	33.7	6.3	17.1	49.3	141
	East	43.8	3.4	37.3	49.8	35
Share of LTU (> 24 months)	West	15.9	5.1	4.3	30.2	141
	East	24.2	3.2	17.2	31.7	35
Share of active measures	West	14.3	2.6	9.2	29.3	141
	East	17.8	2.4	13.0	24.2	35
Share of job creation	West	0.6	0.5	0.0	2.7	141
	East	3.3	1.1	1.5	5.7	35
Share of further training	West	5.9	1.2	3.5	10.7	141
	East	5.0	1.1	3.0	7.4	35
Share of self-employment subsidy	West	5.5	1.4	2.4	10.1	141
	East	3.4	0.9	2.0	5.8	35
Share of wage subsidy	West	0.2	0.1	0.1	0.7	141
	East	0.4	0.1	0.2	0.6	35

Source: Federal Employment Agency, own calculations. The participation rate is calculated by dividing the stock of programme participants in the target-group-oriented schemes by the regional extended unemployment rate. The regional extended unemployment rate is the unemployment rate plus participants in different active measures.

With respect to active measures, temporary job creation schemes are more important than those with a training aspect are. With a 17.8% share of all measures in eastern Germany,

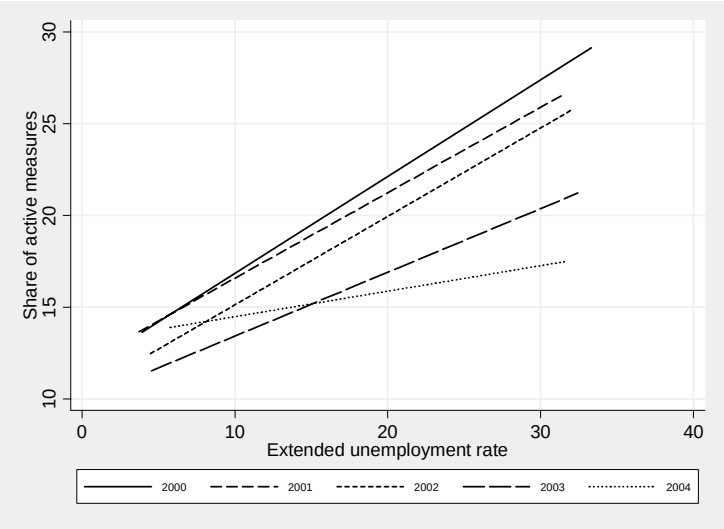
[78] It can be expected that the 2004 values, in particular, will represent a peak or indirectly be reduced be lowered beginning with the reformed subsidy scheme starting from July 2006. However, these recent developments cannot be discussed here.

the difference to western Germany (14.3%) is only 3.5%. Training measures indicate no significant difference, and, with only 0.6%, job creation schemes do not play an important role in western Germany. In the East, this share is much higher, with about 3.3%. At 5.5%, the share of subsidies for self-employment is much higher in western Germany.

4.3.3 Variation of active measures between regions

This subsection addresses the variation of measure participation between regions.[79] Figure 10 shows a clear positive relation between regional extended unemployment and the share of overall active measures. The figure also reveals an overall and continuous decline of active measures during this five-year period in which labour market reforms were gradually introduced. The most important changes to active measures, affecting the long-term unemployed in particular, were introduced in 2004. For this year, both the total amount was reduced and the slope became much flatter.

Figure 10: Relationship between ALMP and extended unemployment (2000–2004)



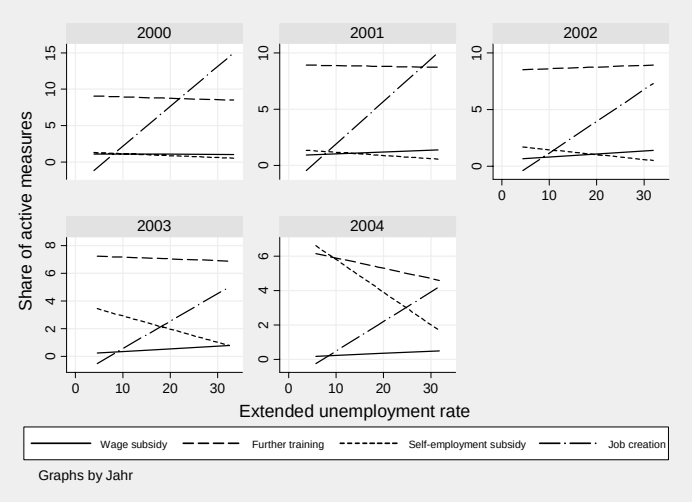
Source: Federal Employment Agency; own calculations.

In figure 11, the variation of the four main active measures is plotted according to the extended regional unemployment rate for different years. Obviously, there is significant change even within this short period, mainly due to the extensive reforms in this period. Nevertheless, a clear pattern can be identified: there is a strong positive correlation between job creation schemes and unemployment for all years. Moreover, whereas subsidies for

[79] The regional dimension is accounted for through the use of regional unemployment figures or regional aggregates of individual wage levels (the x-axis in the following figures).

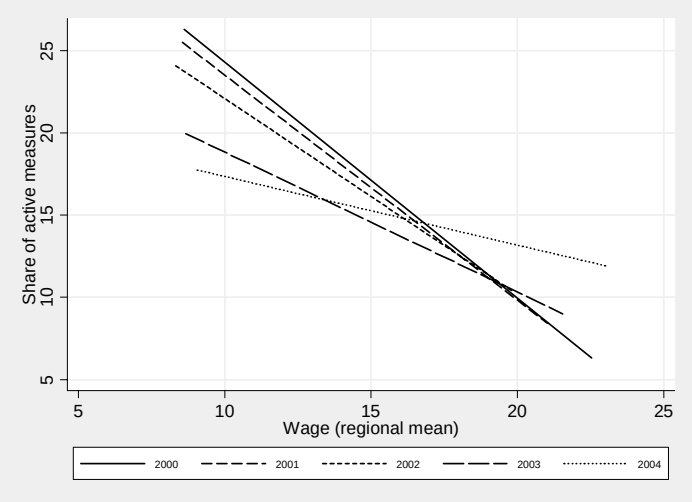
self-employment do not play a significant role between 2000 and 2002 – there is only a slight increase in low-unemployment regions – this pattern changes in the next two years. In 2004, the share of these measures is even higher than job creation schemes in high-unemployment regions.

Figure 11: ALMP measures and extended unemployment



Source: Federal Employment Agency; own calculations.

Figure 12: Active measures and wages

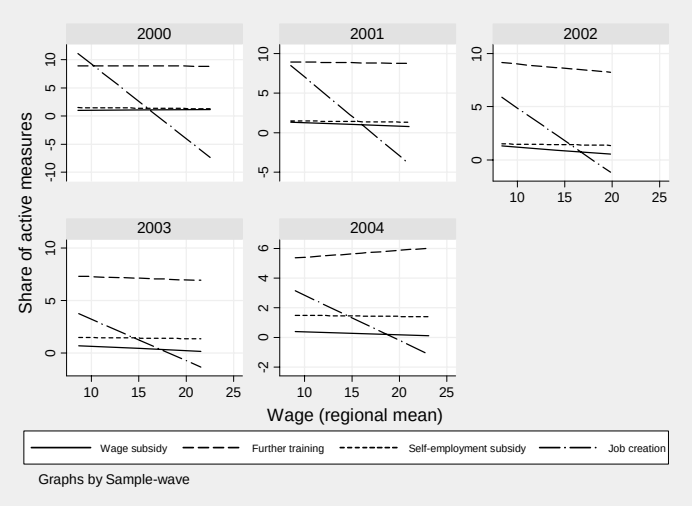


Source: Federal Employment Agency; own calculations.

Figures 12 and 13 plot the variation of measures with respect to real wages. The regional wage is measured as the mean of the real hourly wage of individuals living in a particular agency region. In figure 13, the curves show different measures, and one can see that the main changes over time are due to job creation schemes. Second, an overall increase in self-employment subsidies in 2003 and 2004 can be observed. Third, the slope for further training measures changes substantially: it is negative for the first four years, but in 2004 it

changes sign. In figure 14, there is a clear downward slope for all five sample years. However, although the slope is clearly negative for all years, there is also an obvious pattern: in 2000, the gradient is higher than all other curves. Second, there is a downward shift, which indicates an overall reduction of active measures.

Figure 13: Active measures and regional wages



Source: Federal Employment Agency; own calculations.

To sum up the descriptive statistics on ALMP measures, I can present two main conclusions. First, there is a significant difference in the portfolio of active measures, and this portfolio varies over regional unemployment, over regional wage level, and over the years relevant for this analysis. Second, the individual ALMP measures also vary according to the three dimensions of time, regional unemployment, and regional wage level. On the basis of these results, three questions arise. First, do ALMP have a (positive) impact on the regional wage level? Second, do the various ALMP portfolios have an impact on the performance of regional public employment services? And third, does this (potential) difference in PES performance have an impact on the regional wage level? These aspects are dealt with in chapters 7 and 8. Furthermore, the variation over time is attributable to the reform process undertaken in the period under consideration. It is thus crucial to mention this fact by conducting further analyses not only with pooled data but also in cross-sections.

4.4 Conclusion

In this chapter, descriptive analyses were presented to underline the assumption of the relevance of regions in the labour market and to emphasize our hypotheses. Some stylized

facts on the role of regions from a European perspective were provided, and the German labour market was analysed in its regional dimension. In doing this, I demonstrated the role of qualifications and income and the importance and development of active labour market measures. In sum, it can be concluded that regions do matter in Germany. There is a clear difference not only between eastern and western Germany but also between regions. Unemployment varies substantially, as does remuneration, and different regional levels of aggregation result in different figures.

On the basis of these results, the following chapter pursues the question of whether there is a German wage curve – that is, whether it is possible to identify a negative elasticity between unemployment and wages when regional unemployment figures and individual wage information are used. The analyses on qualifications and wages are ambiguous. Obviously, clear differences emerge depending on how one defines qualifications. Second, an emphasis on specific qualifications with respect to the structure of different regions sparks interest in the question of whether this pattern results in differences in wage-setting. Chapter 6 pursues the question of varying regional wage elasticities.

The section on the different definitions of unemployment and the range of active measures demonstrated that there is a good deal of diversity in the German labour market, both across regions and over time. This substantial variation induces three further questions: First, is the quality of labour market policy dependent on economic conditions – and thus, in the absence of market prices, is it possible to measure adequately the relative performance of regional public employment services through a quantitative model (see chapter 7)? Second, can the impact of unemployment be reduced by means of regional active labour market policies (see chapter 8)? And third, in regions with better performing public employment services, is the real wage level higher than in low-performing regions (see chapter 8)?

5 Is there a German wage curve? Evidence from the German Socio-economic Panel

In chapters 2 and 3, theoretical and technical aspects of wages and unemployment were discussed. In chapter 4, I presented descriptive analyses of regions and provided support for my hypotheses. This chapter focuses on the first hypothesis: the question of whether real wage levels depend on differences in involuntary unemployment between regions. In part, wages are indeed low in high-unemployment regions and high in low-unemployment regions. The main question is whether there is a German wage curve. The theoretical basis for the following analyses is the wage curve approach introduced in section 2.5. Briefly, this approach describes the negative relationship between the local unemployment rate and the level of individual wages. Since Blanchflower and Oswalds book was published (Blachflower 1994), a comprehensive discussion on the existence of a 'general law' of a –.1 wage elasticity and a number of empirical studies have delivered controversial results. My intent is to contribute to this discussion, provide further insight in the functioning of regional labour markets based on individual data from the German Socio-economic Panel (GSOEP) and aggregate regional labour market figures. In the first section, I describe the sample in more detail. In the following section, the econometric modelling is discussed, the specific problem of using data with different aggregation levels is highlighted and the resulting appropriate methods are introduced. I then present and discuss the estimation results in the third section. Several aspects, including a discussion of regional definition and functional form of the unemployment rate as independent variable are highlighted. I close the chapter with some concluding results.

5.1 Sample description

For the wage curve analysis, two data sets are merged: individual data from the GSOEP and aggregate data of regional unemployment figures from the Federal Employment Agency. In chapter 4, I introduced different alternatives to disaggregating regions and described the main figures: the three levels of aggregation utilized are the 16 federal states, 97 economic regions, and 171 agency regions. With the exception of the regional unemployment rates, the dependent variables are derived from the GSOEP. The income variable is the natural logarithm of the real hourly wage, which is calculated as the ratio of

average gross pay per month and contracted working hours.[80] However, from a theoretical point of view, overtime can be interpreted as additional effort in the efficiency wage model. Further controls are individual factors usually applied in Mincerian wage equations. Regional dummies are included to capture the multitude of effects brought about by geographical differences in industry and institutional structure.

The regional unemployment rate is an appropriate measure for wage adjustment when individuals reside and work within the same region. However, mobile individuals commute to work, meaning that they live in one region and work in another. For example, workers who reside in a high-unemployment region but commute to work in a high-wage region generate a spurious positive relationship between the regional unemployment rate and regional pay. As argued in the literature (see Layard, Nickell et al. (1991), Blanchard and Katz (1999), and Pannenberg and Schwarze (2000)), it is important to consider regional labour mobility. Pannenberg and Schwarze (2000), for example, exploit net in-migration rates to test the results. Mobility here mainly means daily commuting from home to work. In the analysis by Collier (2000) with the British Household Panel Survey data,[81] a dummy variable for travel time greater than 45 minutes is included. For reasons of data availability, I have chosen a slightly different approach. In the GSOEP, information about the distance from home to work is available. Therefore, I have constructed a dummy which is one for the case if individuals travel more than 50 kilometres each day, and zero if not. Although this approach does not give any information on whether the workplace is in a region with better labour market conditions, it does reflect individual preferences, as it indicates a readiness to commute.[82]

To capture cyclical effects, time dummies are included, and changes in consumer prices are used. In general, two alternatives are possible: the wage can be adjusted on the left side of the equation by means of the change in consumer prices, or this fact can be captured by introducing another variable, the natural logarithm of the ratio of regional to national consumer prices.

---

[80] Monthly gross pay is a generated variable measuring the monthly wage or salary before taxes and other deductions for an employee's current main job. An alternative would be to include (unpaid) overtime. Tests of models using this specification have not shown substantial differences in the results.
[81] The structure of the British Household Panel Survey is comparable to the GSOEP in many items.
[82] An example would be a suburban area where housing prices are relatively low and the conditions for families are better. People prefer to commute into the city when there is low unemployment but unattractive living conditions.

Table 20: Model variables

Dependent variable	
ln wage	Logarithmic hourly wage[+]
Independent variables	
ln unemployment	Natural logarithm of unemployment rate
Experience	Experience (years)
Squared experience	Square of work experience (years)
Length of education	Length of education in years (generated)
Firm size (dummy)	- 5–20 employees - 21–200 employees - 201–2,000 employees - More than 2,000 employees
ISCO (one-digit)	- Professionals/Technicians and associate professionals - Clerks - Service workers and shop and market sales workers - Skilled agricultural and fishery workers - Craft and related trades workers - Plant and machine operators and assemblers - Elementary occupations
Vocational position (dummy)	Skilled workers - Blue-collar workers - White-collar workers - Specialists and executive staff - Civil servants[*]
Part-time dummy	Less than 30h/week
Community size (dummy)	- 2,000–20,000 inhabitants - 20,001—100,000 inhabitants - 100,001–500,000 inhabitants - More than 500,000 inhabitants
Commuting-dummy	Distance from home to work less than 50km
Marital status	Single[**]
Head of household	Dummy (yes=0, no=1)
Child under 16 in household	Dummy (yes=0, no=1)
Nationality	Dummy (yes=0, no=1)
Satisfaction with health	Dummy (yes=0, no=1)

Source: GSOEP. [+]Wages are defined as contracted employment time derived from yearly income (yearly benefits are included); *ln* stands for the natural logarithm; the wage is adjusted by the consumer price index. [*]The category of civil servants has the disadvantage that no differentiation between aspects of qualifications is possible. As a result, in most of the analyses, this category is excluded. When it is not, this circumstance is explicitly mentioned. [**]The 'single' category includes 'never married', 'widowed' or 'separated', and 'divorced'.

The latter is more in line with the model and is therefore preferred. The sample is selected on the basis of individuals aged 18 to 64 who are currently in dependent employment.[83] Individuals who are retired, self-employed, unemployed, or enrolled in work through government schemes are excluded, as are 'inactive' persons in the working-age population.

[83] This specification does not capture the classic category of 15–65, because the data set starts with individuals older than 16 years. Because most individuals under 18 are in education, and in order to obtain a more consistent sample, I have excluded individuals under 18 years of age. This specification is in line with the greater part of the empirical literature using the GSOEP (see, for example, Anger (2006)).

Individuals with missing relevant information are also excluded, whereas those who enter and/or exit are part of the sample. Whilst this results in an unbalanced panel, it has the advantages of minimizing potential attrition biases and yielding a greater number of observations in the panel. The model variables are documented in table 20.

5.2 Econometric modelling

5.2.1 The standard equation

The empirical model is based on the efficiency wage model introduced in section 2.4. In its basic structure the empirical foundation of the wage curve is a Mincerian earning equation (Becker 1964) augmented with the unemployment rate for an individual's local labour market.[84] As Blanchflower and Oswald (1994) noted that their "novelty is in the inclusion of local unemployment as a regressor". The purpose of the extension therefore is the estimation function with a regional macro-indicator, the unemployment rate, to examine the role of local unemployment in the determination of local wage structure. The common empirical specification of the wage curve is:

$$\ln w_{irt} = \alpha_i + \beta_u \log u_{rt} + \delta X_{irt} + \varepsilon_{irt} \qquad (5.1)$$

with i = 1, …, N, t =1, …, T

where w_{ir} stands for the wage of individual i observed in region r; and u_r is the unemployment rate in region r. The vector X_{ir} is a set of measured characteristics of individual i which includes personal wage explanatory characteristics such as age, level of education, gender, race, and marital status, as well as industrial and occupational affiliation and geographic location (see table 20). Time is indicated by the index t, and ε_{irt} is the randomly distributed error term. Both real wages and unemployment are expressed in logs. The interpretation of β is the elasticity of wages with respect to unemployment.[85]

5.2.2 The simultaneity problem

To account for simultaneity bias, instrumental variables must be employed. Blanchflower and Oswald use the traditional strategy of introducing new variables as instruments, which

[84] There is a wide range of different quantitative studies in line with this theoretical approach; one example for Germany is Schömann and Hilbert (1998).
[85] As will be shown, other specifications are also possible and even plausible under specific circumstances (see subsection 5.3.1).

complicates the modelling of the wage curve. They therefore use only a subset of variables as instruments; as a result, it is difficult to analyse the true causes of regional unemployment. As Blien (2001) has pointed out, one cannot simply accept as definitive the claim that 'the changes in climatic indicators are the best instruments for the unemployment rate'. Blien suggests that panel data ensure an effective method. There it is possible to use lagged values of all exogenous variables in order to provide instruments for the unemployment rate. He further argues that by choosing this alternative, the search for more or less 'exotic' instruments such as the average probability of rain or the average hours of sunshine in a region is not essential.[86] Despite the empirical evidence presented in many studies, the validity of the wage curve is still open to two potential criticisms. The first is the so-called Moulton problem, which describes the methodological problem of connecting micro and macro data. The second concern is a possible simultaneity bias. In the following section, I present empirical results which take into account these aspects.

5.2.3 The Moulton problem and its consequences

Although the data matrix X is defined on the individual level, the unemployment rate u is measured on the regional level. The Moulton problem describes a widely discussed but unsolved problem in the wage curve literature. Described in a nutshell, it is the methodological problem of connecting micro and macro data. Moulton (1990) concludes that observations of individuals are not independent of each other because they are connected through societal and economic relationships. On regional labour markets, nearly the entire workforce is affected by unobservable regional characteristics such as price level, infrastructure, and regional growth rate.

A general assumption of standard analysis is the independence of the variables. If this assumption is not satisfied, the estimate is not efficient. Estimated values may be located away from real values, as their variance grows relatively. It is also important to consider that the standard error and therefore the determination of the level of significance may be biased because the dependent variable varies much more between individuals than between regions. For this problem, unobserved individual effects may cover relationships on the aggregate level.[87] In literature on the wage curve, several options to handle this phenomenon are applied. For my empirical analyses, I follow the preponderance of the

[86] This approach is applied in subsection 5.3.5. For a more detailed discussion of instruments in wage curve estimations, see Blanchflower and Oswald (1994) and Blien (2001).
[87] For a comprehensive discussion of the problem, see Blanchflower and Oswald (1994), Moulton (1986; 1990), Blien (1996), Baltagi (1995), and Baltagi, Blien et al. (2000).

literature and estimate several models and compare their results. The standard approaches applied are random and fixed effects. Following recent wage curve literature – among others based on household panel data – I also apply a generalized least square model (see 5.2.5) and individual fixed and random effects models (see 5.2.4. I present the results in the subsequent chapters.

5.2.4 Fixed and random effects

The most often used and – independent of other approaches – generally accepted standard models are regional fixed and random effects. To control for time-invariant variables such as endowments, amenities, or facilities particular to each region, regional fixed and random effects are a common feature of wage curve analyses. In the fixed effect model, permanent components of the relationship between wages and unemployment are taken into account. The equation has the following form:

$$\ln w_{irt} = \beta_u \log u_{rt} + \delta X_{irt} + \alpha_i + d_i + f_t + \varepsilon_{irt} \qquad (5.2)$$

with d_r and f_t region- and time-specific effects. The coefficients of unemployment could be caused by simultaneity bias. Therefore, even if it is possible to model either type of effect as a random effect, the fixed effects estimator is consistent but inefficient. The use of random effect estimators requires the assumption that d and/or t is uncorrelated with the regressors in the model. The assumption is validated using Hausman's test. Given a model and data for which fixed effects estimation would be appropriate, a Hausman test examines whether random effects estimation would be almost as good.[88] If the Hausman test statistic is large, one has to use a fixed effects model. If the statistic is small, it may sufficient to use random effects (Kennedy 1998).

5.2.5 Generalized least squares (GLS)

For these models, equation (5.2) is estimated in the first step, excluding the unemployment variable and the time-period dummies. Year-by-year estimates of the individual (log) wage function are computed, including observables on employees and their firm, profession, and other individual controls, as well as controlling for regional fixed effects through regional dummies. In the second step, the coefficients of the regional dummies from the first step are regressed on the (log) local unemployment rate, controlling for fixed time and regional

[88] The Hausman test is a test of H_0: that random effects would be consistent and efficient, versus H_1: that random effects would be inconsistent.

effects. Estimation is carried out by means of generalized least squares (GLS), weighting observations with the standard errors of the regional dummies obtained in the first step.

These two procedures have been widely used, especially when the data come from repeated cross-sections. Blanchflower and Oswald (1994) analysed aggregate data and estimated a two-stages least square wage regression, where the dependent variable and all explanatory variables are defined by the region and by year averages. Baltagi and Blien (1998), for example, used this approach by aggregating over individuals living in the same region and carrying out cell-means estimations. For the U.S. case, Blanchflower and Oswald find that such a bias does not exist. By contrast, Baltagi, Blien et al. (2000) find for the west German and the east German case that a wage curve exists only when this bias is controlled for. Buscher (2003) uses a two-step approach to account for the presence of correlation across workers in the same market.

5.2.6 Individual panel estimation

The aggregation of individual data has two main disadvantages: First, information is lost because the individual level is averaged over regions. Second, far fewer observations are available when using the German Socio-economic Panel rather than IAB Establishment Panel data. Recently, researchers using household panel data have proposed that when a panel structure of the data is available, equation (5.2) is estimated, permitting individual effects (Turunen 1998, Montuenga, Garcia et al. 2003; García-Mainar and Montuenga-Gómez 2003). Panel estimation allows one to control for unobservable characteristics, thus reducing the probability of specification bias (Card 1995). In addition, controlling for individual heterogeneity makes it possible to alleviate both aggregation and composition biases. Following this argumentation, the estimated equation becomes:

$$\ln w_{irt} = \alpha_i + \beta_u \log u_{rt} + \delta X_{irt} + a_i + d_i + f_t + \varepsilon_{irt} \qquad (5.3)$$

where a_i is the individual effect.

5.3 Is there a 'standard' wage curve in Germany?

The first step of the empirical analysis is a standard estimation of the wage curve using commonly applied specifications and methods. As mentioned, for the GSOEP a household

survey is utilized.[89] The 'classic' wage curve hypothesis of Blanchflower and Oswald is tested, that is, I question whether one can identify an elasticity of wages by –.1. The most important characteristic of the German labour market is the cleft between eastern and western Germany. In many of the following analyses, both eastern and western Germany are mentioned in separate analyses. In other estimations, however, the analyses are restricted to western or eastern Germany.

5.3.1 The functional form of the unemployment rate

Nonlinearities are a recurring theme in literature on the wage curve. The functional form of the unemployment rate most often used is the log specification. A log-log specification has the advantage that the coefficients can be interpreted as elasticities.[90] However, the steadily decreasing functional form of wages and unemployment is not directly deducible. Evidence from Blanchflower and Oswald (1990) shows that different polynomial structures fit the data. For example, although it is difficult to interpret economically, they find that the inclusion of a cubic term for the log of unemployment improves their estimates. Later evidence, by contrast, rejects the inclusion of such higher order unemployment terms.[91] The literature gives several ad hoc specifications having specific advantages rooted in the shape of the function. The specifications used here are described in table 21.

With ln(real wage) as a dependent variable, the first two lines have a semi-logarithmic specification that relates the log of the real wage to the level of unemployment, implying that the wage-unemployment relationship is exponential. The other two specify the *u*-variable in a double log. According to Rendtel and Schwarze (1996), the quadratic (u^2), the logistic (ln *u*), and the log-cubic $(\ln u)^3$ seem to be good approximations of the wage curve.

Table 21: Different alternatives to specify the unemployment rate in the regression

u	Unemployment rate	Semi-logarithmic function
u^2	Square of unemployment	Semi-logarithmic function
ln u	Natural logarithm of the unemployment rate	Double-log specification
$(\ln u)^3$	Cube of the log unemployment	Double-log specification

Sources: Blanchflower and Oswald (1994), Collier (2000); own illustration.

[89] This approach is different from the majority of other empirical studies. However, recently some analyses using the British Household Panel Survey and the European Community Household Panel have been published. This kind of data has specific advantages and disadvantages. Specific attributes of alternative data were discussed in section 3.2.

[90] The wage is always in log, as it is common in all types of wage equations; the discussion here is limited to the unemployment specification.

[91] See Blanchflower and Oswald (1994)

As mentioned, the main advantage of the latter is that it can be interpreted: the reported coefficient may be immediately interpreted as the elasticity. The disadvantage is that the wage curve imposes significant constraints on the data: it considers the wage-unemployment relationship to be log-linear across the whole range of observed data and implies constant unemployment elasticities. It also implies that the relationship between wages and unemployment is either increasing or decreasing without limit. The advantage of the semi-log specification is that it is not very restrictive. It has some desirable features because it will be asymptotic, and as a result will never reach the x-axis, whereas a negative sign means a downward-sloping locus. This is more realistic as wages will never equal zero. For this reason, Collier (2000), among others, prefers this specification in his study based on the British Household Panel Survey.

In table 22, the results of the estimations are depicted by means of the three standard models of the wage curve: ordinary least squares (OLS), regional fixed effects, and regional random effects. I refer to the entire German labour market, controlling for East-West and gender differences by using additional dummy variable. The second row of the table (m1) shows the log-log specification. The overall elasticities are not substantially different from those for the male labour force in western Germany, a result that departs from other studies.[92] For the regional fixed and random effects model, the results are similar. However, although the significance is the same, the t-statistics indicate that the relation is not robust. The coefficients of the other three unemployment specifications show the same signs and the same significance level, indicating that there is no substantial difference.[93]

In the light of the results presented in this section, the assumptions of the log-log specification do not seem to be very restrictive: the extremes are not of central interest. When wage curves are discussed, the focus is on the shape and therefore more in the centre. Thus, because the main interest for the purpose of this thesis is in the elasticities and their differences and most of the analyses presented here will be based on the log-log specifications to document the 'real' elasticities.

---

[92] This issue is discussed in the following section in more detail.

[93] The results for the 97 economic regions are not documented here. They show the same overall pattern: the results of the different specifications are quite stable, whereas the smaller t-statistics indicate that the estimations are not as robust as in the case of the agency regions.

Table 22: Wage curves for different unemployment specifications

		ln u	u	u^2	ln u^3	_cons	F-test	Region
OLS	m1	-0.108** (-19.35)				2.152**	1509.9	no
	m2		-0.014** (-8.98)	0.001* (2.52)		2.036**	1473.3	
	m3	-0.051* (-2.45)			-0.004* (-2.82)	2.071**	1473.5	
FE	m4	-0.042** (-3.45)				2.629**	97.0	yes
	m5		-0.003 (-0.98)	-0.001 (-0.82)		2.499**	94.8	
	m6	0.012 (0.43)			-0.004* (-2.15)	2.483**	94.7	
RE	m7	-0.085** (-10.45)				1.976**		yes
	m8		-0.010** (-4.62)	0.001 (0.52)		1.877**		
	m9	-0.018 (-0.77)			-0.005* (-3.01)	1.881**		
	N	49,513						

Source: German Socio-economic Panel 1997–2004; own calculations. Dependent variable: log of the hourly gross wage; unemployment is on the agency level (N=176); controls for experience, school degree, vocational position, ISCO, and several individual characteristics are included. The corresponding F-tests give information about the overall significance of the coefficients: * significant at 5%; ** significant at 1%.

5.3.2 Wage curves in different regional aggregates

As discussed in section 3.1, three alternative levels of aggregation are reasonable. In this subsection, estimation results using these alternatives are depicted, and some conclusions on the 'best' aggregation level are drawn.[94] In the western German labour market, a clear negative and significant elasticity of around –.1 for all aggregation levels is obtained. Most coefficients are statistically significant for the OLS and the GLS cases. In eastern Germany, the results are even weaker, especially for the female labour force at the level of 'economic regions'. In this case, the differences in the elasticities are not that high, and so the results differ from those of the other regional definitions. By performing several sensitivity tests, I came to the conclusion that the estimations for economic regions do not lead to the stable results of the agency level or the level of federal states.

[94] With respect to transparency, only OLS, GLS, and regional fixed effects are depicted in addition to the individual random effects model. Analyses run with regional random and fixed effects follow the same structure. The Hausman test is always rejected in the regional as well as in the individual case.
* significant at 5%; ** significant at 1%.

Table 23: Wage curves for different regional aggregation levels

				Federal states (r=16)		Economic regions (r=97)		Agency regions (r=171)	
		Reg	Ind	b	t	b	t	b	t
West, male	OLS	yes	no	-0.103*	(-8.93)	-0.085*	(-10.30)	-0.089**	(-11.79)
	GLS	yes	yes	-0.070*	(-7.75)	-0.085*	(-10.30)	-0.098**	(-8.10)
	reg. FE	yes	no	0.052	(-1.49)	0.102	-0.8	-0.070*	(-4.66)
	ind. RE	yes	yes	0.051	(-1.50)	0.074	-0.57	-0.077*	(-10.93)
	N								20,704
East, male	OLS	yes	no	-0.114*	(-2.73)	0.03	-1.08	-0.093**	(-3.32)
	GLS	yes	yes	-0.083*	(-2.23)	0.028	-1.01	-0.055**	(-2.03)
	reg. FE	no	yes	0.002	(-0.04)	-0.129	(-0.51)	-0.058	(-1.11)
	ind. RE	yes	yes	-0.008	(-0.15)	-0.152	(-0.59)	-0.055*	(-2.03)
	N								6,906
West, female	OLS	yes	no	-0.090*	(-5.88)	-0.096*	(-9.16)	-0.096**	(-9.98)
	GLS	yes	yes	-0.057*	(-4.71)	-0.097*	(-9.23)	-0.084**	(-9.37)
	reg. FE	yes	yes	0.079**	(-1.68)	0.04	(-0.21)	-0.034	(-1.06)
	ind. RE	no	yes	0.068	(-1.5)	0.084	(-0.44)	-0.032	(-0.96)
	N								14,469
East, female	OLS	yes	no	0.136*	-3.17	0.014	-0.52	-0.103**	(-3.69)
	GLS	yes	yes	0.132*	-3.48	0.013	-0.45	-0.082**	(-3.02)
	reg. FE	yes	yes	0.101**	-1.74	-0.751*	(-2.55)	-0.03	(-0.55)
	ind. RE	no	yes	0.083	-1.42	-0.894*	(-2.99)	-0.077	(-1.93)
	N								6,647

Source: German Socio-economic Panel 1997–2004; own calculations. Dependent variable: log of the hourly gross wage; several controls; * regional controls; ** individual controls; + Hausman test for regional fixed effects; ++ Hausman test for individual fixed effects. * significant at 5%; ** significant at 1%.

In the case of the federal states, one can easily argue that overestimating through a higher aggregation level is a serious problem.[95] On the other hand, between federal states we find quite large regional variations. As shown in the descriptive statistics vary significantly on unemployment measures on the level of economic regions, indicating that a good deal of variation is not measured in the case of the federal states. If the Moulton problem were the most dominant factor influencing the results, one should expect that the 'best' results would be obtained with the federal states, and the worst with the most disaggregated level,

[95] This was discussed in the previous section (under 'Moulton problem').

the agency level. Yet this is not the case. The results from the agency level seem to be the most promising.[96]

One can interpret this outcome as follows: First, although the Moulton problem cannot be neglected, there must be other forces influencing the results. Second, the more disaggregated level of labour markets, and in particular the definition used by the German employment office, seems to best reflect regional differences. In most of the estimations to follow, I favour this specification. In sum, an examination of the different regional definitions and sub-labour markets supports the conclusion of the previous section: there is a stable and statistically significant negative wage elasticity. However, this elasticity not only depends on the econometric methods used but also varies with the regional definition.

5.3.3 Standard wage curves and other controls

The focus here is on western Germany, which is the more homogenous labour market. Table 24 shows the results of the wage curve estimation with OLS, regional fixed-effect, and regional random-effect models. For these standard models the further control variables are documented.[97] In the first row, wage elasticities are depicted. The dependent variable is the log hourly gross wage based on the contracted employment time. The log-log specification allows one to interpret the unemployment coefficients as elasticities. The observation unit is individuals in different regions and years.

The coefficient of the log unemployment rate has a significant negative sign. What one cannot identify is the expected value of more or less –.1. However, especially for the random-effect case with a highly significant value of –.082, is not that far away from the 10%-law. On the other hand, the fixed-effect result is not statistically significant. The OLS and the random effect models are statistically significant, whereas the fixed-effect case is negative with –.044, but lower and not statistically significant. Therefore, for a sample of 21,080 dependently employed men in western Germany, a wage curve is identified in an alleviated form.

The coefficients for the control variables are also depicted. Those for the individual controls are statistically significant for almost all variables.[98] Standard variables of the wage

[96] Different specifications were used to undertake several sensitivity tests. The results did not change substantially.
[97] For the sake of transparency, these coefficients are not documented in the following analyses. Because the main focus here is on the individual exogenous variables, this omission does not represent a loss of information.
[98] Sensitivity tests with various model specifications were carried out, using dummy variables for school degrees rather than length of education, NACE-category professions rather than vocational position, and

equations show the expected sign. Experience and age have a positive impact on the wage. The positive effect of schooling (length of education) on wages is also positive and statistically significant. The categories firm size, branch (ISCO), and vocational position deal with specific labour market segments and are particularly important for the analysis of the impact of qualifications aspects on the wage-unemployment relationship.

The dummy for firm size shows a clear upward trend with the size of the firm through the positive sign. One can conclude, first, that larger firms have a greater number of hierarchical levels. Consequently, wages must be differentiated. Because, as a result of collective bargaining, wages do not fall under a specific level, more hierarchies call for higher average wages. Second, it is reasonable to expect a selection bias in the sense that larger firms compete for better-qualified – or, to be more precise, better-performing – workers within specific qualification levels. Within the efficiency wage model, this would mean that effort is improved or that shirking is reduced because intrinsic motivation is higher. This argument also holds from the perspective of individuals: motivated individuals have better qualifications and prefer larger firms.

The ISCO classification of professional groups shows a significant negative sign in comparison with the reference category of legislators, senior officials, and managers. From a human capital approach, this outcome can be viewed as expected output, as this category is characterized by a high demand for qualifications. Service workers show the lowest value, with 30.2% for the OLS case, which is even lower than the value for elementary occupations. The size of the city of residence has a limited influence in particular, residents of cities with more than five hundred thousand inhabitants are statistically significant. The commuting-dummy indicates that travelling more than 50 kilometres between the workplace and home influences the gross wage in a negative way. The individual characteristics are also significant and show the expected sign.

---

other different satisfaction variables. All of these specifications did not change the overall results or the unemployment coefficient substantially. This is the specification with the best fit.

Table 24: Standard wage curves for men in dependent employment, western Germany, 1997–2004

	OLS		Regional FE		Regional RE	
	b	t	b	t	b	t
log unemployment	-0.107**	(-14.14)	-0.044	(-1.28)	-0.082**	(-5.00)
Experience	0.017**	(27.55)	0.017**	(27.86)	0.017**	(27.92)
Squared experience	-0.000**	(-16.57)	-0.000**	(-16.84)	-0.000**	(-16.86)
Length of education	0.027**	(25.71)	0.027**	(24.97)	0.027**	(25.17)
Firm size: 5–19 employees	0.048**	(3.87)	0.055**	(4.47)	0.054**	(4.40)
Firm size: 20–100 employees	0.123**	(10.52)	0.129**	(10.97)	0.127**	(10.90)
Firm size: 101–200 employees	0.181**	(15.31)	0.185**	(15.63)	0.184**	(15.60)
Firm size: 201–2,000 employees	0.221**	(18.56)	0.214**	(18.02)	0.215**	(18.15)
ISCO: Professionals	-0.035**	(-3.53)	-0.036**	(-3.64)	-0.036**	(-3.64)
ISCO: Technicians and associate professionals	-0.112**	(-11.24)	-0.109**	(-11.04)	-0.110**	(-11.10)
ISCO: Clerks	-0.174**	(-15.67)	-0.170**	(-15.29)	-0.171**	(-15.42)
ISCO: Service workers and shop and market sales workers	-0.302**	(-21.88)	-0.298**	(-21.71)	-0.299**	(-21.76)
ISCO: Skilled agricultural and fishery workers	-0.247**	(-9.47)	-0.232**	(-8.92)	-0.235**	(-9.04)
ISCO: Craft and related trades workers	-0.152**	(-13.79)	-0.149**	(-13.58)	-0.150**	(-13.64)
ISCO: Plant and machine operators and assemblers	-0.154**	(-13.04)	-0.148**	(-12.62)	-0.149**	(-12.72)
ISCO: Elementary occupations	-0.265**	(-19.99)	-0.258**	(-19.56)	-0.259**	(-19.66)
VP: Skilled workers/blue-collar workers	0.078**	(11.86)	0.080**	(12.25)	0.080**	(12.22)
VP: White-collar workers	0.099**	(11.88)	0.098**	(11.76)	0.099**	(11.83)
VP: Specialists and executive staff	0.349**	(36.98)	0.350**	(37.07)	0.350**	(37.16)
VP: Civil servants	0.053**	(4.75)	0.063**	(5.63)	0.061**	(5.46)
Part-time workers	0.193**	(14.33)	0.198**	(14.64)	0.197**	(14.60)
City size: 2,000–20,000	-0.005	(-0.53)	-0.021*	(-2.13)	-0.018	(-1.82)
City size: 20,001–100,000	0.021*	(2.40)	0.002	(0.22)	0.006	(0.60)
City size: 100,001–500,000	0.011	(1.18)	-0.021	(-1.81)	-0.014	(-1.30)
City size: > 500,000	0.046**	(4.52)	-0.022	(-1.62)	-0.008	(-0.61)
Distance home to work > 30km	-0.057**	(-7.24)	-0.058**	(-7.35)	-0.058**	(-7.36)
Marital status	-0.074**	(-14.46)	-0.077**	(-15.04)	-0.076**	(-14.92)
Head of household	0.045**	(9.54)	0.048**	(10.11)	0.047**	(10.02)
Child in household younger than 16	-0.039**	(-8.63)	-0.038**	(-8.45)	-0.038**	(-8.54)
Nationality: German	0.020**	(3.36)	0.035**	(5.49)	0.032**	(5.09)
Satisfaction with health	0.005	(1.25)	0.009*	(2.26)	0.008*	(2.05)
_cons	2.414**	(81.12)	2.284**	(27.35)	2.361**	(53.09)
R-square	0.498		0.481			
F-test	548.6		509.3			
Hausman			93.11			
Number of cases	21,080					

Source: German Socio-economic Panel 1997–2004; own calculations. Dependent variable: log of the hourly gross wage; unemployment is on the agency level (N=176). Reference groups in the regressions: FS1 – firm size fewer than 5 employees; ISCO1 – legislators, senior officials, and managers; vocational position – unskilled blue-collar workers; occupational classification. The corresponding F-tests give information about the overall significance of the coefficients. * significant at 5%; ** significant at 1%.

The main conclusions to be drawn from these estimations are, first, that Blanchflower and Oswald's 'general law' of a –.1 wage elasticity is not supported. However, an alleviated wage curve is supported, indicating a significant negative regional wage elasticity. Second, the model is well specified with significant coefficients, and all variables have a significant impact on wages. Although the results of estimations differ, a clear pattern is identified. Third, the overall fit with an R^2 of around 0.5 indicates a proper model-fit and is in line with comparable estimations in the literature. These results are of value, as they are the 'entrance card' for the use of the GSOEP as an alternative resource for wage curve analysis. In the following subsection, I discuss results obtained through the use of different functional forms of the unemployment variable.

5.3.4 Standard wage curves for different labour market specifications

Table 25 summarizes the results of estimations for eastern and western Germany, differentiated by gender. In addition to the standard models, the table includes three additional models discussed in the section above and thus reports elasticities from random effects and the GLS model. As discussed, the labour markets of eastern Germany and western Germany differ substantially. To satisfy these needs and to identify possible differences, separate results for eastern and western Germany are given. In line with the efficiency wage model and the resulting non-linear form of the wage curve, it is expected that in regions with higher unemployment, the wage is lower and thus the wage curve flatter. Consequently, for eastern Germany one would expect a substantially lower elasticity. This cannot be verified here. Although elasticities for eastern Germany are slightly lower than the coefficients for western Germany, no substantial difference is observed.

For the female labour market, one outcome that can be expected is a difference between eastern and western Germany, as the participation rate of women in eastern Germany is higher. This would mean that female employees work not simply 'in addition' to the better paid male in the household, especially in the case of southern Germany, which performs better in economic terms.[99] There, the additional income of households, and therefore the decision to work for a specific wage, differs from that in the eastern part of the country, which generally has lower wages and the need for a double income. However, this hypothesis cannot be verified. There are, of course, differences in the results for female

[99] The causality cannot be discussed here. To a large extent, this fact is also sociologically based, for in the former GDR it was quite normal for women to work full time, whereas in western Germany the 'breadwinner model' has been more common.

wage curves, but a clear pattern cannot be identified. Compared to the male labour force, a wage curve is supported even more, especially for eastern Germany.

Table 25: Standard wage curve total labour force, 1997–2004

		Reg*	Ind**	Total labour force		Male labour force		Female labour force	
				b	t	b	t	b	t
West	OLS	no	no	-0.095*	(-4.78)	-0.089*	(-11.79)	-0.096*	(-9.98)
	Reg. FE	yes	no	-0.034	(-1.26)	-0.002	(-0.06)	-0.032	(-0.73)
	Reg. RE	yes	no	-0.095*	(-4.78)	-0.034*	(-2.01)	-0.080*	(-4.29)
	GLS	yes	no	-0.078*	(-13.97)	-0.013	(-0.56)	-0.084*	(-9.37)
	Ind. RE	yes	no	-0.019	(-1.02)	-0.077*	(-10.93)	-0.03	(-0.96)
	Hausman+			153.1		347.34		54.24	
	N			35,173		20,704		14,469	
East	OLS	no	no	-0.090*	(-14.97)	-0.093*	(-3.32)	-0.103*	(-3.69)
	Reg. FE	yes	no	-0.032	(-0.55)	-0.062	(-1.15)	-0.032	(-0.39)
	Reg. RE	yes	no	-0.072*	(-6.38)	-0.014	(-0.17)	-0.103*	(-3.69)
	GLS	yes	no	-0.066*	(-3.41)	-0.052	(-0.97)	-0.082*	(-3.02)
	Ind. RE	yes	no	-0.015	(-0.38)	-0.055*	(-2.03)	-0.077	(-1.93)
	Hausman+			169.9		451.1		594.5	
	N			13,553		6,906		6,647	

Source: German Socio-economic Panel 1997–2004; own calculations. Dependent variable: log of the hourly gross wage; unemployment is on the agency level (N=176). Controls for experience, school degree, vocational position, ISCO, and several individual characteristics are included. * regional fixed effect; ** individual fixed effect; + Hausman test for regional fixed effect. * significant at 5%; ** significant at 1%.

A comparison of the outcomes of the different models reveals clearly that the basic OLS regression shows the 'best' results. In the case of male labour force in western Germany, for example, a statistically significant elasticity of –10.3% is obtained. This sample represents the most homogenous labour market, as it includes neither the 'white noise' of specific eastern German labour market conditions connected with high unemployment rates and structural deficits nor that of specific characteristics of the female labour force. The results of the regional fixed effects model with an elasticity of –3.4% – although showing the same picture and a significance level of 0.05% – are not that high.[100] And, with the exception of the male labour force in western Germany, one also obtains significant negative values for the unemployment figure by applying the GLS. Random effect is significant and also shows negative wage elasticities between –.6 and –.9. In line with other

[100] This specification has been the main model used since the commencement of wage curve analyses in the 1990s. Although it has been criticized from a methodological perspective, the regional fixed effects model is now a standard method in the empirical literature.

studies, the Hausman test is rejected; therefore, fixed effects should be preferred over the random effects model.

Compared to other studies on German wage curves,[101] my results point in the same direction for different labour market specifications, but they also give stronger support for the wage curve hypothesis. Although the elasticity is lower than the expected –.1, it is always negative and often statistically significant. Unlike in other studies on eastern Germany, the coefficients are statistically significant in some cases. Thus, to sum up the results, an alleviated wage curve for the German labour market has been identified.

5.3.5 Robustness check of reversed causality

To check the robustness of the estimates against possible reversed causality, I first vary the proxy of perceived job insecurity, which so far has been measured in levels. Unemployment and wages are positively correlated at the aggregate level of federal states, but they lag slightly behind. In terms of a signalling hypothesis, this outcome might be explained by a time delay in the perception of labour market conditions. Because lagged unemployment might be more relevant in capturing the perceived unemployment situation, in table 26 one year is replaced by current unemployment rates. Results are depicted for the agency level and on the level of economic regions, allowing one to control for reversed causality, as the estimations above merely indicate a correlation between unemployment and the hourly wage. Reversed causality might arise from the wage affecting the rate of unemployment. However, by creating an instrument for current unemployment with its lagged value, one might control for this causality at least to some extent.[102]

Another alternative to proxy the perceived unemployment risk is the percentage change in unemployment, since it is likely that both the current level and the past level, as well as the difference to the previous year, affect the perceived conditions in the labour market. Table 26 presents the results for the individual fixed and random effect models, with regional controls. For both western and eastern Germany, the lagged values of unemployment as well as the change in unemployment are negative. For random effects model of the western German case, a clear negative and statistically significant pattern is obvious. In most cases, the coefficient of the lagged value is lower than that of the current unemployment shown in table 24. Hence, there is strong evidence that past unemployment is relevant, but it does not seem to be more important than current unemployment rates

[101] The main studies on the German labour market were mentioned in section 2.3.
[102] I also performed estimations with two-year lags, but the results did not change substantially.

for the determination of the regional wage. Therefore, the results of the lagged values point to the causation of variation of wages on a variation of the regional unemployment rate, especially for the case of male workers in western Germany. The issue of reversed causality cannot be cleared out for eastern Germany.

Table 26: Lagged unemployment rates and first difference estimation

		Individual FE			Individual RE		
		m1	m2	m3	m4	m5	m6
Western Germany, male	log u (t-1)	-0.042*		-0.009	-0.044*		-0.110***
		(-2.08)		(-0.35)	(-2.28)		(-8.46)
	log u-change		-0.066**	-0.060*		-0.059**	0.023
			(-2.85)	(-1.98)		(-2.69)	-0.99
	N	16,555	16,555	16,555	16,555	16,555	16,555
Eastern Germany, male	log u (t-1)	0.005		-0.038	-0.012		-0.026
		(-0.13)		(-0.69)	(-0.30)		(-0.46)
	log u-change		0.04	0.071		0.001	0.022
			(-0.89)	(-1.11)		(-0.03)	(-0.35)
	N	5,662	5,662	5,662	5,662	5,662	5,662

Source: German Socio-economic Panel 1997–2004; own calculations. Dependent variable: log of the hourly gross wage; several controls. * significant at 5%; ** significant at 1%.

5.3.6 Regional unemployment and commuting

I have already discussed the 'best' way to define the regional level of aggregation, and have concluded that the agency level seems to fit best. However, the question arises of whether this regional specification is the appropriate measure of unemployment risk if workers commute to other districts. In this case, even if the unemployment rate in the district of a worker's residence is high, he might not fear losing his job if he commutes to a district with better labour market conditions. Table 27 shows the impact of commuting for eastern and western Germany. In western Germany, 11.9% of the labour force commutes more than 50 kilometres from their residence to work; in eastern Germany, commuting is somewhat less important.

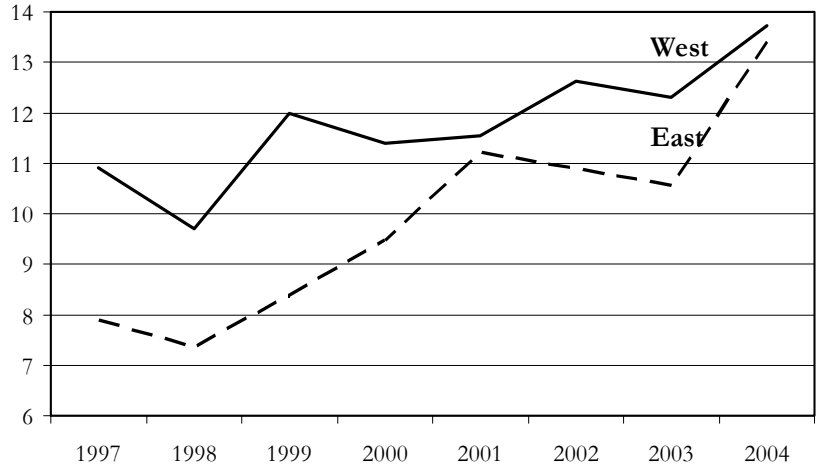
Table 27: The importance of commuting (> 50km)

	West		East	
	N	%	N	%
No	35,968	88.1	13,470	89.9
Yes	4,842	11.9	1,503	10.1
Total	40,810		14,973	

Source: German Socio-economic Panel 1997–2004.

Figure 14 depicts the development of commuting over an eight-year period. Obviously, in the 1990s commuting was far less important in eastern Germany than in the western part of the country. A catching-up process since then can be observed. To check the robustness of the estimates of the main analysis, I therefore include information on commuting.

Figure 14: Development of commuting from home to work, 1997–2004



Source: German Socio-economic Panel; own illustration.

In checking the robustness, I attempted to control for the effect that not all of the workers commute daily, since these workers are quite likely to leave their employment district for work. An interaction term of regional unemployment and commuting is added. In table 28, one of the results shown for the estimates for the male labour force is that the newly added coefficients are not significant in any case. Moreover, no significant difference between the two regional aggregation levels can be observed. This indicates that the functional definition of economic regions does not fit the regional wage-setting better. In general, commuting has no significant impact on the regional wage curve. Keeping the weakness of the results in mind, one can nevertheless draw some conclusions: First, the negative sign of the distance-dummy indicates that with a reduction of the regional unemployment rate, commuting implies lower regional wage. In other words, an individual living in a region with a high unemployment level can expect a positive effect on his wage through commuting.

Table 28: Estimates of regional wages with commuting

	West		East	
	FE	RE	FE	RE
Agency regions				
log u	-0.027	-0.098**	-0.071	-0.123*
	(-1.27)	(-7.88)	(-1.35)	(-3.05)
Distance	-0.033	0.038	-0.170	-0.204
	(-0.75)	(0.94)	(-0.86)	(-1.09)
u * distance	0.021	-0.003	0.068	0.086
	(1.09)	(-0.15)	(1.01)	(1.36)
Economic regions				
log *u*	-0.062	-0.125**	-0.258	-0.003
	(-1.26)	(-8.19)	(-1.57)	(-0.05)
Distance	-0.068	-0.044	0.120	0.398
	(-0.83)	(-0.59)	(0.41)	(1.47)
u * distance	0.038	0.036	-0.025	-0.110
	(1.02)	(1.06)	(-0.26)	(-1.21)
N	21,080		6,996	

Source: German Socio-economic Panel 1997–2004; own calculations.
Dependent variable: log of the hourly gross wage; several controls.
* significant at 5%; ** significant at 1%.

5.4 Conclusion

This chapter pursued the question of whether a wage curve for Germany exists in a general sense. The answer is 'Yes, but …' The hypothesis of a wage-unemployment elasticity of –.1 independent of time, structure of the labour force, and institutional background cannot be fully verified. Nevertheless, there is a clear negative wage-unemployment relationship on the regional level. The significance, as well as the elasticity, varies according to different model specifications, regional aggregation levels, and labour force specifications. In a way, these results are in line with several other studies both for Germany and for other industrialized countries. When one looks at the German case in more detail, one finds a somewhat differentiated picture compared to that of previous studies: First, the difference between eastern and western Germany is significant because for eastern Germany the trend is a smaller elasticity. However, even a significant relationship is observed, a result that differs from other studies, particularly those using the GSOEP. It should be noted, however, that many of the previous studies use data from the beginning to the middle of the 1990s, whereas the studies presented here cover an eight-year period from the mid-1990s to the middle of this decade.

Particularly for eastern Germany, this fact can be viewed as crucial: First, if a concave wage curve is assumed, the elasticity depends on where one is on the curve. At a point with

relatively low wages and relatively high unemployment, as is the case in eastern Germany, a decrease of unemployment by one percentage point results in a lower increase of wages than in the case of a low-unemployment, high-wage region. Second, the transition from the former socialist system to the social market economy has strongly affected the regional labour market and its institutions. Therefore, one can expect that these forces influence wage-setting and thus differ from the established system in western Germany. The third argument takes a similar approach but is rooted more in the individual perspective: as a consequence of the transition, the expectations of individuals in eastern and western Germany may differ, as they are bounded in their rationality. In terms of the efficiency wage model, this can involve differences in expected effort or shirking.

Is this result disappointing? I do not think so. In fact, it even should be interpreted in the opposite way: First, an important claim of the wage curve model is corroborated the negative wage-unemployment relationship. This indicates – apart from the free market model – that in a monopolistic labour market structure, lower wages do not affect a decline in unemployment. However, if unemployment declines in a region, one can expect a rise in regional wage levels. Second, one can interpret in two ways differences according to regions with different institutional and labour market settings: First, there is the possibility of differences in wage elasticity between labour subgroups, for example by qualifications or unemployment class. This possibility is examined in the next chapter. Second, the results imply that institutions do possibly matter, and hence that labour market policies matter and have an impact on wages. This possibility is discussed in chapter 8.

6 Qualification-specific analyses of regional unemployment and wages

This chapter focuses on the impact of the structure of qualifications. What can we expect from the analysis of labour market subgroups? As the results in the previous chapter showed, a deviated wage curve can be identified. However, there are variations in the elasticity and the hypothesis of a 'global' elasticity of –.1 cannot be verified. Therefore, it is reasonable to ask whether the results obtained reflect a kind of an average of the relevant labour market, and whether there are criteria influencing the elasticity, which depend on competitive factors.

In pursuing these questions, this chapter first presents estimation results for subgroups on schooling, vocational position, profession (ISCO), and branches (NACE). Additionally, subgroups of unemployment categories are highlighted. Although regional unemployment is not a direct indicator for a specific qualification, my assumption here is the empirical fact that high-unemployment regions are characterized by a lower-skilled labour force.[103] I then consider the question of what effect ceteris paribus changes in unemployment would have on the wage curve. Therefore, in extension to static estimations, changes in the unemployment rates are simulated for unemployment categories.[104]

6.1 A motivation for the analysis of qualification subgroups

This section examines whether and, if so, how wage elasticities are influenced by qualification levels. This aspect was already discussed in theoretical terms in section 2.6 within the framework of the efficiency wage. As stressed by Neugart and Schömann (2002), the analysis of qualifications and skills is critical in developed economies, and an important task is to deepen the knowledge of skill needs and their impact, for example through shortages. Hilbert and Mytzek (2002) have discussed the question of to what extent analyses of regional qualification needs contribute to a more efficient vocational education and training system, on the one hand, and to better matching in the labour market, on the

[103] No doubt, this is a very rough assumption. But as is shown here, some conclusions can be drawn.
[104] This also serves as a bridge to the following chapters. There it is assumed that labour market policies matter. Here we ask what happens if this is the case.

other. This analysis provides a contribution by analysing the impact of qualifications on regional wages.

The question involves potential differences in the wage elasticity among qualification subgroups. Theoretically, one can explain this potential by taking into account differences in shirking behaviour and effort expended by individuals. The descriptive analyses in section 4.2 also point to significant variations in the remuneration of dependent employees by qualifications. The increase of wages from east to north Germany and from north to southern Germany is also well-documented. However, this fact in itself is neither new nor surprising as long as no further information about its variation is available. I thus pursue the question of the causal effect of qualifications here. Within the efficiency wage model, the mechanisms are as follows:

First, higher-qualified persons provide more effort; therefore, the wage curve is steeper with rising qualifications and located above the wage curve of the lower-skilled labour force. Second, the impact of shirking is ambiguous because the expected shirking probability within different qualification groups is ambiguous. On the one hand, low-skilled work is more standardized and detection is more likely. On the other hand, intrinsic motivation in higher-skilled groups is expected to be higher. So what might one expect? In general, both results are possible: a steeper wage curve above or a flatter wage curve below the average. Because two effects, the high-effort effect and the low-shirking effect of higher qualifications, point to a higher elasticity, one can assume that the probability is higher. Third, it is assumed that the elasticity is lower in regions with high unemployment because the concave wage curve is less elastic in high-unemployment, low-wage regions. Moreover, this assumption is in line with the assumption above of the stronger effect of high-effort, low-shirking individuals. Fourth, from an empirical perspective one can surmise that, because of lower unionization in eastern Germany, collective bargaining is not very influential there. Fifth, the mobility of low-skilled persons is expected to be lower, as they usually are more closely tied to a specific region. Therefore, the probability of finding a job is lower and implies a downward shift of the wage curve.[105]

What impact can be expected from these five effects? Because most of the effects indicate a steeper wage curve with a higher intercept, my hypothesis is that higher qualifications are

[105] This lower mobility can stem from either individual or economic reasons. An example of the former is that the person has a strong connection to and engagement with his or her familiar surrounding. An economic reason is that commuting, as well as relocation of residence to economically better-performing regions, is easier for higher-skilled individuals to finance. In addition, for higher-skilled jobs, the costs of relocation are often paid by employers, and even when relocation is paid by higher-skilled individuals themselves, it is easier for them to finance the move.

confronted with better-functioning labour markets. It is therefore expected that, first, the elasticities are higher in these labour markets, and, second, the significance level of the coefficients is higher. In the following sections, this hypothesis is tested empirically. The supply-specific aspects of qualifications are identified, and demand-specific aspects are highlighted. The information on the former is related more to formal qualifications, whereas information on the latter relates more to the actual position held in a firm and therefore includes information on hard and soft skills.

6.2 Supply-specific aspects of qualifications

6.2.1 Wage curves by school degree

First, I analyse the effects of a basic school education.[106] Table 29 depicts the results for different subgroups for western Germany. In the second part of the table, interaction terms are added. I have already discussed possible advantages of the introduction of interaction terms in section 5.3. In short, the task is to check for the robustness of the results, as this controls for potential reversed causalities.[107] The table shows coefficients for two alternative models: First, the 'classic' regional fixed effects model is estimated, controlling for region- and year-specific effects. Second, an individual random effects model is estimated, which also controls for region- and year-specific effects. The log-log specification is applied in order to interpret the results directly as elasticity.

As expected, the results vary between the different qualification levels. In most subgroups, there is a negative sign, and therefore the general hypothesis of the wage curve holds for the different subgroups. However, the statistical significance is low in most cases. Men in dependent employment with lower-level schooling are one exception. This category has both highly significant results and a very high elasticity of more than –30%. The robustness checks with an interaction term do not show substantially different results. As a result, the following trend can be observed: for men in dependent employment, elasticity is highest in the low-skilled category. It decreases gradually with higher-level school degrees. The category of low-level schooling has the highest significance. For those with a high

[106] I use the three aggregated degrees as well as those without any school degree. Because of the negligible number of the latter in eastern Germany, this category is excluded from my analysis of eastern Germany.
[107] Reversed causality might arise from the wage affecting the rate of unemployment. However, by providing an instrument for current unemployment with its lagged value, one might control for this causality at least to some extent.

school degree, both the elasticity (–.006) and t-statistics (–.09) are very low.[108] Consequently, the hypothesis of the existence of a wage curve must be rejected.

For the female labour market in western Germany, the results are also very weak, but a general trend is obvious: The variation between the schooling categories is not as high as that for the male labour market, and there are statistically significant results for the mid-level categories. In general, the elasticity is negative and varies between approximately –5% and –16%. Compared to those for the male labour market, the t-statistics are even lower in the high-school category. Therefore, a rising elasticity with higher qualifications is observed, but with very low statistical significance. On the other hand, for low-skilled male workers the elasticity is more pronounced. The female labour market in western Germany is hardly characterized by unemployment-driven wage differences.

Table 29: Wage curves by school degree, western Germany

	No degree		Basic school		Secondary school		High school	
	M	F	M	F	M	F	M	F
Regional FE	-0.334**	0.201	-0.061	-0.085*	0.015	-0.142**	-0.006	0.048
	(-2.18)	(1.21)	(-1.52)	(-1.86)	(0.23)	(-3.30)	(-0.09)	(0.97)
F-test	9.2	1.5	146.8	6.4	86.6	8.7	111.5	14.9
Indiv. RE	-0.319**	0.169	-0.024	-0.066	-0.036	-0.178**	-0.002	-0.092
	(-2.41)	(0.73)	(-0.80)	(-1.39)	(-0.83)	(-3.39)	(-0.04)	(-1.34)
F-test	347.0	216.5	2653.7	1,068.1	1698.9	1,136.4	2298.9	1,088.4
With interaction terms								
Regional FE	-0.187	0.177	-0.019	-0.019	-0.036	-0.036	-0.014	-0.014
	(-1.49)	(1.04)	(-0.66)	(-0.66)	(-0.91)	(-0.91)	(-0.38)	(-0.38)
F-test	2.6	1.4	14.3	14.3	12.2	12.2	21.9	21.9
Indiv. RE	-0.317**	0.169	-0.029	-0.071	-0.034	-0.173**	0.003	-0.106
	(-2.40)	(0.72)	(-0.93)	(-1.42)	(-0.77)	(-3.28)	(0.05)	(-1.52)
F-test	346.4	212.4	2,653.5	1,067.6	1,700.1	1,137.3	2,300.0	1,090.6
N	651	339	10,388	3,805	4,734	3,461	4,410	2,214

Source: GSOEP; own calculations. * significant at 5%; ** significant at 1%.

Table 30 depicts the results for the eastern German labour market. For eastern Germany, the category 'no school degree' is excluded, as this category is underrepresented in the sample. Two reasons are possibly responsible for such an effect: First, due to high unemployment rates in eastern Germany, there is a crowding-out effect. Second, students in the former GDR left school without a degree much less frequently than did their

[108] Values are only documented for the regional fixed-effect case, but, as can be seen in the table, they do not differ substantially from the model specifications.

counterparts in western Germany,[109] which can be explained by differences in the schooling system and school policies. The results for eastern Germany are substantially different from those for western Germany. First, and most obviously, there is no significant result – with the exception of the female high school category – in the regional fixed effects specification. However, because the patterns of all other models go in another direction, this result is not very reliable. Although statistically not significant, a similar pattern in the elasticity can be observed, with slightly higher values for the lower-level schooling categories. Once again, the exception here is the regional fixed effects specification showing a pattern with the other way around.

Table 30: Wage curves by school degree, eastern Germany

	Basic school		Secondary school		High school	
	M	F	M	F	M	F
Regional FE	-0.076	-0.013	0.053	-0.051	-0.190	-0.218*
	(-0.46)	(-0.08)	(0.55)	(-0.86)	(-1.06)	(-1.94)
F-test	20.479	1.227	57.055	6.237	23.353	4.524
Individual FE	0.106	-0.183	-0.070	-0.011	-0.035	-0.064
	(0.85)	(-1.06)	(-1.08)	(-0.16)	(-0.35)	(-0.53)
F-test	489.6	270.2	1015.8	1112.3	589.7	604.5
N	1,285	650	3,947	3,699	1,527	1,301
With interaction terms						
	Basic school		Secondary school		High school	
	M	F	M	F	M	F
Regional FE	0.142	0.142	-0.087	-0.087	-0.011	-0.011
	(1.08)	(1.08)	(-1.32)	(-1.32)	(-0.11)	(-0.11)
F-test	3.021	3.021	7.138	7.138	7.923	7.923
Individual FE	0.096	-0.173	-0.047	-0.007	-0.037	-0.070
	(0.77)	(-1.00)	(-0.70)	(-0.11)	(-0.37)	(-0.58)
F-test	489.2	270.5	1,017.0	1,111.5	589.2	604.6
N	1,285	650	3,947	3,699	1,527	1,301

Source: GSOEP; own calculations.

6.2.2 Wage curves by vocational position

In this subsection, I estimate the wage curves by vocational position. Table 31 depicts the elasticities for these estimates for western Germany. It is clear that a pattern of an upward or a downward trend for the male labour market cannot be identified, and the elasticity is not significant in any case. For the female labour market, there are significant results, which

[109] See subsection 4.3.1 for a detailed discussion of the differences in schooling between eastern and western Germany before unification.

are highest in the category of white-collar workers, with values above –.3 in the different model specifications. For the individual random effects model, there is also a significant result for female specialists, though it is lower than for the mid-level vocational position, with values just above –.2. Nevertheless, the elasticity is even double the value approximated by Blanchflower and Oswald. These high elasticities indicate, particularly for the female labour market, a significant sensitivity of individual wages to regional unemployment. Wage pressure is higher with increasing unemployment of dependently employed women.

Table 31: Wage curves by vocational position, western Germany

	Unskilled		Skilled		White collar		Specialists	
	M	F	M	F	M	F	M	F
Regional FE	-0.024	-0.158	-0.058	-0.083**	-0.089	-0.108	-0.074	0.066
	(-0.49)	(-0.79)	(-0.87)	(-2.70)	(-0.95)	(-0.70)	(-1.00)	-0.8
F-test	62.3	1,696	64.2	18,431	49.7	3,296	42.2	6,405
Individual RE	-0.043	-0.169	-0.06	-0.091**	-0.032	-0.328*	0.022	-0.204*
	(-1.13)	(-0.98)	(-1.38)	(-2.42)	(-0.49)	(-1.73)	-0.44	(-1.83)
F-test	1,273.7	268.9	1,471.3	1,809.9	862.5	431.7	1,219.1	428.9
With interaction terms								
Regional FE	-0.026	-0.146	-0.031	-0.031	-0.016	-0.016	0.011	0.011
	(-0.71)	(-0.72)	(-0.80)	(-0.80)	(-0.26)	(-0.26)	-0.26	-0.26
F-test	10.3	1.636	15.3	15.287	5.1	5.059	15.1	15.085
Individual RE	-0.044	-0.127	-0.039	-0.074*	-0.034	-0.333*	0.031	-0.203*
	(-1.15)	(-0.73)	(-0.86)	(-1.91)	(-0.52)	(-1.76)	-0.62	(-1.83)
F-test	1,274.1	271.644	1475.3	1813.398	867.1	429.177	1,224.5	429.21
N	6,315	403	4,484	6,202	1,537	461	4,178	1,148

Source: GSOEP; own calculations. * significant at 5%; ** significant at 1%.

Table 32 shows the results for eastern Germany. For men in dependent employment, these results do not differ significantly from those for western Germany. Here, too, one finds a slight increase of elasticities with higher vocational positions, but these elasticities are not statistically significant. With the exception of the individual fixed effects model with interaction terms, the results for female dependent employees also are not significant.

To sum up the results for schooling and vocational position, I can present the following conclusions: as expected, there is variation in the wage-unemployment elasticity among different sub-samples of qualifications. Compared to the estimations of standard wage curves in the previous chapter, some categories do have statistically higher significance. The category of female dependent employees, in particular, shows stronger elasticity in the mid- and high-qualification categories. However, the results are quite weak,

and a clear conclusion cannot be drawn. In the next section, subsamples of demand-specific qualifications are depicted.

Table 32: Wage curves by vocational position, eastern Germany

	Unskilled		Skilled		White collar		Specialists	
	M	F	M	F	M	F	M	F
Regional FE	-0.09	-0.018	0.081	-0.072	0.196	0.046	-0.088	-0.143
	(-0.88)	(-0.11)	-0.44	(-1.17)	-0.71	(0.15)	(-0.48)	(-0.96)
F-test	26.8	2.7	20.7	6.9	12.9	2.5	11.1	2.3
Individual RE	-0.012	0.055	-0.016	0.018	-0.032	0.177	-0.049	-0.034
	(-0.16)	(0.32)	(-0.13)	(0.28)	(-0.17)	(0.58)	(-0.45)	(-0.23)
F-test	1273.7	268.9	1471.3	1809.9	862.5	431.7	1219.1	428.9
With interaction terms								
Regional FE	-0.026	-0.146	-0.031	-0.031	-0.016	-0.016	0.011	0.011
	(-0.71)	(-0.72)	(-0.80)	(-0.80)	(-0.26)	(-0.26)	(0.26)	(0.26)
F-test	10,272	1,636	15,287	15,287	5,059	5,059	15,085	15,085
Individual RE	-0.044	-0.127	-0.039	-0.074*	-0.034	-0.333*	0.031	-0.203*
	(-1.15)	(-0.73)	(-0.86)	(-1.91)	(-0.52)	(-1.76)	(0.62)	(-1.83)
F-test	1,274.1	271.6	1475.3	1813.4	867.1	429.2	1224.5	429.2
N	6,315	403	4,484	6,202	1,537	461	4,178	1,148

Source: GSOEP; own calculations.

6.3 Demand-specific aspects of qualifications

6.3.1 Wage curves by professional groups

Table 33 depicts the results for wage elasticities of different occupational groups.[110] Unlike in the case of eastern Germany, in western Germany statistically high significant results are apparent for men in dependent employment, with the exception of the elementary occupations. The t-statistics are highest for technicians and clerks, indicating that here the relationship is most significant. Furthermore, the elasticities vary around the –.1 value and do not exhibit a clear pattern. However, it is clear that the elasticity is somewhat lower for crafts and machine operators. In the individual random effect model, the results are not clear and elasticities are systematically lower.

[110] For the sake of transparency the estimations with interaction terms are not documented. It has already been shown in previous estimations on school degree and vocational position, as well as in the previous chapter, that the interaction term of lagged unemployment to control for reversed causality is of minor importance. Tests with ISCO subgroups as well as tests for other analyses to follow did not show significant differences in the results.

Table 33: Wage curves for different occupational levels

	West				East			
	Male		Female		Male		Female	
	FE	RE	FE	RE	FE	RE	FE	RE
	b/t/N	b/t/N	b/t/N	b/t/N	b/t/N	b/t/N	b/t/N	b/t/N
(1)	-0.127** (-2.52)	-0.067 (-1.11)	-0.095 (-0.47)	-0.227** (-2.06)	0.498 (-1.11)	0.06 (-0.26)	0.19 (-0.49)	0.379 (-1.40)
	1,041		374		286		231	
(2)	-0.051** (-2.15)	-0.03 (-0.96)	-0.003 (-0.04)	-0.054 (-1.04)	-0.059 (-0.29)	-0.048 (-0.49)	-0.021 (-0.15)	-0.002 (-0.02)
	3,182		1,651		1,100		1,084	
(3)	-0.095** (-4.11)	-0.063** (-2.07)	-0.019 (-0.42)	-0.090** (-3.31)	-0.125 (-0.62)	-0.322** (-3.45)	0.057 (-0.70)	-0.05 (-0.85)
	3,574		4,719		904		2,343	
(4)	-0.165** (-5.09)	-0.097** (-2.18)	-0.077 (-1.39)	-0.131** (-3.77)	0.015 -0.04	-0.031 (-0.19)	-0.133 (-1.27)	-0.191** (-2.39)
	1,773		3,068		328		1,244	
(5)	-0.104** (-2.08)	-0.083 (-1.29)	-0.072 (-1.19)	-0.073* (-1.90)	-0.537* (-1.67)	-0.241 (-1.34)	-0.033 (-0.23)	-0.034 (-0.38)
	762		2,374		350		961	
(6)	-0.064** (-3.84)	-0.040* (-1.71)	0.103 -0.77	-0.073 (-0.84)	-0.04 (-0.34)	-0.121** (-2.06)	0.159 -0.55	0.032 -0.15
	5,938		564		2,376		273	
(7)	-0.057** (-2.35)	-0.057* (-1.72)	-0.312* (-1.97)	-0.101 (-1.22)	0.06 (-0.32)	-0.013 (-0.14)	-0.618 (-1.20)	-0.251 (-0.97)
	2,951		574		980		156	
(8)	-0.06 (-1.48)	-0.033 (-0.61)	-0.003 (-0.03)	-0.009 (-0.15)	0.024 (-0.08)	-0.123 (-1.00)	-0.553* (-1.91)	-0.641** (-3.38)
	1,231		1,073		466		251	

Source: GSOEP; own calculations. (1) Managers, (2) professionals, (3) technicians, (4) clerks, (5) services, (6) crafts, (7) machine operators, (8) elementary occupations. * significant at 5%; ** significant at 1%.

In the female labour market for western Germany, elasticities for all professional groups are statistically significant for both model specifications. Although controlled for regional effects in both models, this outcome indicates that in the case of women, the unemployment rate has an even stronger effect and individual-specific factors do not count as much. This result is different in the face of most of the previous estimations. It therefore indicates that, depending on the professional subgroup, female dependent employees are confronted with relatively high variation in their income which in turn is dependent on regional unemployment variation. The highest elasticity is observed for female managers, with a statistically significant –20%. Technicians, clerks, and services also show statistically negative elasticities around the –10% margin. In eastern Germany, the elasticities are not statistically significant in most specifications. An exception is men in the service professions, with a statistically significant –.5 elasticity for the regional fixed effect model. For both men and women in the eastern German labour market, the elementary occupations have a high and statistically significant rate of over –.5.

In sum, the estimations on occupational groups are more reliable than the previous categories on formal education. There is weak support in the regional fixed effect model for western German male employees that wage curves are steeper for higher qualification levels. The other groups show ambiguous but partly significant results. Because there are different effects within the efficiency wage model, one can consider differences in the importance of these effects. In the following subsection, I focus on economic branches and firm size.

6.3.2 Wage curves by NACE

Table 34 shows the wage curve elasticities for NACE categories. Separate estimations are depicted for men and women in the labour market as well as for eastern and western Germany. I have already shown that this kind of classification is advisable, as these groups and regional classes have specific preconditions. [111] When examining the results in table 34, one most likely notices first that the elasticities in the NACE subgroups are less significant than those for the profession-specific subgroups. This is in a way astonishing, for – regardless of individual qualifications – one could expect that different branches are confronted with differences in the bargaining system. Because unionization in mining and manufacturing are expected to be high as these industries are characterized by large multinationals, which might have led one to expect lower variation of wages.

One might also have expected the eastern part of Germany to be characterized by a statistically higher significance due to lower unionization. In the previous chapter, we have seen that this is not the case in the analysis of the aggregate labour force. Moreover, this result holds in the branch-specific analyses. As I have already suggested, this outcome may be caused by the nature of the unemployment figures: it is not actually clear whether the general unemployment rate provides an accurate picture of the potential labour force.

[111] In subsection 3.3.6, I presented the definitions of the NACE code in more detail and discussed the adjustments for my analyses.

Table 34: Wage curves for different professional groups, men in western Germany (NACE categories)

	West				East			
	M		F		M		F	
	FE	RE	FE	RE	FE	RE	FE	RE
C, D	-0.033 (-0.75)	0.022 (0.69)	-0.073 (-1.15)	-0.029 (-0.45)	0.054 (0.36)	0.115 (1.15)	-0.299* (-1.89)	-0.190 (-1.24)
	8,594		2,377		1,835		650	
E, F	-0.103 (-1.11)	-0.048 (-0.63)	-0.229 (-0.49)	0.695* (1.79)	-0.175 (-1.07)	-0.171 (-1.24)	-0.119 (-0.44)	0.054 (0.17)
	1,942		142		1,193		181	
G–I	-0.024 (-0.26)	-0.048 (-0.71)	-0.112* (-1.71)	-0.178** (-2.26)	-0.009 (-0.05)	-0.237* (-1.82)	-0.243 (-1.53)	-0.138 (-0.91)
	2,609		1,829		961		907	
J, K	-0.169 (-1.40)	-0.117 (-1.26)	-0.015 (-0.21)	-0.192* (-1.95)	-0.140 (-0.42)	0.230 (1.06)	-0.224 (-1.20)	0.149 (0.71)
	1,418		1,008		386		464	
L–P	0.028 -0.21	-0.079 (-0.65)	-0.213** (-2.57)	-0.117 (-1.19)	-0.138 (-0.55)	-0.096 (-0.53)	0.024 (0.18)	-0.001 (-0.01)
	1,339		1,254		563		910	

Source: German Socio-economic Panel; own calculations. Categories not reported are due to low cell numbers; category 9, exterritorial organizations, is excluded from the entire sample. * significant at 5%; ** significant at 1%.

6.3.3 Wage curves by firm size

The respective elasticities for estimations on firm-size subgroups are documented in table 35. For western Germany, in particular, one can observe that firms with more than 2,000 employees show a highly significant elasticity; for men, it is –.108 in the regional fixed effect model and even –.68 when we additionally control for individual effects. In the female labour market for western Germany, this effect is even higher for large firms. In the individual fixed effect model, the elasticity is about –.134 for very large firms and even –.249 for firms with 201 to 2,000 employees.

In the eastern German labour market, one can observe slightly higher elasticities for larger firms in the male labour market, whereby in the individual random effect model the elasticity is also quite high and statistically significant for relatively small firms with 5 to 20 employees. These results are in line with the earlier predictions made on the basis of existing theory. In general, the wage curves are statistically less significant in eastern Germany. This result is also in line with the estimations presented in the previous chapter and with the assumption of a concave wage curve, which is flatter in high-unemployment sections.

At this point, a word on theoretical modelling is apt.[112] These results refer to the conclusion that the bargaining approach is reasonable because a central hypothesis within such a model is that large firms should provide lower elasticities, particularly in Germany. Supported by the German Works Constitution Act[113] bargaining rights dependent on the firm size. Therefore smaller differences and lower elasticities in large firms are expected, because differences in remuneration between firms are expected to be lower. In fact, the opposite can be observed. This supports the theoretical considerations in chapter 2 that the bargaining approach is not the appropriate approach for the German labour market and that the wage efficiency model provides a better fit.

Table 35: Wage curves for different firm sizes

	West				East			
	M		F		M		F	
	RE	FE	RE	FE	RE	FE	RE	FE
(1)	-0.051 (-0.89)	0.007 (0.09)	0.292 (1.01)	-0.108 (-0.75)	-0.051 (-0.35)	-0.091 (-1.28)	0.210 (1.12)	-0.042 (-0.37)
	638		348		935		545	
(2)	-0.084** (-3.02)	-0.080** (-2.22)	0.086 (0.53)	-0.108 (-1.38)	-0.113* (-1.68)	-0.122** (-3.03)	0.164 (1.33)	0.024 (0.28)
	2,427		1,257		2,314		1,137	
(3)	-0.071** (-3.96)	-0.052** (-2.15)	0.007 (0.05)	-0.071 (-1.16)	-0.00o (-0.01)	-.000 (-2.23)	-.000 (-0.70)	-0.038 (-0.57)
	5,843		2,674		4,312		2,144	
(4)	-0.095** (-5.14)	-0.081** (-3.27)	-0.071 (-0.42)	-0.249** (-3.10)	-0.065 (-1.32)	-0.085** (-2.84)	-0.178 (-1.64)	-0.245** (-3.14)
	5,682		1,312		3,693		1,550	
(5)	-0.108** (-6.40)	-0.068** (-2.99)	-0.184 (-1.10)	-0.134* (-1.76)	-0.117** (-2.16)	-0.117** (-2.16)	0.125 (1.02)	0.087 (1.02)
	5,999		1,305		3,203		1,209	

Source: German Socio-economic Panel 2000–2004, German Employment Office. (1) Less than 5 employees; (2) 5 to 20 employees; (3) 21 to 200 employees; (4) 201 to 2,000 employees; (5) more than 2,000 employees. * significant at 5%; ** significant at 1%.

However, what can be stated from the efficiency-wage perspective? I have already stressed that either differences in expended effort or differences in the probability of shirking detection could cause differences in elasticities. Both effects can occur among firm-size subgroups. First, effort could be higher in large firms, as several hierarchies raise the

[112] Different theoretical models of the wage curve were discussed in subsection 2.4.5. I have already presented the argument that the efficiency wage model seems to be more appropriate.

[113] The Works Constitutions Act (*Betriebsverfassungsgesetz*) target is to ensure that every person in an establishment is treated in accordance with the principle of equity and that there is no discrimination on the basis of gender. The act stipulates that works councils should be founded in all establishments that have five or more regular employees, with voting rights to represent workers. Work agreements negotiated between the employer and the works councils apply to all employees, regardless of whether or not they are a trade union member.

intrinsic motivation of the employee: the target of his or her work may be to perform better than colleagues. This circumstance can result in higher elasticities in larger firms. Second, higher elasticities can be caused by working conditions that are more standardized. Whereas in a small firm one employee might manage several specific tasks, in larger companies there are sometimes several departments for the same tasks, making it easier to monitor the work of each employee. As a result, shirking can be expected to be lower in large firms. The results are therefore in line with the theoretical expectations presented earlier.

6.4 Wage curves in unemployment categories

So far, I have considered labour market subgroups by the demand- and supply-side characteristics of qualifications. Regional aspects – apart from the East-West labour markets – have not been discussed in detail. The following analysis takes up this focus. The common assumption with respect to aspects of qualifications is that high-unemployment regions are characterized by a lower-skilled labour force. The question is what effect ceteris paribus changes in unemployment would have on the wage curve. Therefore, in extension to static estimations, changes in the unemployment rates are simulated for different unemployment categories.

As I have shown, the categories eastern Germany and western Germany are useful for reliable estimations. Moreover, these differences can be handled either by introducing a dummy variable or by running separate analyses. For the following analyses, however, another approach is favoured: I do not differentiate by the 'historical' facts of development after the Second World War. Rather, I consider current labour market performance figures based on the unemployment rate. The sample is divided into five main categories of unemployment (see table 36). The limits of these categories are defined by percentiles of individuals in regional clusters from very low unemployment in category 1 (10% percentile) to very high unemployment in category 5 (90% percentile).[114] The western German regions have significantly lower unemployment rates in most regions. The best-performing eastern German region in 2004 in terms of unemployment was Dresden, which ranked number 139 with an unemployment rate of 15.4%, followed by Potsdam (ranked 140, with 15.5%) and Jena (ranked 141, with 16.7%); ten of the agency regions with the highest unemployment rate in 2004 are regions in eastern Germany.

[114] Unemployment figures for all agency regions are documented in table A3 (in the appendix).

Table 36: Definition of regions by unemployment categories

UE category	UE range	Frequency	Relative share (%)
1	u < 6.3%	4,407	9.7
2	6.3% < u < 10.3%	7,203	15.9
3	10.3% < u < 16.0%	11,345	25.1
4	16.0% < u < 20.0%	17,843	39.4
5	u > 20%	4,444	9.8
	Total	45,242	100.0

Source: German Socio-economic Panel; own calculations.

With these categories I already implicitly control for an East-West cluster. However, this approach is defined by empirical facts and opens up the possibility of exceptions. What does this imply for the wage elasticity? Table 37 shows wage elasticities for male and female labour market segments. For the wage curve for men, the highest elasticity is estimated in the mid-level category (10%–14% unemployment), indicating a statistically significant coefficient of –.15 in the regional fixed effect model, and –.133 in the individual random effect model. In general, the elasticity seems to be higher in high-unemployment regions. For the case of women, the category 'more than 20% unemployment' is statistically significant and has a high positive elasticity of over 60%, prompting an interpretation that high unemployment in a region leads to higher wages. I therefore cannot verify the hypothesis that, because the unemployed labour force is more competitive than the long-term unemployed dominating regions with high unemployment rates, regions with low unemployment tend to have higher elasticities.

Taking the results of the former studies on school degrees into account, one finds that this is not counterintuitive. Because the wage curve is steeper in the low-skilled categories, and because unemployment is very much a problem of lower-skilled individuals, one can expect higher elasticities, when it is assumed that low-skilled individuals are characterized by reduced mobility. Although different from the expectation discussed in section 2.6, this result can be explained within the framework. The central assumption is that both regions have the same level of unemployment benefit; first, for zero migration equilibrium, they must face different distributions of demand shocks and exhibit different wage-unemployment patterns. Second, the convexity of the wage curve is defined by the effort of the employees. In a two-region economy with different levels of effort, a region with higher expended effort results in a steeper wage curve. Therefore, an overall increase in unemployment in a specific high-unemployment region induces higher effort. Consequently, one can expect the wage curve to be steeper in a particular set of regions with high unemployment. The impact of a ceteris paribus change in the unemployment level is analysed in the next section through a simulation of changes.

Table 37: Wage curves by unemployment category, by gender

Category		M		F	
		FE	RE	FE	RE
1	UE < 6.3%	-0.097	-0.051	-0.101	-0.254**
		(-0.68)	(-0.53)	(-0.97)	(-2.14)
		2,355		1,604	
2	6.3% < UE < 10.3%	-0.047	-0.058	-0.009	0.001
		(-0.36)	(-0.68)	(-0.08)	(0.01)
		3,874		2,581	
3	10.3% < UE < 16.0%	-0.150*	-0.133**	-0.016	-0.021
		(-1.65)	(-2.11)	(-0.21)	(-0.25)
		5,946		4,258	
4	16.0% < UE < 20.0%	0.072	0.050	-0.006	-0.016
		(1.32)	(1.34)	(-0.16)	(-0.39)
		8,777		7,524	
5	UE > 20%	-0.247	-0.221*	-0.029	-0.029
		(-1.24)	(-1.78)	(-0.22)	(-0.22)
		2,078		2,117	

Source: German Socio-economic Panel; own calculations.
* significant at 5%; ** significant at 1%.

6.5 Simulation of changes of unemployment levels

Up to now, I have shown the (more or less static) pattern in specific regional unemployment clusters. Although the results are not entirely stable, one can assume that there is a difference in the elasticity which depends on the overall unemployment level. The general assumption is that low-unemployment regions tend to have higher elasticities and therefore steeper wage curves. The empirical results, however, do not paint such a clear picture. The question therefore becomes, what impact is made ceteris paribus by a change in unemployment. The background of such a change could be any external shock or change on the demand side. I have already introduced these kinds of shocks within the framework of the efficiency wage model in section 2.6.

To test the impact, I simulate the effect of a variation in different unemployment classes. For the sake of transparency, the results are limited to men in full-time dependent employment. The sample consists of regions in eastern and western Germany, and I control for this with a dummy variable in order to take into account unobserved differences between them. In addition, I control for regional differences by means of regional dummy variables for unemployment classes. The results of the simulation are depicted in table 38.

The first column shows elasticities of a standard wage curve with a sample including male employees in regions in eastern and western Germany. An elasticity of –.096 is

obtained, which is statistically significant at the 1% level in the regional random effect model, and –.060 when one additionally controls for individual effects in a random effect model. Therefore, in this specification the results are more or less in line with the hypothesis put forward by Blanchflower and Oswald.[115]

In the second column, an overall reduction of unemployment of 10% is simulated. As can be seen, there is no change in the elasticity, but a change in the intercept. An overall reduction of the unemployment rate therefore does not have any impact. This implication is not as trivial as it might at first seem: a reduction implies an upward shift of the wage curve and thus an increase in overall remuneration. It therefore contradicts the oft-stated argument that a reduction in unemployment implies more pressure on the labour market, less bargaining power on the supply side, and hence lower wages.

In the third column, I vary the unemployment in regions with very high unemployment of above 20%. With –.099, the elasticity increases because of an unemployment reduction of 1% (at 20% unemployment) in the case of the regional fixed effect model. Therefore, in this category the overall wage becomes slightly more volatile. When one additionally controls for individual effects, no significant effect is observed. The fourth column indicates a 20% unemployment reduction in category 4 (14%–19% unemployment). Here, the elasticity increases about 0.8% compared to the initial situation, and is therefore again slightly higher than a reduction of a region with very high unemployment. The change in the individual random effect model is very low with –.061 compared to –.060 in the previous cases. Categories 1 to 3 show a statistically significant reduction of the elasticity with a respective change. The change ranges from 0.8% (category 3) to 1.1% (category 2). This reduction in the elasticity comes with a decrease of the intercept. Hence, when unemployment is reduced, the wage curve gets flatter and is on a lower level in the high-wage, low-unemployment region.

[115] In the following columns, the unemployment rate is sequentially reduced within the unemployment categories by a 10% margin. This 10% reduction implies a reduction of two percentage points in the case of an unemployment rate of 20%, and a 1% reduction when the unemployment rate is 10% in the respective region.

Table 38: Simulation of changes in unemployment figures, men in full-time dependent employment

	Orig.	Overall 20% red.	20% reduction in unemployment category				
			Cat. 5	Cat. 4	Cat. 3	Cat. 2	Cat. 1
Regional FE							
Lnu	-0.096**	-0.096**	-0.099**	-0.103**	-0.088**	-0.086**	-0.087**
	(-9.94)	(-9.94)	(-9.89)	(-10.02)	(-9.43)	(-9.49)	(-10.10)
_cons	2.378**	2.394**	2.397**	2.407**	2.375**	2.369**	2.371**
	(-77.2)	(-74.8)	(-74.2)	(-73.3)	(-74.6)	(-76.7)	(-78.8)
Individual RE							
Lnu	-0.060**	-0.060**	-0.060**	-0.061**	-0.051**	-0.049**	-0.052**
	(-4.95)	(-4.95)	(-4.90)	(-4.96)	(-4.43)	(-4.38)	(-5.12)
_cons	2.241**	2.258**	2.259**	2.258**	2.234**	2.225**	2.240**
	(-54.7)	(-54.3)	(-53.8)	(-54.3)	(-55.6)	(-54.4)	(-57.9)
N	22,590	22,590	22,590	22,590	22,590	22,590	22,590

Source: German Socio-economic Panel; own calculations.
* significant at 5%; ** significant at 1%.

6.6 Conclusion

To sum up the empirical results, the efficiency wage framework seems to be the appropriate approach to explain wage curves in the German labour market. We cannot verify Blanchflower and Oswald's hypothesis about the 'general rule' of a unique wage curve. What one can observe is an alleviated form of wage curve which shows different elasticities by qualification-specific labour market subgroups. What I can observe is an alleviated form of wage curve, which shows different elasticities by qualification-specific labour market subgroups. Although my results are partly statistically weak they allow to draw some conclusions. Especially the wage curves from professional-group and firm-size estimations show a good model fit. Obviously, the differences in elasticities are not solely based on regional differences in the overall unemployment rate. Unemployment matters, but is not the sole explanation of wage differentials. Especially analyses between eastern and western Germany indicate that they partly following other or further rules. Subgroups with higher qualification, particularly school degree, show higher variation in higher qualification groups. The same is the case for a classification in respect to the actual vocational position.

This clearly indicates that wages of lower skilled are less volatile in respect to unemployment figures in regions. This is an indicator for the fact that competition between qualified is higher, and let to the hypothesis that more specific qualifications are responsible for further wage differentials. Higher qualification makes employee more dependent from regional labour market performance; their earning is more related to their individual abilities and their actual effort. In firm size related subgroups, larger firms have higher wage

elasticities. This result is counterintuitive especially from the perspective of the bargaining theory: Larger firms are subject to stronger regulation with respect to wage-setting rules and their payments are in general stronger related to collective agreements. As bargaining power of employee is higher one would expect that here wages are less volatile in respect to regional unemployment levels. In the light of the efficiency wage theory, however, this result makes sense: there is a selection bias of people working in large firms; they are willing and/or able to provide more effort. Competition within the labour force concerning a job in a larger firm with more comfortable is at hand.

However, the results from subgroup estimations are weak. Especially for the first-degree variables on formal education (school and vocational position), no statistically significant wage curve is identified. Some conclusions, however, can be drawn: one observable trend is that higher education results in higher wage elasticities, which is in line with the theoretical prediction from the wage curve. The wage curves from professional-group and firm-size estimations support these results, which show a slightly better model fit. More reliable conclusions are possible. The differences in elasticities are not solely based on regional differences between eastern and western Germany (which is one result from the previous chapter). Differences in the German labour market according to different qualification-specific subgroups are also observable. In consideration of the results from the previous chapter, as well as of other studies on wage curves in Germany, it is not possible to verify the existence of a standard wage curve, though it is possible to verify an alleviated wage curve with variation in labour market adjustment.

For the subgroups by first formal qualification degree ('school degree') and the current vocational position, the hypothesis of a increasing elasticity with higher qualifications is verified. For subgroups by professional classification (ISCO) and branches (NACE), the results are too weak. In the subgroups by firm size, larger firms that are subject to stronger regulation with respect to wage-setting rules have higher wage elasticities. This result is counterintuitive from the perspective of the bargaining theory. In the light of the efficiency wage theory, however, this result makes sense: there is a selection bias of people working in large firms; they are willing and/or able to provide more effort.

So far, I have analysed the impact of unemployment on wages, and in the last section of this chapter I examined the impact of different unemployment classes on the wage level. In the next chapter, I turn to the institutional side and consider how the performance of regional labour market policies can be measured.

7 Performance in public employment services: The Swiss model and an application with German data

So far, the focus of my empirical work has been on the impact of regional unemployment on wages. In the previous section, I analysed the impact of chances in regional unemployment figures and simulated ad hoc chances. It was shown that a reduction of unemployment can result in an upward shift of the wage curve, which means that a reduction implies not only a higher wage level along the wage curve but also a change in its location. However, the changes were assumed to be external shocks. In this chapter, I examine how policy can influence changes of the unemployment. One hypothesis is that the quality of labour market policy depends on economic conditions. In the absence of market prices, the relative performance of regional public employment services can be measured adequately with a quantitative model. On the basis of this, an instrument based on yardstick competition is applied. This concept allows one to conduct artificial prices in markets with regional monopolies and homogenous goods.[116] I introduced the theoretical background of such an approach in section 2.8.

I begin this chapter by discussing the main motivation for a regional performance measure of public employment services.[117] The systems of Germany, the Netherlands, the United Kingdom, Switzerland, and Australia are highlighted. The second section focuses on Swiss labour market reforms. After briefly introducing the labour market conditions initiating the reforms of the 1990s, I highlight the institutional aspects of Switzerland and outline the main reform steps of the country's labour market policy. With reference to an earlier theoretical discussion on management by objectives in public employment services (see section 2.8), section 7.3 discusses the way the system has been implemented. Specific problems are highlighted. Section 7.4 examines whether the models underlying the performance measurement are sufficiently reliable. The question here is the applicability of such an approach more or less independent of institutions. However, because this thesis focuses on the German labour market, the results are incorporated in the analyses of chapter 8.[118] In the final section, major conclusions and political implications are presented.

---

[116] Basically, the model developed by Schleifer (1985) is dedicated to regional monopolies with homogenous goods like water or energy. The approach is adapted for the measurement of relative efficiency in regional employment offices and was first introduced in the Swiss labour market.

[117] For a more detailed discussion see Hilbert (2004).

[118] The impact of active labour market policies on regional wage-setting is analysed in .

7.1 Motivation for the improvement of PES performance

In recent years, many countries have become increasingly interested in structuring government organization and financing of job brokerage and employment reintegration to use market forces, whereas until the 1990s most European countries had a state monopoly in job placement. Because there are as many institutional settings and historical preconditions as countries exist, these systems vary extensively ranging from traditional administrative solutions to entire privatization of job placement. Whereas countries such as Netherlands and Australia privatize their former public employment services, others countries, such as Switzerland and Germany, try to reorganize their public employment services to get 'better' output. However, what is 'better' output, and how can this be measured? The mentioned countries have introduces different more or less elaborated models to measure and compare the regional outputs.

These reforms are the main topic of this chapter, focusing organizational change of the public employment services from input to output control. This basically means the change from an administrative public employment service to an organization in which agencies have a lot of freedom to decide for themselves what actions to take. However, a more decentralized system requires that there is some kind of quality control. In a market situation with real competition between contractors, the price mechanism would take care of that, but this is not the case here, as public agencies are mentioned here.

To handle this, the Swiss introduced a control mechanism based on benchmarking linked with a monetary incentive scheme. They have created a system making it possible to compare the relative performance of regional agencies quantitatively. One could imagine that if relative performance is made visible, this alone will create competition between the agencies and such competition may be expected to improve the results. However, in their original plan, the Swiss even went one step further by making the budget allocated to a regional agency dependent on its relative performance. This was supposed to provide a strong incentive for improvement. Even given the fact that this change in the allocation system was indeed passed initially but never put through in full extent, it seems to be worth wile to take a closer look at the Swiss plan, how it was implemented and why some parts of it were not realized.

The decentralization involved in the Swiss reform of the public employment services has a wider significance and is an important topic in the international governance discussion. To overcome traditional, administrative systems, there are mainly two alternatives: either the system will be privatized, which means in the context of public employment services that the services will be contracted out under specific regulation

schemes, or the local public agencies get more freedom in design and budgeting within agreements on objectives.

An important aspect of decentralization is to bring decisions closer to where problems are, as it facilitates the coordination of labour market policy with economic development strategies and adapting policies to local conditions. Different approaches of governance are flourishing in nearly all OECD countries. Independent of the organizational consequences, the objective is to improve the performance of regional offices. In any case, when looking at regions and giving regional actors responsibility on their policy, tools to monitor or control their performance are needed. Whereas concepts like 'balanced scorecard' are primarily designed to evaluate single regions' performance, concepts to compare regions among each other have dynamic components: First, they focus on the construction of a kind of competition; second, they support learning from each other. [119]

The performance-based management, which is what the approach basically implies, rests on the assumption that in the absence of market prices relative performance can be measured adequately through a quantitative model. In the case of the public employment services, this is not at all obvious, as the results achieved by the public employment service depend on many context factors outside the control of the public employment service. In the Swiss approach, this is accounted for by correcting gross output using regression models that are supposed to include the relevant factors. Question is then whether these models are sufficiently reliable to form the basis of a budget allocation model.

7.2 Labour market policy institutions in Switzerland and the reforms of the 1990s

From an economic point of view, Switzerland has a special status within Europe which is apparent, for example, from its political neutrality.[120] Apart from this, the economic

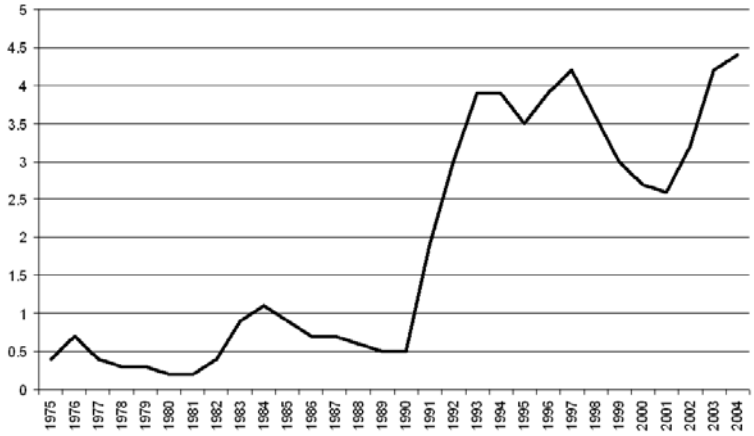
---

[119] Independent of the degree of market orientation of the public employment services, the mentioned countries have introduces different more or less elaborated models to measure and compare the performance of regional agencies. Whereas countries such as the Netherlands, the United Kingdom, and Australia chose the way of (full) privatization their former public employment services, some others like Switzerland and Germany try to reorganize their public employment services to achieve 'better' output. Schütz (2003) gives an overview of different management by objectives in European labour administrations. Bruttel (2005) analyses the privatization activities of Australia, the Netherlands, and the United Kingdom in more detail, focusing on contracting-out.

[120] This has not been changed substantially since the end of the Cold War. There are, of course, different examples of more intensive cooperation, for example between the European Union and Switzerland. But the point here is that this has in no way the extent of integration like that in Finland, Austria, or the Central and Eastern Europe.

development with only little cyclical variation after the Second World War is unique. Despite relatively weak but continuous economic growth during the entire post-war period, the structural unemployment remained nearly zero. This changed dramatically at the beginning of the 1990s. Figure 15 reflects this development: the Swiss unemployment rate grew from around 1% to 3.9% – which means for around 200% within only one year. Due to increasing unemployment, the necessity for an active labour market policy was recognized and substantial reforms have been conducted.[121]

Figure 15: Development of Swiss unemployment rate, 1970–2003



Source: OECD, CESifo.

With respect to institutions, one finds a structure comparable to those in Germany, with considerable power of the regions (i.e. the Swiss cantons). The House of Parliament (Bundesrat) and/or the Federal Department of Economic Affairs (Eidgenössisches Volkswirtschaftsdepartement) has the responsibility for economic policy. The conception and implementation of labour market policies are characterized by a strong parliamentarism on the one hand, and a co-determination of federations, management and industry and cantons on an early level. For example if a law is in parliament, relatively small groups can exercise influence through a referendum. Due to the federal structure, the cantons also exercise large influence, so that the legislation is bound to a strong consensus orientation.

From a legal point of view, labour market policy is based on three pillars. First, the federal law over the mandatory unemployment regulates predominantly passive measures, which means the payment of benefits. The second component is the legislation regulating the permission of foreign workers. The Federal Office for Foreign Affairs is responsible

[121] Sheldon (1998) identifies two characteristics of labour market developments in the 1990s that present specific problems. First, he argues that the high unemployment is not to be attributed to high reductions in staff in the first instance, but to an increasing 'closeness' of the job market. Before 1977, unemployment insurance was not mandatory

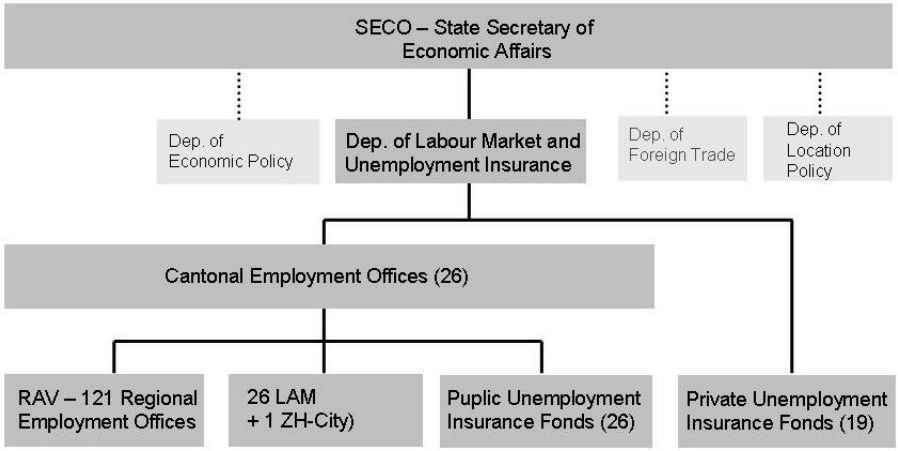
for these questions. The third pillar is the Arbeitslosenversicherungsgesetz (or 'AVIG' – Unemployment Insurance Act), which regulates the public employment service and active labour market policies. The AVIG is the main focal point in the labour market reforms. With the AVIG, the main competence of the regulation authority is in the hand of a national institution, while the operational implementation is in the hand of the cantons. The strategic guidance and the supervision are with the Federal Department of Economic Affairs within the State Secretariat for Economic Affairs (Staatssekretariat für Wirtschaft, or 'SECO').

The reforms have been initiated in reaction to massive changes in the labour market in the early 1990s and these efforts resulted in a broad reform of the AVIG. Before hardly negligible labour market policy activities where organized on the communal level. In 1995, parliament discharged the revision of the AVIG and created the conditions for reform. A key point of the reforms was to make the national level more central in strategic questions and to encourage transparency between regions by maintaining a strong orientation on regional aspects. The cantons have been required to build up regional employment bureaus (*regionale Arbeitsvermittlungszentren* – RAVs) as operative units of placement activities in the regions. Figure 16 shows the most important labour market institutions following the 1995 reform.

The Department of Labour Market and Unemployment Insurance within SECO is the national institution in charge of strategic labour market policy. On the cantonal level, there are also three more or less independent institutions responsible for specific sub-areas of labour market policy. First, the Public Unemployment Insurance Funds responsible for unemployment benefits.[122] The main tasks of the LAM (Logistic of Active Measures) are the management and central acquisition of specific trainings. Main objective is cost reduction and transparency through standardization. The RAVs are centres mainly responsible for the integration of unemployed. The RAVs are the most relevant institutions for public placement and therefore, they are in centre of interest in the following sections.

[122] The private unemployment insurance funds have the same function. Their existence is based on historical reasons and the membership of dependent employed depends on their choice.

Figure 16: Main institutions of labour market policy



Source: SECO; own illustration (reduced diagram of the organization).

The cantons are obligated to operate as many RAVs as necessary for the support of the unemployed. The costs are carried by the unemployment insurance fund and accepted by SECO. The RAVs exist since 1998 and initially there where 151 agencies. A special feature of the RAVs is that their number as well as their geographical extent is not fixed. They can be organized from the cantonal level due to specific necessities in regions.[123] The strategic guidelines and objectives as well as the financing of measures are given by the national government and the responsible institution, SECO. To support efficient resource allocation, SECO needs a tool to measure and compare the activity and the output of the cantons, respective the RAVs. In the first stage of the reform, SECO formulated activity agreements (so-called *Leistungsaufträge*) with the cantons. Nevertheless, the first evaluation of the reforms in 1999 showed, that a substantial revision was needed (Imboden, Baumann et al. 1999).

In sum, the evaluation showed that the first stage reforms gave substantial improvements in labour market policy, as the AVIG revision of 1995 is marked by massive changes in institutional structure. However, a number of inefficiencies have been found. One of these inefficiencies is the fact that the new RAVs started to develop their own objectives and strategies, while they were supposed to follow the primary SECO goals. This was caused by the fact that labour market measures were designed at the central level and had to be appointed by the RAVs from the central level. Owing to this centralization of

[123] Due to historical developments private employment offices have an important role. Therefore the market share of the public employment services in number of placements is only around 20%. Private agencies are mostly profit-oriented and therefore, their main interest is to employ people as fast as possible and consequently, their clientele are in the first line the easy to employ job applicants. The public employment service therefore has its main objective in reintegrating those unemployed persons not placed through the private market. For detailed information on private employment services in Switzerland, see Henneberger and Sudjana (2003).

active measures, the latter did not sufficiently meet regional needs. At the same time, there was no incentive for weighing off costs and benefits in the use of the measures. There was a tendency among the RAVs to make use of the measures as much as possible.

The evaluation led to a new 'order for achievement' (*Leistungsauftrag*) and to a transition to an output orientation. In line with this, together with the cantons, SECO decided to replace the former resource-oriented input by an impact-oriented output control. From this agreement, the 'Vereinbarung RAV/LAM/Amtsstelle 2000' was adopted. The new agreements between SECO and the cantons included a wider window of opportunities in the composition of regional labour market policies. To control for the activities and their efficiency in the sense of management by objectives, a model was established allowing an impact-oriented comparison of the RAVs through four performance indicators. This combined system can be interpreted as a kind of market simulation. This model based on management by objectives was already introduced in section 2.8.[124] In the following section, implementation of a yardstick model is discussed in more detail.

7.3 Implementation of the Swiss model

7.3.1 The benchmarking model and implementation scheme

Due to the contractual agreement, the Swiss Federal Government sets the strategic objectives for the labour market. The responsible institution, SECO, is in the role of principal. Its concern is to motivate the agents, the cantons with their RAVs, to set their operational objectives in line with the strategic and political goals. In this setting there is asymmetric information in the specific regional labour market conditions. SECO has in-depth knowledge of the national labour market and macroeconomic developments and defines political goals on the basis of this information. Regions on the other hand are less informed – and also less interested – in national developments as their main focus is on the performance of their own regional labour market. Using the principal-agent approach as a tool to handle this potential divergence means dealing with an ex-ante agreement. The agreement is set in a way that the incentives for the agents are in line with the objectives of the principal. This means that it should be rational for the agent to act in a way that leads

[124] Puhani (2003) gives a comprehensive overview and explanation of the reasons for the developments in unemployment over the past decades in Switzerland. Bertelsmann-Stiftung, Hans-Böckler-Stiftung, et al. (2001) and SECO (2002) discuss the broad field of benchmarking and labour market reforms in Switzerland.

to fulfilment of the goals of the principal. In Swiss labour market policy, the central objective is a quick and sustainable reintegration of unemployed persons in the labour market. Thus, SECO rewards individual RAVs according to the degree to which the latter achieve this objective better than other RAVs.[125] Therefore, achievement indicators were to be used as criteria to judge the performance of the RAVs (Imboden, Baumann et al. 1999).

Objectives in the agreement are defined by defining four individual impact indicators (for more details see Robert 2000). The objective measured with the fourth indicator (ind4) is the sustainability of reintegration and is measured by the share of re-registration of unemployment in relation to the total employment. In a further step, these four indicators are aggregated to a total indicator of the relative regional labour market policy performance. This step in the procedure is strictly normative, and in the analyses, two different weighting schemes have been applied and two different indicators have been compiled. In the following analyses, I pick up the results of the previous benchmarks, both, the different target measures, as well as the two alternative total indicators.

In the previous section, I used the extended unemployment rate as a regional performance indicator. In this case, high unemployment rates stand for low performance and vice versa. To conduct comparative elasticities with the performance indicator from the benchmarking model, these indicators must be transformed, because there the best-performing regions have high indicator values, whereas low-performing regions have low values. The transformation is conducted by subtracting the indicator value of a region from the highest value in the respective indicator category. Because the cantons and the RAVs act under regionally specific conditions, the goals must be corrected for regional factors that influence the outcomes but are out of the control of the RAVs. Technically, this is done by carrying out multivariate cross-section regression analyses for each of the four indicators.

7.3.2 Experiences with the yardstick competition approach

In practice, the monetary incentive scheme was never implemented to its full extent. The year 2001 was the first and only year during which the remuneration scheme was used. Here, 16 cantons showed above-average performance, whereas 10 performed below average (NZZ 2001). In the ensuing public discussion on the results, problems arose with the acceptance of the output indicators. Especially – and not really remarkably – the RAVs that did not perform well did not accept the results. But what happened? Why was the

[125] For a detailed description, see Robert (2000).

system never introduced to its full extent? Why did the canton not even give the system a chance in practice, although they had accepted in beforehand?

Actually, a scientific evaluation of the entire scheme (benchmarking and the incentive scheme) is not available, and a clear identification of the causes why it was not fully implemented cannot be identified. The cantons themselves raised three main points of criticism. They stated, first, that (due to the position of some cantons), the weighting favours the fast integration compared to the sustainability indicator. Second, the indicators are, in their opinion, not constructive, as they do not give any clue about how to improve performance. Third, the four impact indicators do not count for prevention, that is, for avoiding unemployment in the first place. The latter is an important objective in the AVIG. In addition to this criticism, there are five more relevant points:

(1) the impact of the new system on the reputation of the employment offices;
(2) the political sensitivity of the issue;
(3) the way the new system was implemented;
(4) the institutional setting
(5) some technical aspects of the model.

While the first three points are discussed in this section, the technical aspects are handled in section 7.4 in more detail.

One important reason why it was difficult for the poorly performing cantons and RAVs to accept the results was that they were afraid that if poor results became publicly known, it would ruin their reputation among jobseekers and employers. A bad reputation among employers, in particular, can create problems for an employment office, as this may reduce the preparedness among employers to register their vacancies at the office and to use it as a hiring channel. Even if employment offices would accept a budget allocation system on the basis of performance in principle (which in fact was the case in the design phase), they may therefore still object in practice.

The second point has to do with the fact that poor performance leads to a budget reduction, at least compared to the best performers. In the short term this goes at the expense of the clients, as less money is available for service provision for them. As a large part of the population is either client or potential client of the employment office, one can imagine that such a system encounters opposition when it is put to practice and has concrete negative effects for some people, even if the concept is appealing in theory. Additionally, less money for bad performers could lead to path-dependencies, as most likely less money will be disposable for placement activities in following periods.

The latter point suggests that the introduction of such a system should be done in a different, more prudent way. First, the cantons and the RAVs should been have given the time to adjust to the idea. At least during a certain period, the system should have been kept internally. Although the criticism of the model used, came probably partly from an opportunistic motivation, it is still reasonable to assume that the model may not have been good enough. More time would have given the opportunity to test the model and, if needed, to improve it. Furthermore, the public could be informed about the deficiencies of the old system, which basically favours the poor performers and the advantages of the new system, which favours good performers and therefore raises average performers which is also in the interest of (potential) clients, at least in the long term.

However, even if the model was perfect, one might question whether the system in its original model would stand. This brings us to the fourth point, the institutional setting. In the Swiss federal system, the power of the cantons is such that if they are against a programme or system, it is very difficult for the federal government to enforce it. A more fundamental question one could pose is whether financial incentives would lead to improved results of the RAVs. The point is that if poor results lead to less budget, this does not directly affect the position of the employment office's management and staff. This is a big difference with a true market system in which providers can go bankrupt and poor performance can have consequences for the positions of management and staff. In that sense, it would be more logical to make for instance the pay of the management and the staff dependent on performance than the budget. However, politically this alternative may not be feasible at all. Today, with the renewed revision of the AVIG and the new agreement for 2003–2005, the incentive control was weakened again in view of the experiences of the former years. The main revisions are the following:

(1) The results are no longer published.

(2) A ranking list based on the composite indicator is still produced, but only used internally.

(3) Budgets no longer depend on performance.

Instead, more emphasis is placed on consultation and support of the cantons and the RAVs. In this process one attempts to detect best practices, which can then be mainstreamed. Does this mean that the original model has failed in practice? In the sense that there is no incentive scheme at work today, this can indeed be interpreted as an indicator for failure. On the one hand, failures were made in the implementation process, and prior to the implementation not enough thought was given to the power division between the federal government and the cantons and what that might mean for the

acceptance of the new system. On the other hand, one cannot know whether the system, if it had been fully implemented, would have led to better results. The latter is at least possible.

Although the original ideas were not fully realized, a number of reforms have been implemented. What can be said about the effects of these reforms? First, the general acceptance of the public employment services in Switzerland is much better than it was in the early 1990s. Furthermore, due to improvements in the data in line with the reforms and the development of the model, today the placement efficiency of every counsellor can be measured. However, it is difficult to make inferences on the basis of these data about effects on performance.

The hypothesis of a general improvement in the efficiency and effectiveness of the regional public employment services in Switzerland is tested by means of an ex-post evaluation based on data envelopment analysis by Sheldon (2003). His conclusion is that the overall performance has improved substantially. He calculates an improvement of around 20% between 1998 and 2003. Beside the analysis of the general performance development, Sheldon also looked at the causes of the differences in performance between the RAVs without coming to clear conclusions, however.

Summing up, one can say that the system that was adopted by the Swiss is in line with the principles of the management by objectives. However, in the end the step towards a budget allocation system on the basis of performance was not made. Especially the fact that even relatively small financial penalties in the original system caused massive opposition, supports the hypothesis that, especially in public institutions like the public employment services, soft factors like for example 'general acceptance of work' or other intrinsic motivation factors on the individual and on regional level, play an important and sometimes probably underestimated role.

7.4 An analysis based on German data

In this section, an implementation of the introduced model is tested using data from the German Federal Employment Agency. The question to be answered is how German employment offices perform on the basis of results of the indicator model. This approach is chosen not only because it gives the opportunity to test the applicability of such a model and its main advantages and deficits. It is also possible to evaluate the possibility for an implementation in Germany and/or to evaluate the specific additional needs on the data side.

7.4.1 Indicator calculation

To carry out an analysis for Germany, two data sets from the Federal Employment Agency are merged.[126] For the analysis, cross-section data on 141 western German employment agencies with respect to 1999 is used. The data are sufficient to carry out analyses analogous to the Swiss case.[127] In table 39, the four goals are defined and explained how they were made operational with the data. For indicator 1, which indicates a quick integration, the average unemployment duration is measured by the yearly inflow into and the outflow from unemployment. It indicates the dynamic component of the placement activities.[128] Indicator 2 measures the change of medium-term unemployment up to six months. This gives a picture of the placement results of jobseekers without specific deficits. With indicator 3, avoidance of very long unemployment duration is measured, respectively the integration of the disadvantaged.[129] The right to receive an unemployment benefit or an unemployment support depend on different criteria and has changed in the 1990s.[130]

As a measure, I use the new registration in unemployment support. This variable[131] captures people having massive problems in finding a job for a longer period, independent from the fact whether they are very long-term unemployed or whether they have discontinuous employment periods with short-term contracts. Finally, indicator 4 measures the quality of placement through the ratio between the re-registered and total unemployment. The objective measured with the fourth indicator (ind4) is the sustainability of reintegration and is measured by the share of re-registration of unemployment in relation to the total employment.

In a further step, these four indicators are aggregated to a total indicator of the relative regional labour market policy performance. This step in the procedure is strictly normative, as it is based on a weighting scheme. Two different weighting schemes have been applied, and two different indicators have been compiled (weight A and weight B). In the following

---

[126] Data from the business statistics and the employed statistics are merged. The employed statistics contains detailed information all persons liable to social security. Not included in the statistics are self-employed, civil servants, students, assisting family members and persons marginally employed.
[127] The reason for this relatively old data is that in this wave, more qualification-related information is given. For a more detailed description of the data, see Bade (1987).
[128] The variable is based on the definition of the Federal Employment Agency.
[129] In Switzerland this is measured by the so-called *Aussteuerung* which defines the end of the right to receive an unemployment benefit after 12 months.
[130] In 1999, unemployment support was paid when the right to get unemployment benefit was expired. The duration of unemployment benefit was dependent on years paid in the unemployment insurance system or age and ranged between 6 months for those paid one to two years into the system up to 32 months dependent on age. Launov, Wolff et al. (2004) gives a detailed picture on the schemes over time.
[131] Unemployment support was a special welfare payment with the target of preventing long-term unemployment to receive social security benefit, which was even lower. With the Hartz reforms, this differentiation no longer exists.

analyses, I pick up the results of the previous benchmarks, both the different target measures and the two alternative total indicators.

Table 39: Impact indicators from data sources of the Federal Republic of Germany

	Objective	Indicator	Weight A	Weight B
Indicator 1	Quick reintegration	Average duration of unemployment	50%	25%
Indicator 2	Avoidance of unemployment of intermediate duration > 6 months	Unemployment more than 6 months in relation to total unemployment	20%	25%
Indicator 3	Avoidance of long-term unemployment/support of disadvantaged (*Aussteuerung*/Transition from UE benefit to UE support)	New registration of unemployment support (*Arbeitslosenhilfe*) in relation to total employment	20%	25%
Indicator 4	Sustainability of reintegration	Re-registration of unemployment in relation to total employment	10%	25%

Note: Own illustration; weight A in column 4 is the same as used in the Swiss case; weight B gives all indicators the same weight.

In this case, high unemployment rates stand for low performance and vice versa. To conduct comparative elasticities with the performance indicator from the benchmarking model, these indicators have to be transformed, because there the best-performing regions have high indicator values, whereas low-performing regions have low values. The transformation is conducted by subtract the indicator value of a region from the highest value in the respective indicator category.

The residuals are derived from regressions estimated with ordinary least square according to equation (2.25) from section 2.6 and the indicators are computed according to equation (2.26) from the same section. The exogenous variables in the model, reflecting the factors with an impact on labour market outcomes, but are out of the control of the employment offices, can be divided into three categories: the job market, the economic structure, and the structure of qualifications of the labour force. The first category describes the condition on the labour market. The overall unemployment rate is the most important explanatory factor in this category. In addition, the share of vacancies, the share of female unemployed, and the share of unemployed without education are accounted for. The second group, representing economic structure, consists of the sectoral structure (four categories) and additionally of an agglomeration dummy. The third group, representing the structure of qualifications, contains the share of different educational levels. The descriptive statistics for the indicator variables and the exogenous factors are depicted in table 40.

Results from two different estimations have been used to conduct the indicators. Estimation 1 includes only the unemployment rate as the explanatory variable. An examination of the different regression results reveals that this variable is the most important in explaining regional differences. Estimation 2 also includes the other above-mentioned factors. The regressions results are depicted in table A4 in the appendix.

Table 40: Descriptive statistics of the four indicators

	Obs	Mean	Std. dev.	Min	Max
Partial performance indicators					
Indicator 1	141	6.365	1.2	3.8	9.8
Indicator 2	141	0.8904	0.008	0.865	0.9104
Indicator 3	141	2.799	0.954	1.153	5.919
Indicator 4	141	4.142	1.127	1.711	7.615
Exogenous control variables					
Unemployment	141	0.0587	0.0155	0.0248	0.1006
Vacancies	141	1.196	0.4219	0.483	2.883
Female	141	0.4556	0.0354	0.3665	0.566
Foreign	141	0.4556	0.0354	0.3665	0.566
Low-skilled	141	0.4424	0.0547	0.2895	0.5694
Service	141	0.5698	0.0894	0.3852	0.795
Industry	141	0.3372	0.0909	0.1366	0.556
Construction	141	0.0667	0.0157	0.0361	0.1084
Basic	141	0.026	0.0178	0.0103	0.1357
Blue	141	0.1961	0.0335	0.1013	0.2976
Skilled	141	0.1946	0.0328	0.1056	0.2684
High skilled	141	0.0162	0.0033	0.0094	0.0355
White	141	0.3684	0.0583	0.2824	0.5949
Agglomeration	141	0.3049	0.462	0	1

Source: Federal Employment Agency; own calculations.
Unemployment-regional unemployment rate; vacancies-change in vacancies; female share of female unemployed; foreign share of foreign unemployed; low-skilled share of jobseekers without education; service share of employed in service sector; industry share of employed in industry sector; construction share of employed in construction sector; basic share of employed in basic sector; blue-collar share of blue-collar workers; skilled share of highly qualified blue-collar workers (*Handwerksmeister*); high-skilled share of skilled blue-collar workers; share of white-collar workers; agglomeration-agglomeration dummy.

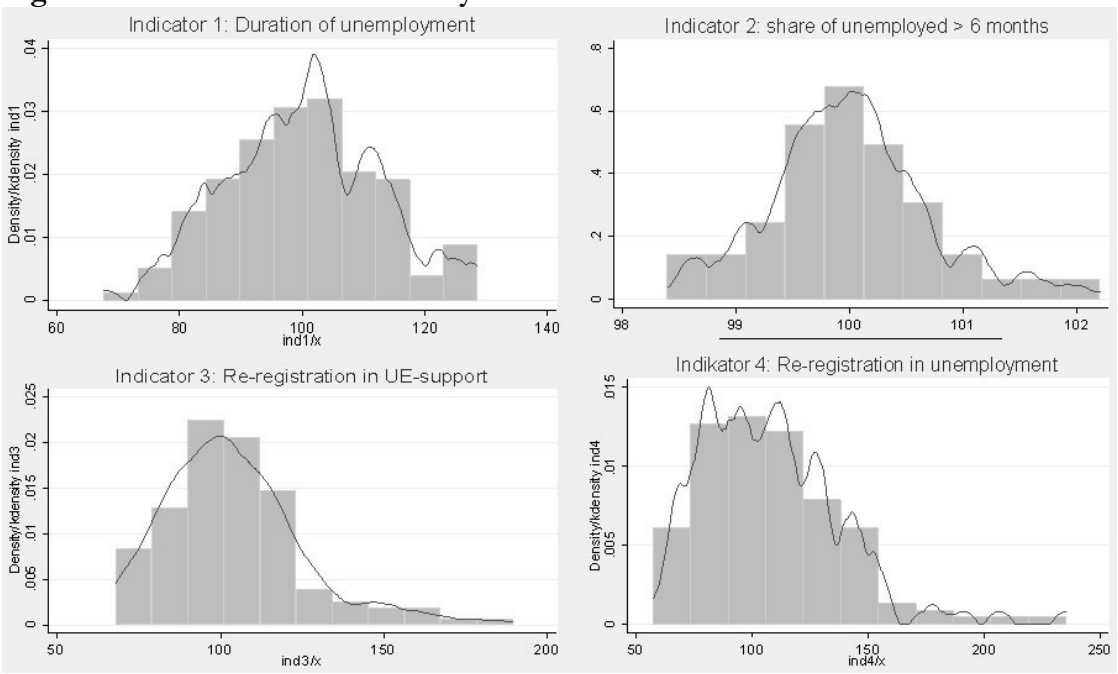
7.4.2 Results

The performance indicators are based on the regression results. As described in subsection 2.8.3, the residuals are used to compute the four indicators.[132] First, I look at the distribution of the four indicators in figure 17. Indicator 1, indicating the rate of reintegration, shows a pattern close to a normal distribution and an appropriate variation

[132] In the Swiss case there are three administrative levels. In the German case I am working with only two (141 agencies as agents in western Germany and the Federal Employment Agency as principal). Therefore, equation (4) is not required.

between 70 and 130. However, indicator 2, which indicates avoidance of unemployment of intermediate duration, does not show this pattern. It has quite a small variation with values between 98.3 and 102.4. Indicator 3 (indicating avoidance of (very) long-term unemployment) also shows a different pattern. It ranges between 64.5 and over 180 with a clear positive skewness indicating, that most of the agencies perform below or around the average and some of them are outliers with high indicator values. The variation in indicator 4 (indicating re-registration of unemployed) is even larger, ranging from 50 to 240. However, it should be noted that the size of the variation does not say anything about the relevance of the indicator. The processes underlying each of the indicators are different. The fact that the variation in duration is less than in, for example, re-registration does not imply that the efforts of the employment offices to reduce unemployment duration are more similar than their efforts to avoid re-registration.

Figure 17: Distribution and density function of the four indicators

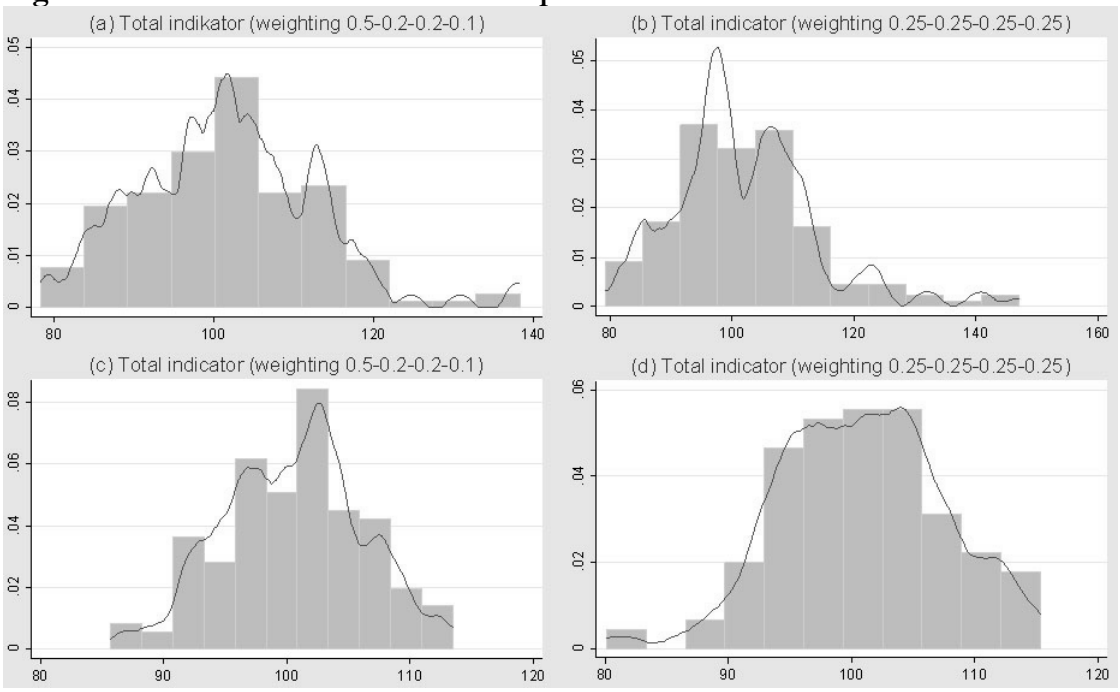


Source: Federal Employment Agency; own calculations.

Similar to the Swiss example, a composite indicator has been computed using weightings for the four indicators. The previous remark implies that these weights do not simply reflect the priorities for the various indicators. They also in a way correct with the difference in variation between the employment offices, which only partly reflects variation in efforts and effectiveness. Therefore, I have computed two different composite indicators using different weightings. The first one (see the graphs to the top left is the same used in the Swiss approach: Indicator 1 has a weight of 50%, indicators 2 and 3 have 20%, and indicator 4 is weighted with only 10%. The second weighting scheme (the graphs on the

right in figure 18) gives all indicators the same weight of 25%.[133] Figure 18 shows the results. The first two graphs (a and b) show the distribution of the composite indicator for the two sets of weightings, where the underlying four indicators are based on regressions in which only correcting took place for regional unemployment. The lower two graphs (c and d) show the distributions of the composite indicator considering all exogenous factors mentioned in the previous section (conducted from regression results depicted in the appendix (see table A4).

Figure 18: Total indicators in different specifications



Source: Federal Employment Agency; own calculations.

It is not straightforward to draw clear, one-dimensional conclusions from the results in favour of one specific alternative. What has been done here is, that alternatives have been conducted and presented here, and that the quality of these alternatives depends on specification and on normative assumptions. Therefore, it will never be possible to find 'the best' specification on pure objective criteria. However, the graphs clearly show that although the overall unemployment rate is the most important exogenous variable, adding more exogenous variables leads to a considerable reduction in the variance of the composite indicator, independent of the weightings used. Therefore, (c) and (d) seem to be more attractive than (a) and (b). If one compares (c) and (d), (c) seems to be most appealing. Given lower weights to indicators 2, 3, and 4 than to indicator 1, corrects for the

[133] The weighting scheme cannot be derived on an objective weight, as this is a purely normative question of objectives of labour market policy and placement activities.

fact that the variance of the first three is considerably larger than for the first one. Table 41 shows the ranking of the ten best performers using the composite indicator (c).[134] All ten best performers have a high value for the underlying indicators 3 and 4. Particularly, indicator 4 is important, even though its weighting is only 0.10. Indicator 2, on the other hand, with a weighting of 20%, has a very low influence on the total indicator.

Table 41: Ranking of top ten performers according to total indicator 3

	Agency	Ind. 1	Ind. 2	Ind. 3	Ind. 4	Total ind.
1	Frankfurt	120.5	99.0	173.6	235.5	138.3
2	Stuttgart	127.9	99.1	166.3	206.7	137.7
3	Düsseldorf	110.0	99.2	189.4	180.9	130.8
4	Helmstedt	117.2	98.6	157.4	148.2	124.6
5	Bergisch Gladbadbach.	123.2	99.0	124.7	142.7	120.6
6	Munich	112.0	99.3	157.0	128.8	120.2
7	Bielefeld	110.6	99.7	139.9	156.5	118.9
8	Reutlingen	128.6	99.6	99.0	142.7	118.3
9	Heilbronn	123.2	98.6	112.2	139.4	117.7
10	Darmstadt	123.5	99.3	105.6	144.4	117.2

Source: Federal Employment Agency; own calculations.

What are the main implications from these exercises using the four-indicator model with data from the German regional labour market? First, it seems to be possible to define performance indicators and to remove the impact of exogenous factors from them with the help of regression analyses. The resulting residuals can be seen as reflecting the results of the activities of the employment offices. At least, these corrected indicators are better performance indicators than the uncorrected ones. I do not think that the present models should be used to benchmark German employment offices. However, there are several ways to further improve them, and I am confident that it is possible to end up with reasonable models.

More fundamental questions are which performance indicator or indicators should be used and, if more than one indicator is used, how to summarize them in a composite indicator. As I have shown, the different indicators used are difficult to compare. It is possible to compute a composite measure using weightings for the individual indicators, but the composite indicator is highly sensitive for the weightings used. Furthermore, given the fact that the underlying indicators are difficult to compare, the weightings do not really reflect the priorities attached to each of them. Then, one might be inclined to choose for

[134] For the ranking of all 141 agency regions, see appendix table A1. As will be shown in the following, the weight in the specification of indicator 3 is 20%, that of indicator 4 is only 10%.

the weightings that lead to the most plausible outcomes. However, that seems to be contrary to objective performance measurement. This considerable subjective element in the Swiss approach makes it difficult to use as a basis an incentive scheme on it. A possible way out might be the use of multi-criteria analysis. This type of analysis was specifically designed to deal with evaluation on the basis of qualitative criteria.

7.5 Conclusion

In this chapter, an instrument to measure the performance of regional public employment services was discussed. The model is based on an approach that was implemented in Switzerland. First, the Swiss reforms of the 1990s have been evaluated. Then, performance indicators were estimated using data from 141 western German employment offices and the results were discussed in the light of an implementation in the German system. The Swiss reforms were caused by a sudden increase in unemployment during the 1990s. This called for enhancing active labour market policy. First, a strongly centralized model was introduced, but this proved to be unsatisfactory. This led to a different concept in which still the federal government defines the objectives, but in which the cantons and the employment offices have considerable freedom in determining for themselves how to reach the centrally defined objectives. However, such a system required a mechanism, which would give the federal government sufficient guarantees for efficiently and effectively operating employment offices. Performance-based management was seen as the solution to this problem.

The implementation process showed that, apart from the attractiveness and the broad acceptance in the design phase, a main element of the approach, the monetary incentive scheme, was never given a chance, as it was never introduced in its full extent. The problems came along with the implementation and in line with this, acceptance decreased dramatically. Why did this happen? One reason was that the political sensitivity and the role of public discussion were underestimated. The reaction by the public was often emotionally loaded and not always well founded, but it did have a considerable impact as it made implementation of the original idea virtually impossible. The second reason was that the employment offices were afraid of losing their reputation. If information of bad performance becomes known to clients and particularly employers, it could negatively affect the market position of employment offices. This is probably even more important than the financial penalty for poor performance (which was relatively small according to the plans). A third reason is the considerable power of the cantons. If they strongly oppose a programme or a system, it is very difficult for the federal government to continue with it.

Using German data, I took a closer look at the technical aspects of the Swiss approach. I have chosen German data because, first, the results are applied for further analyses on wage curve analyses in chapter 8 and, second, I could not dispose of the Swiss data. A basic assumption underlying the Swiss approach is that it is possible to isolate the impact of employment offices on labour market outcomes by correcting labour market indicators for the impact of exogenous factors using regression analysis. My analyses led to the conclusion that it is possible to develop reliable regression models that can be used to compute corrected indicators that give a reasonable indication of the (relative) performance of employment offices. These models will never be perfect. It thus seems to be very ambiguous to link the results to a direct monetary incentive scheme. However, the more sophisticated approach gives more reliable results than do simple output indicators.

An unsatisfactory feature of the Swiss approach is that it measures performance based on four (corrected) indicators, which are then aggregated to one composite indicator. The outcomes appear to be highly sensitive to the weightings used for the four indicators. Furthermore, it is difficult to give a clear interpretation to the weightings. Therefore, the composite indicator is highly subjective by nature, which makes it difficult to use it as a performance indicator. One possible way out could be the use of multi-criteria analysis, which was specifically developed to deal with evaluation on the basis of qualitative criteria. Another solution could be the use of one single indicator such as the regional unemployment rate as dependent variable. However, although the indicators are error-prone and therefore difficult to directly link to, for example, an incentive scheme, they give a picture of the regional performance of public employment services. To evaluate the impact of regional performance, and therefore the impact of active labour market policies, these indicators will be incorporated into the wage curve framework within the next chapter. There, the impact of labour market policies on the wage-setting is measured.

8 The impact of active labour market measures and performance of public employment services on wages

So far, the empirical analyses on the wage curve have shown that (a) Germany has negative wage elasticities indicating that wages are lower in high unemployment regions, this elasticity varies (b) over time, (c) by the definition of regional labour market (chapter 5), and (d) it also varies between qualifications (chapter 6). With the introduction of the indicator model for the measurement of the relative performance of regional employment services (chapter 7), the institutional side of the labour market was focused and I have shown that (d) the relative performance of regional public employment services can be measured adequately through a quantitative model.

Drawing on these four results, this chapter integrates the individual wage perspective with the institutional perspective and focuses on active labour market policies (ALMP) and their impact on regional wage levels. Therefore the analysis is twofold: In the first part the impact of ALMP input is evaluated by applying the extended efficiency wage model discussed in section 2.6. This model explicitly mentions active labour market policies. Based on this the overall impact of ALMP and the impact of specific ALMP measures like training and job creation are estimated separately. In the second part I integrate the wage curve view with the performance of regional labour markets. First, classes of regional labour markets are evaluated, and second the performance view from chapter 7 is mentioned and the impact of labour market policy performance, i.e. institutions on regional wages, is estimated. [135]

The chapter is structured as follows: I begin the chapter by discussing my motivation for the consideration of ALMP in the wage curve approach and as well as my main hypotheses. Then I document the empirical results. In the third section the extended wage curve results are discussed. And in the fourth section I document the estimations on the impact of PES performance on the regional wage level. Some conclusions are drawn in the final section.

[135] Theoretically, the model is discussed in section 2.7. The performance-based wage curve model and its implications are discussed theoretically in section 2.8: For the empirical analysis, the benchmarking indicators estimated in chapter 7 are integrated to measure the impact of PES-performance on the regional wage level.

8.1 ALMP and the wage curve: Motivation and hypotheses

Some empirical studies on the wage curve mention the possible impact of ALMP and suggest that it may represent a research gap, but this issue is hardly ever discussed in empiric terms. One exception is a small study by Pannenberg and Schwarze (1998). As discussed in section 2.7 they introduce an extended wage curve in considering further training in an eastern German sample. Their analysis identified an extended wage curve but no standard wage curve. The implication is that for an adequate measurement of the wage curve, an extended approach seems to be favourable in countries like Germany, which have extensive active labour market policies.

Theoretically the Pannenberg-Schwarze-contribution does not explicitly mention the improvement of matching as the model discussed here does. This has important implications on the wage level. Second, empirically it is very specific in nature, as it covers only the eastern German labour market for just three years during an early phase of the transition (1993–1995) and solely considers further training. Therefore, they do not state that their analysis is satisfactory to verify the hypothesis that the inclusion of ALMP improves labour market performance, nor do they say anything about the potential differences in the impact of measures. Hence, more evidence for the impact of labour market policies on the improvement of wage curve analyses is needed, which is the issue of this chapter by grabbing this discussion and estimate different model extensions. Therefore I test the following hypotheses:

(1) Unemployment can be reduced through regional active labour market policies.

(2) The performance of regional PES has an impact on individual wages. As two there is a positive effect unemployment reduction effect and a negative competition effect, the sign of the total effect is a priori unclear.

I investigate both the overall impact and differences among ALMP measures.[136] For hypothesis (1), the empirical analysis is based on the extended efficiency wage curve model introduced in section 2.7. This model explicitly recognizes active labour market measures. With this model, the overall impact of ALMP, as well as the impact of individual ALMP measures, is estimated. For hypothesis (2), two alternatives to operationalize the labour market policy effect are chosen:

[136] The main ALMP measures in Germany are discussed in detail in section 3.4.

(1) Performance is measured by creating regional groups by unemployment categories, which assumes that the unemployment rate is a performance indicator of regional labour market policies.

(2) The benchmarking indicators introduced in chapter 7 replace the unemployment figures.

I refer to the model explaining PES performance on wages introduced in section 2.8 and discuss the impact of labour market policy outcomes. It is assumed that regions with better-performing public employment services have a higher real wage level than do low-performing regions, leading to a performance-based wage curve.

8.2 The impact of labour market policies on the wage curve

In this section, I focus on the impact of active labour market policies on the extended wage curve. Theoretically, the impact of ALMP is that matching is improved with the effect that the wage curve is shifted downward and wages are lower. On the other hand unemployment is reduced leading to rising wages, and outward shifted, steeper wage curve is expected through benefit effect. This expectation results in the following hypothesis: If ALMP have positive effects on the labour market, the extended model predicts a steeper wage curve compared to the standard wage curve indicated by an elasticity that is higher in comparison with the latter. The impact on the wage level is not clear. When measures are compared, higher elasticities indicate relatively better performance of these measures. The estimated model has the following reduced form:

$$\ln w_{irt} = \alpha_i + \beta_{jt} \log j_{rt} + \gamma p + \delta X_{irt} + \varepsilon_{irt} \qquad (8.1)$$

with i = 1, …, N, t =1, …, T, where w_{ir} stands for the wage of individual i observed in region r; and j_r is the extended unemployment rate in region r.[137] The vector X_{ir} is a set of measured characteristics of individual i. Time is indicated by the index t, and ε_{irt} is the randomly distributed error term. Both real wages and extended unemployment are expressed in logs. The interpretation of β is the elasticity of wages with respect to unemployment, γ is the effect of the respective active measure. The sign of γ is expected to be negative as successful ALMP reduces unemployment.

[137] Extended unemployment means that the labour force figures to calculate unemployment rate are extended by participants in active measures. Details are discussed in section 2.7. The specification of the model variables are discussed in table 20 of section 5.1.

I differentiate the analysis regionally between eastern and western Germany, and report the results for both parts of Germany. Second, I differentiate the analysis by gender and show the respective elasticities for men and women. For the sake of brevity, the following tables are limited to the results of two different econometric models, the regional fixed effect model, which is the standard approach in wage-curve literature, and the individual random effect model, additionally controlling for individual heterogeneity. In the individual random effect model, regional fixed effects are also considered on the agency level.[138]

8.2.1 The labour market in western Germany

Table 42 depicts the results for the labour force in western Germany for men and women. In the first part of the table, elasticities from a regional fixed effect model are depicted. In the second part, elasticities incorporate additional individual random effects. In order to enable comparisons, the first two columns show the elasticities of the standard wage curve analysis without consideration of active measures. In the first column I use the standard unemployment measure, whereas in the second column the unemployment rate is the extended measure including the participants in ALMP measures among the unemployed.[139] The columns that follow report the unemployment elasticities for the respective active measure. Column 3 shows the coefficients of an estimation including all active measures, column 4 denotes job creation schemes, column 5 the share of long-term professional training, column 6 short-term training measures, and column 7 the aggregate of short- and long-term training measures together. In the respective rows, the estimation results are depicted.

The first and second rows show the elasticities and the t-statistics of the two unemployment specifications. The first row shows the standard estimation for comparative reasons. This unemployment specification is not estimated incorporating the active measures. It is documented to show the wage effect compared with the extended unemployment. In the third row, the coefficients of the respective active measures are documented when estimated in an equation using extended unemployment. In the forth row, the intercepts of the wage curves are documented. The results are documented separately for male and female labour force.

---

[138] The results from the previous sections and further sensitivity tests using different models discussed in chapter 5 have shown results similar to the pattern identified earlier.
[139] For a detailed discussion of the definition of extended unemployment, see Schmid ed.al. (2001).

Table 42: Impact of labour market policies on the wage-unemployment elasticity in western Germany

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		lnu	lneu	smes	sabm	spt	strain	sft
Male								
FE	Unemployment (lnu)	-0.110** (-12.19)						
	Extended UE (lneu)		-0.116** (-12.75)	-0.116** (-12.78)	-0.107** (-9.57)	-0.120** (-13.06)	-0.117** (-12.71)	-0.121** (-13.12)
	Active measure			-0.002* (-2.11)	-0.006 (-1.32)	-0.008* (-3.30)	-0.003 (-0.68)	-0.006* (-3.21)
	Intercept	2.471**	2.501**	2.529**	2.439**	2.514**	2.508**	2.510**
RE	Unemployment	-0.099** (-7.30)						
			-0.109** (-7.89)	-0.109** (-7.89)	-0.110** (-7.12)	-0.114** (-8.10)	-0.108** (-7.78)	-0.114** (-8.01)
	Active measure			-0.001 (-0.98)	0.001 (0.13)	-0.004* (-1.82)	0.001 (0.28)	-0.003 (-1.46)
	Intercept	2.223**	2.262**	2.267**	2.263**	2.239**	2.251**	2.291**
Number of Cases		14,942						
Female								
FE	Unemployment	-0.099** (-8.67)						
			-0.104** (-9.04)	-0.104** (-9.05)	-0.087** (-6.08)	-0.107** (-9.28)	-0.105** (-9.00)	-0.109** (-9.37)
	Active measure			-0.003* (-2.84)	-0.012* (-2.00)	-0.008* (-3.00)	-0.002 (-0.49)	-0.007* (-2.85)
	Intercept	2.097*	2.122**	2.170**	2.062**	2.169**	2.129**	2.182**
RE	Unemployment	-0.086** (-5.07)						
			-0.093** (-5.36)	-0.093** (-5.36)	-0.091** (-4.70)	-0.095** (-5.41)	-0.095** (-5.44)	-0.098** (-5.48)
	Active measure			-0.001 (-0.83)	-0.001 (-0.21)	-0.002 (-0.76)	-0.005 (-0.95)	-0.003 (-1.15)
	Intercept	1.844**	1.872**	1.831**	1.812**	1.836**	1.888**	1.907**
Number of Cases		10,653						

Sources: GSOEOP; Federal Employment Agency lnu: log regional unemployment; lnue: log extended regional unemployment; smes: share of active measures (aggregate); sabm: share of job creation schemes; spt: share of professional training (long-term); strain: share of training measures (short-term); sft: share of further training (aggregate). * significant at 5%; ** significant at 1%.

In the specification at hand, statistically significant results are obtained for all cases and in both labour markets. In the male labour market the 'standard' wage curve in the five-year period from 2000 to 2004 has a statistically significant elasticity of –.11 in the regional fixed effect model, and a slightly lower coefficient with –.099 in the individual random effect

model. For this period, the results are therefore in line with Blanchflower and Oswald's hypothesis of a negative 10% elasticity. At –.116 and –.109, the estimations with the extended unemployment rate (column 2) show a slightly higher elasticity. At first, this is counterintuitive as the extended unemployment is by definition higher than the standard unemployment and one would perhaps expect lower elasticities as the wage curve is a concave function. However, as the use of the extended definition does not reflect a 'real' increase in terms of increased unemployment, this indicates an outward shift of the wage curve. As the elasticity is also higher than in the standard case this can be interpreted as a first hint that ALMP has an impact.

In the following columns (3) to (7) I also control for respective measures. The most striking result is the impact of wage formation when active measures are controlled for. The negative sign points to the possibility that active measures – if significant – increase the wage pressure in the primary labour market and wages are lowered. The results of the other specifications show a persistent negative sign, which also supports the hypothesis that there is an increased wage pressure caused by active measures. The intercepts are all above that of the standard estimation. This supports the results the theoretical thoughts from section 2.7 that ALMP increase the wage elasticity.

The training measures, in particular long-term training, shows a higher elasticity than that for other estimations. The elasticity does not change when I additionally control for all active measures, regardless of the significance of the coefficient. For the regional fixed effect model, there is a slightly negative and significant coefficient. For the random effect case, too, the coefficient is negative, but statistically insignificant. The changes of the intercept indicate only slight changes of the wage level. When the share of long-term professional training (*spt*) is controlled for, one obtains the highest elasticity with a statistically significant value of -.120 in the regional fixed effect model.

The individual random effect model shows a slightly lower coefficient for extended unemployment with –.109. While job creation schemes (4) and short-term training (6) show a positive, but statistically insignificant sign, professional training has a significant negative impact. Therefore, this is weak but clear evidence that those measures pushing the unemployed into the labour market (either the primary or the secondary) can result in higher wage pressure, which is in line with expectations.

The female labour market in western Germany generally shows the same pattern as that of the male labour market, indicating that differences in the impact of active measures do not differ significantly between men and women. Whereas the coefficients of the active measures are statistically significant in most cases using the regional fixed effect model

(with the exception of short-term training), this is not the case for the individual random effect model. However, as the t-statistics indicate, the differences are not striking. The intercepts of the models for women are systematically lower than those of the models for men. This outcome is not astonishing either, as the average wage level of women is below that of men.[140]

To sum up, in western Germany higher elasticities are observed when ALMP are taken into consideration. This outcome indicates that the extended wage curve is above the standard wage curve in all regions. However, I cannot say anything about the impact on the wage level as there is also a technical effect leading to an outward shift. Differentiated interpretation of active measures is difficult and should be taken with caution as they are quiet low. However, for the fixed effect case I can state that the effect of training measures is stronger than that of others in the fixed effect case. In the random effect model all coefficients of active measures are negative but statistically insignificant.

8.2.2 The case in eastern Germany

Table 43 shows the estimation results of the labour market in eastern Germany. In the male labour market, the standard wage curve estimation shows a value for the elasticity of –.085, which is around 20% lower than in the western German labour market, but which is already both statistically significant and in the range of Blanchflower and Oswald's hypothesis. Therefore – and in contrast to the estimations for an eight-year period – it is more in line with the hypothesis of these authors than with the majority of other wage curve studies for the German labour market.[141]

First, and in contrast to the models for western Germany, the random effect estimations differ significantly from the results of the regional fixed effect estimations. Although the random effect case indeed shows negative and statistically significant results for the elasticities, these are substantially lower than those for the western German labour market. Hence, the reaction of the wage to changes in the unemployment figures is not that strong in eastern Germany. Because unemployment rates are systematically higher here,

---

[140] Other estimations with the full-time sample have shown that the lower level of the wage curve is reinforced by the fact that the sample also includes part-time employees, for whom I control with a respective dummy variable.

[141] The following results are particularly of interest as they are directly linked to the estimations of Pannenberg and Schwarze (1996a, 1996b). The estimations include both extended unemployment measures and training measures for the eastern German labour market. Two main differences, however, are important: First, my sample includes part-time workers. And, whereas Pannenberg and Schwarze have a three-year sample (1992–1994), my sample is larger, with a five-year horizon (2000–2004). However, although some patterns follow the same direction, the main results differ significantly.

this situation raises the question of how the overall performance of the labour market influences the wage-setting mechanism. This question is discussed in detail in section 8.3.

The difference between the results of the fixed-effect and the random-effect model estimations points in the same direction as the Pannenberg and Schwarze estimations: whereas the standard model is negative and statistically significant, the model controlling for individual heterogeneity is negative in all cases but does not differ significantly from zero. This fact indicates that the standard unemployment rates, as well as the extended unemployment rates, are not the appropriate measure for the adjustment process in the eastern German labour market when we control for individual heterogeneity.

This outcome presents a clear difference from the western German labour market and raises the question of whether the reason for the difference can be found between the eastern and western German labour markets – in other words, whether the difference is caused by persistent differences due to the fact that unemployment figures are higher leading to general less elastic labour markets. Another, more risky conclusion could be that institutions differ as the Eastern part is characterized by a former socialistic regime whereas the other has an established market economy. This explanation would mean that, because the eastern German labour market is in transition or because of other institutional peculiarities, substantial differences are already embedded.

In the case of further training, the coefficients of the labour market policy variables also paint a picture different from that of western Germany. Short-term training, in particular, shows a positive and statistically significant coefficient of 0.020, which indicates that these measures have a positive impact and that wage pressure is reduced in this case. An interpretation could be that here, training measures enable people to fit better into specific jobs which they – or any other individual – would not be able to fulfil. This could be caused by the fact that a high persistent mismatch in eastern Germany is at hand: often long-term unemployed do not reach the skill needs of companies; well qualified people tend to migrate to western Germany because job and income prospects are much better there. However, the result is rather weak, and it is only valid for the male labour market estimated with the regional fixed effect model.

Table 43: Impact of labour market policies in eastern Germany, 2000–2005

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		lnu	lneu	smes	sabm	spt	strain	sft
Male								
FE	Unemployment (lnu)	-0.085* (-2.52)						
	Extended UE (lneu)		-0.039* (-2.60)	-0.050* (-3.23)	-0.044* (-2.90)	-0.040* (-2.63)	-0.038* (-2.51)	-0.038* (-2.45)
	Active measure			-0.005* (-3.65)	-0.011* (-5.13)	-0.002 (-0.42)	0.020* (2.70)	0.002 (0.78)
	Intercept	2.115**	1.978**	2.100**	2.068*	1.949**	1.922**	1.960*
RE	Unemployment (lnu)	-0.139* (-2.76)						
	Extended UE (lneu)		-0.002 (-0.16)	-0.006 (-0.51)	-0.006 (-0.56)	-0.006 (-0.50)	0.000 (0.01)	-0.001 (-0.06)
	Active measure			-0.001 (-0.86)	-0.003 (-1.38)	-0.003 (-0.95)	0.016* (2.50)	0.001 (0.26)
	Intercept	1.851**	1.434**	1.422**	1.427**	1.458**	1.391**	1.371**
Number of Cases		4,748						
Female								
FE	Unemployment (lnu)	-0.091* (-2.63)						
	Extended UE (lneu)		-0.042* (-2.66)	-0.043* (-2.67)	-0.044* (-2.77)	-0.039* (-2.42)	-0.041* (-2.60)	-0.039* (-2.40)
	Active measure			-0.001 (-0.33)	-0.006* (-2.58)	0.005 (1.39)	0.007 (0.96)	0.005 (1.54)
	Intercept	1.784*	1.642**	1.673**	1.695*	1.633*	1.629**	1.627*
RE	Unemployment (lnu)	-0.050 (-0.97)						
	Extended UE (lneu)		-0.014 (-1.16)	-0.009 (-0.70)	-0.019 (-1.51)	-0.004 (-0.35)	-0.014 (-1.19)	-0.007 (-0.54)
	Active measure			0.001 (0.96)	-0.003 (-1.46)	0.008* (2.23)	-0.003 (-0.42)	0.005** (1.75)
	Intercept	1.299*	1.197**	1.192**	1.256*	1.104**	1.223*	1.123*
Number of Cases		4,594						

Sources: GSOEOP; Federal Employment Agency lnu: log regional unemployment; lnue: log extended regional unemployment; smes: share of active measures (aggregate); sabm: share of job creation schemes; spt: share of professional training (long-term); strain: share of training measures (short-term); sft: share of further training (aggregate). * significant at 5%; ** significant at 1%.

Finally, the intercepts are now significantly lower compared to the estimation with standard unemployment in all specifications. Combined with the lower overall elasticities compared to the standard estimation (-.85) this can be interpreted as an indicator for the fact that ALMP does not have an accelerating effect on the elasticity and the wages are lowered

significantly. In sum, for eastern Germany with its specific conditions in the labour market and its high overall unemployment figures gives different and even contrasting results. However, I will come back to differentiate this view in section 8.3 when labour market segments and regional performance are discussed in more detail. First, the following section gives some attention to the developement of wage elasticities over time. Therefore I show development of wage elasticities during the German reform process in the beginning of this decade.

8.2.3 Extended wage curves during the German reform process

I have already discussed the changes in distribution and the change in focus of different ALMP measures during the sample period of 2000 to 2004 (see section 4.3). These changes cannot be characterized as 'normal' variation in the policy mix, for within this period substantial institutional changes of labour market policies were implemented following the proposals of the Hartz Commission. In the previous section, I showed that the use of extended unemployment (i.e. the inclusion of measure participants as part of the unemployed) has an impact on the outcome of estimated wage elasticity as compared with the estimations with the standard unemployment rate. In this section, I shed more light on the impact of these changes on the wage-setting process within the regions. I have therefore estimated a sequence of wage curves by sample years (see table 44). The elasticities are estimated by means of a one-way fixed effect model using regional dummies on the federal state level. These dummies control for the respective regional effects.[142]

I do not use dummies on the agency level as on a yearly basis, too many cells are not specified caused by the lack of cases. This drives the coefficients to insignificance out of technical reasons. I have estimated four different models: the first comprises the extended regional unemployment rate, and the others additionally control for different ALMP measures. In this table, I do not differentiate between long-term and short-term training measures. Tests have shown that the differences are not important, as they do not show a substantially different picture.

Row (1) depicts the elasticities of the standard approach estimated with the standard unemployment rate. A comparison with the results with the extended unemployment rate in row (2) shows that the model performs slightly better with this variable: both elasticities are significant at the 5% level, but the higher t-statistics in (2) indicate this fact. In the

[142] I chose this level of aggregation, which includes 11 regional dummies for western Germany because the alternative of regional dummies on the agency level produces collinearity problems.

analyses by year and agency dummies, as described in chapter 5, it has been shown that there is a good deal of trouble with the performance of the model. It can be concluded that, first, the elasticities are statistically significant in each year and, second, they systematically show a negative sign, which is in line with my theoretical and empirical hypotheses. Third, the elasticities of the extended models are above those estimations with the standard model excluding ALMP and I am therefore in line with the results of the previous section: With the exception of 2001, for which the elasticity of extended unemployment is 1% below that of the standard measure, the coefficient is also slightly higher for the estimate with the extended unemployment rate. The year 2001 differs in a second respect. With a value of –.67, it is significantly lower than in the other years. The coefficient is around the –.1-level in the other years, with an upward trend and a peak of –.151 in 2003, which can be interpreted as an extreme value in the other direction compared to the year 2002.

Table 44: Yearly extended wage curves, 2000–2004

		2000	2001	2002	2003	2004
(1)	lnu	-0.089* (-3.73)	-0.068* (-2.62)	-0.101* (-3.31)	-0.131* (-3.68)	-0.104* (-3.22)
(2)	lneu	-0.095* (-4.03)	-0.067* (-2.60)	-0.108* (-3.63)	-0.151* (-4.20)	-0.118* (-3.48)
(3)	lneu	-0.092* (-3.87)	-0.069* (-2.62)	-0.102* (-3.33)	-0.148* (-4.11)	-0.116* (-3.21)
	smes	-0.004** (-1.78)	0.001 (0.33)	-0.001 (-0.61)	-0.006 (-1.61)	0.001 (0.24)
(4)	lneu	-0.061* (-2.06)	-0.062* (-2.02)	-0.116* (-3.41)	-0.129* (-3.16)	-0.101* (-2.57)
	sabm	-0.014** (-1.88)	-0.003 (-0.34)	0.007 (0.50)	-0.022 (-1.13)	-0.019 (-0.89)
(5)	lneu	-0.103* (-4.27)	-0.071* (-2.66)	-0.112* (-3.77)	-0.151* (-4.21)	-0.118* (-3.46)
	sft	-0.007 (-1.53)	-0.003 (-0.57)	-0.010** (-1.93)	-0.012** (-1.95)	0.000 (0.01)
	N	3,635	2,902	2,908	2,689	2,808

Source: GSOEOP; Federal Employment Agency. Dependent variable: log hourly wage; lneu: log of extended regional unemployment rate; smes: share of active measures (aggregate); sabm: share of job creation schemes; sft: share of further training (aggregate). Several individual controls are also included in the model. * significant at 5%; ** significant at 1%.

Rows (3) to (5) show the estimations with the inclusion of shares in various types of active measures. The coefficients for all measures (4) and those for job creation schemes (5) show

a statistically significant negative value. The other years, although negative, are not significant. For the model, which additionally controls for the share of training measure participants, I can observe a different picture: whereas the first two years produce no statistically significant result, the coefficient becomes highly significant on the 1% level in 2002 and 2003. In 2004, this coefficient becomes irrelevant with a value of zero and an irrelevant t-statistic. The differences in the wage-unemployment elasticity are of minor importance.

What are the main conclusions to be drawn? First, continuously negative signs of the active-measure coefficients corroborate the results of the pooled regression that higher shares of active measures do not increase the wage pressure. If they are insignificant, their direct effect is even of minor importance. Therefore, the outcome does not differ substantially from those of the pooled regressions. Second, the outcome is different and even more striking in its implications when the elasticities are taken into account. Here one obtains a different picture from that of the pooled regressions: with use of the extended unemployment rate, the elasticities are systematically higher in the estimations by year. In the case at hand, this outcome implies that the inclusion of active measure participants brings about a higher wage elasticity, which further implies that the participants have an influence on wage-setting. This impact is higher in high-unemployment regions.

To sum up, a clear change in the main figures caused by substantial changes in labour market policy cannot be observed. Because the results are for the most part significant, though merely on a 5% level, and because the observed period covers only five years, the results must be interpreted with caution. However, there is variation between the five years of the reform process in Germany. It can thus be argued that changes in labour market polices as discussed in section 3.4 have an impact on regional wages. Apart from the limitations of the reliability of the estimation results, the lack of a clear pattern may also be caused by adjustments in the reform process.

8.3 Performance of public employment services, wage curves, and performance curves

In the previous section, extended wage curves were estimated. I have shown that active labour market policies increase the wage elasticity and enforce competition on the labour market indicated by a higher wage pressure. These estimates are based on the absolute number of measures, whereby quality aspects were not taken into account. Therefore, this analysis is input-oriented, and the effects are highly dependent on the number of participants. In this section, I pursue a different question. As the previous results show, there is an impact on wage-setting, but this impact does not draw a distinct picture. Yet the differences between eastern and western Germany indicate that one can state that the 'if' question is answered: ALMP can have an impact on wages. The more specific 'how' question can be raised: How does the performance of regions influence individual wage elasticity? This question is in the focus of the following sections. I adopt two approaches to examine this question, a quiet rough way using unemployment categories and a more sophisticated way by incorporating performance measures of regional employment offices from chapter 7.

First, the regional labour markets are categorized into specific performance groups; these performance groups are defined by regional unemployment figures and I estimate extended wage curves for the different labour markets. Basic assumption behind this approach is that regions with high unemployment figures have less performing regional labour market. It is obvious that this is a quiet rough definition which does not reflect real-life conditions in labour market policy performance. However I expect to get a some more impressions about the connection between regional labour market conditions in and wage formation. The separate estimates for eastern and western Germany already indicated that there is a potential relationship as unemployment between these two regions differ substantially. However; although unemployment is much higher in the eastern part, the overall German picture is much more differentiated. Therefore, geographilcally independent groups seem to be more useful to shed some more light on the question how the labour market performance has an impact on the regional wage level.

Second, a more elaborated approach is introduced and the regional performance of public employment services is recognized. This is done by combining the benchmarking approach of chapter 7 with the efficiency wage framework. Theoretically, this approach was discussed shortly in section 2.8. This approach involves a more elaborate measure of regional performance, the results of the four-indicator model introduced in section 2.7 and estimated in chapter 7 replace the standard unemployment and ALMP figures.

8.3.1 Performance-based wage curves I: Unemployment categories

The first alternative for a performance-based analysis is similar to the approach in chapter 6 on qualification aspects of the wage curve. In this chapter, the sample is reduced to five years – 2000 to 2004 – and five performance categories based on macro figures are constructed. The definition of these categories is based on the following rules: The starting point is a ranking of the 176 regions for the sample period with respect to their unemployment rates in the respective year. This step involves a measure of average performance based on the extended unemployment rate. In a second stage, the regional categories are matched to the individual data set. Unlike in the previous chapter on qualification aspects, there are differences in the size of the sub-samples. There, the individual sample was used to generate the unemployment categories leading to subsamples of the same size. Each of these two approaches has its advantages.

An argument for even distribution within the individual sample as applied in chapter 6 is that deviations caused by differences in the sample size can falsify the results through differences in the weighting. One can therefore argue that the category boundaries based on the regional aggregates are more distinct. However, in the end it is more a question of belief than of hard facts, especially when one takes into account that each of these categories is, in a way, artificial. Therefore, the best way to counter this criticism is to test both alternatives.[143] The same is the case for differences in the number of categories. Here, as in chapter 6, a five-category approach is chosen. The respective case numbers and the distribution in the aggregate regional sample as well as in the individual panel are depicted in table 45. It shows that the best-performing category, with 22.5%, and the worst-performing category, with 24.4%, have more individual cases than the others, although, for example, the average performers (category 3) include one more region than the others.[144]

The results of the wage curve estimates using the unemployment classes are depicted in table 46. The table is divided into two parts. The first part shows the results for men, the second part the results for women. The first row shows the unemployment category starting with the best performer (1). The pattern shows a u-shaped curve, whereby the

[143] These sensitivity tests have been carried out and have shown that changes in the outcomes are more or less arbitrary. The figures are comparable with both alternatives. This result is also an indicator for the fact that the GSOEP-sample is representative even when disaggregated to regions.

[144] Here, too, sensitivity tests with slightly different definitions did not produce significantly different results. As already mentioned, this more rigorous definition is favoured. In the next subsection, when I estimate wage curves with alternative performance measures, the same definition is used, and therefore a consistent category definition seems to be more important than even subsample distributions.

best-performing and the worst-performing regions show both significant and relatively high elasticities.[145]

Table 45: Average unemployment categories and their distribution in the sample period 2000–2004

UE category		Agency regions		Individuals	
		N	%	N	%
(1)	u < 8.2	35	19.9	8,514	22.5
(2)	8.2<u<9.8	35	19.9	5,871	15.5
(3)	9.8 < u < 12.0	36	20.5	7,286	19.3
(4)	12.0<u<17.0	35	19.9	6,910	18.3
(5)	u > 17.0	35	19.9	9,203	24.4
Total		176	100.0	37,784	100.0

Source: German Socio-economic Panel, German Federal Employment Agency; own calculations.

For the male labour force, the coefficients for the best-performing regions (1) including regions with an extended unemployment rate of less than 8.1% show the same elasticity, with –.109 in the regional fixed-effect case and –.125 in the individual random-effect case, whereas one can observe only slight differences in the t-statistics. The values for the three other classes are not statistically significant. The estimates with the extended unemployment rate do not change the pattern significantly in the sense that the elasticities at both ends, high-performing and low-performing, are statistically significant and already above the 10% margin of the 'classic' Blanchflower and Oswald hypothesis. On the other hand, the classes that tend to the average are already negative, but with a smaller elasticity, and the estimates are not statistically significant.

An interesting result is that of the individual random effect model with extended unemployment. In these estimates, we observe an additional statistically significant elasticity of –.126 in the mid-performing class (3). This elasticity has another important character: it is between the high-performing elasticity in (1) with –.096 and the elasticity of low-performing class (5) with –.141. Hence, instead of a u-shape, one can observe an upward trend in the elasticity with declining regional labour market performance. As in the case in the regional fixed effect model, this pattern cannot be observed when individual heterogeneity is taken into account.

The female labour market provides a somewhat different picture. The elasticities of the three best-performing classes are consistently negative but statistically insignificant. In the regional fixed effect estimates, both class (4) and class (5) are highly significant and

[145] As mentioned above, performance is defined by unemployment rate: the lower the unemployment rate, the better is the relative performance in regional (labour market) policies. Structural problems within the regions are not taken into account.

show elasticities above the –10% margin. In the individual random-effect case taking into account individual heterogeneity, only class (4) is statistically significant. There the difference between the standard unemployment measure and the extended unemployment measure seems not to be very important.

Table 46: Extended wage curves by unemployment performance classes

		(1)	(2)	(3)	(4)	(5)
Male						
Regional fixed effect	UE rate	-0.109**	0.129	-0.031	-0.076	-0.109**
		(-3.26)	(1.57)	(-0.46)	(-1.32)	(-3.11)
	Extended UE rate	-0.129**	0.029	-0.090	-0.104	-0.125**
		(-3.74)	(0.29)	(-1.11)	(-1.61)	(-3.55)
Individual random effect	UE rate	-0.125**	-0.055	-0.137*	-0.018	-0.129**
		(-3.39)	(-0.61)	(-1.76)	(-0.24)	(-2.50)
	Extended UE rate	-0.096**	0.007	-0.126**	-0.030	-0.141**
		(-2.51)	(0.09)	(-1.97)	(-0.46)	(-2.80)
	N	4,409	3,170	3,773	3,474	4,455
Female						
Regional fixed effect	UE rate	-0.034	0.000	-0.032	-0.123*	-0.137**
		(-0.84)	(-0.00)	(-0.36)	(-1.86)	(-3.78)
	Extended UE rate	-0.039	0.055	-0.031	-0.173**	-0.134**
		(-0.94)	-0.41	(-0.31)	(-2.33)	(-3.69)
Individual random effect	UE rate	0.025	-0.035	-0.059	-0.141*	-0.071
		-0.54	(-0.34)	(-0.71)	(-1.94)	(-1.37)
	Extended UE rate	0.025	-0.044	-0.064	-0.167**	-0.067
		-0.56	(-0.36)	(-0.65)	(-2.06)	(-1.28)
	N	3,174	2,108	2,744	2,745	4,195

Source: German Socio-economic Panel, German Federal Employment Agency; own calculations. * significant at 5%; ** significant at 1%.

What do these results imply? First implication is that the hypothesis that elasticities follow a clear pattern according to regional unemployment performance cannot be verified from this point of view. However I get some hints that wages are more dependent from unemployment in regions with relatively low unemployment – and therefore better functioning labour markets. Second implication is that the individual wage for the male labour force seems to be more dependent on the regional unemployment than female wages. Additionally, female wage elasticity is, although statistically not significant, higher in

regions with relatively high unemployment and lower in regions with relatively low unemployment.

Before I draw political implications from these results, I shall first take a more detailed look at the impact of different active measures on the wage-unemployment elasticity. These estimates are reduced to two main groups of active measures: job creation schemes and training measures. A third model is depicted for an aggregate measure of the share of all participants in active measures in regions.[146] In table 47, the estimation results are depicted for two econometric specifications and three different definitions of active measures. The table shows coefficients for the extended unemployment rate (the elasticity coefficient) and the respective active measure in the model. The elasticities do not differ dramatically from those in table 46. The t-statistics are slightly above those with additional active measure coefficients, which might indicate that the additional variable partly explains a part of the relationship; this is, however, of minor importance.

The most important result is that the coefficients of the active measures are nearly all negative, independent of the type of measure and the model specification. This result is in line with the estimation results for the entire labour market and implies that active measures do have a wage pressure impact, regardless of the performance of regional labour markets. However, the results are quiet weak as most of the coefficients are statistically not significant for all cases. For the regional fixed-effect case, these coefficients are statistically significant, particularly in the low-performing regions. However, the converse does not hold even when the unemployment rate is high. This implies that, regardless of the measure and of the unemployment rate in a region, active measures do increase competition in the labour market.[147]

---

[146] Therefore, I neither take into account the measures of minor importance nor differentiate between long-term and short-term training measures. This approach is in line with previous estimates in this chapter. When the wage subsidy and self-employment subsidy are of 'minor importance', I explicitly do not address the impact or significance of these kinds of measures. The reason for this approach is mainly technical in nature: the total number of participants is reduced, and, as a result, within specific regions estimates often are not even possible, as too many cells are empty.

[147] For the sake of clarity, the estimates for women in the labour market are not depicted in the discussion of the following results. The previous estimations – as well as further tests - have shown that the results do not differ substantially from those for the male labour force depicted in tables 46and 47. The general pattern, as well as the direction and the significance of the active measure coefficients, is similar.

Table 47: Impact of active measures in an extended unemployment framework

			(1)	(2)	(3)	(4)	(5)
Job creation schemes	Regional fixed effect	Extended UE	-0.120** (-3.49)	0.111 (1.35)	-0.014 (-0.20)	-0.076 (-1.32)	-0.092** (-2.57)
		sabm	0.007 (1.42)	-0.018* (-1.87)	-0.019** (-2.10)	-0.014* (-1.76)	-0.007** (-2.86)
	Individual random effect	Extended UE	-0.107** (-2.67)	-0.017 (-0.22)	-0.125* (-1.93)	-0.030 (-0.47)	-0.142** (-2.82)
		sabm	0.003 (0.89)	-0.021** (-2.02)	-0.003 (-0.27)	-0.002 (-0.21)	-0.001 (-0.47)
Further training	Regional fixed effect	Extended UE	-0.099** (-2.77)	0.118 (1.44)	-0.089 (-1.23)	-0.099* (-1.66)	-0.110** (-3.11)
		sft	0.002 (0.70)	-0.006 (-1.25)	-0.010** (-2.48)	-0.008 (-1.57)	-0.001 (-0.16)
	Individual random effect	Extended UE	-0.088** (-2.27)	-0.004 (-0.06)	-0.164** (-2.37)	-0.057 (-0.83)	-0.140** (-2.77)
		sft	0.003 (1.17)	-0.004 (-0.87)	-0.006 (-1.49)	-0.006 (-1.17)	0.001 (0.25)
All active measures	Regional fixed effect	Extended UE	-0.107** (-3.17)	0.108 (1.28)	-0.084 (-1.16)	-0.108* (-1.67)	-0.119** (-3.36)
		smes	0.000 (0.28)	-0.003 (-0.97)	-0.005** (-2.19)	-0.002 (-1.07)	-0.004** (-2.23)
	Individual random effect	lnu	-0.095** (-2.50)	-0.024 (-0.29)	-0.147** (-2.15)	-0.026 (-0.37)	-0.142** (-2.72)
		smes	-0.000 (-0.11)	-0.003 (-1.29)	-0.002 (-0.88)	0.000 (0.10)	-0.000 (-0.09)
		N	4,409	3,170	3,773	3,474	4,455

Source: German Socio-economic Panel, German Federal Employment Agency; own calculations.
* significant at 5%; ** significant at 1%.

What do these results imply for the impact of labour market policies? There is an important result in the light of the Blanchflower-Oswald hypothesis: wage curves differ and depend on the overall performance in regional labour markets. Therefore, I cannot verify their hypothesis with respect to active labour market policies. Moreover, I have not been able to identify an indicator for the existence of a pattern in the way that elasticities are higher or lower in specific unemployment regions. The use of the extended unemployment rate rather than the standard unemployment rate increases the wage-unemployment elasticity, indicating that participants of active measures are not 'parked' in measures in order to disburden the labour market. Active measures do increase competition on the regional

labour market in the way that the wage pressure rises in high-unemployment and/or low-unemployment regions.

So far, I have classified regional labour markets by unemployment figures. As already mentioned above, this is a quiet rough way to built categories and I cannot assume that the performance of active labour market policies is mapped adequately. Apart of the fact that unemployment is a very rough measure it is difficult to justify the arbitrary boundaries of unemployment categories. Therefore, it seems to be useful to have an alternative way to measure regional performance. I have already introduced one possibility in the previous chapter using four indicators which measure the relative performance of regional public employment services in respect to normatively set targets. In the following subsection, I use this more elaborate characterization of regional performance based on the benchmarking model introduced in section 2.7 and discussed in detail in chapter 7.

8.3.2 Performance-based wage curves II: The impact of PES performance

In chapter 7, regional performance indicators were estimated in order to evaluate the effectiveness of regional labour market policies. Central elements of this approach are four indicators characterizing labour market performance in different dimensions. These four indicators are aggregated to one 'total indicator' using normative weighting schemes.[148] As a measure that characterizes the relative performance of regional labour markets on the basis of policy targets, this total indicator represents the main difference from the measure and the approach in the previous subsection, where I used the one-dimensional measure of static macro-measures to evaluate the influence on regional wage-setting. Now the regional differences in the impact of labour market policy performance on the regional wage elasticity are estimated.

From the perspective of the previous analyses, I vary the wage curve approach by introducing alternative or additional regional macro-measures from the relative performance model.[149] Due to data requierement restrictions the following estimations are reduced to one year.

---

[148] This step in the procedure is strictly normative; in the analyses in chapter 7, two different weighting schemes were applied and two different indicators were compiled.
[149] The formal transformation of the efficiency wage model and its implications are described in section 2.9.

The indicators, their specification, and two alternative weighting schemes are depicted in table 39 of chapter 7.[150] I use these indicators to analyse the impact of the regional labour market performance. Based on this the estimated equation has the following form:

$$\ln w_{ir} = \alpha_i + \beta_j \log I_r + \gamma p + \delta X_{ir} + \varepsilon_{ir} \qquad (8.2)$$

With i = 1, …, N, where w_{ir} is stands for the wage of individual I observed in the region *r*, and I_r is the performance indicator in region *r*, and ε_{ir} is the randomly distributed error term. In line with estimations in previous chapters, the coefficients for standard OLS estimation and for a regional fixed effect model are documented. The sample for these estimations encompasses the overall active labour force in western Germany; dummy variables are introduced to control for gender and part-time work. The estimation results for the year 2000 are depicted in table 48.[151]

The first row shows the yearly wage curve estimation for comparative reasons. The results for western Germany are in line with previous estimations using these models: the elasticity is slightly below the values predicted in the standard approach, and it ranges from –.083 using the standard unemployment rate (first column) and OLS, up to –.094 in the case of regional fixed effects under the use of extended unemployment (second column). The elasticities are all highly significant and do not substantially differ. Depending on from the additional control for regional fixed effects, the elasticity of the extended unemployment is slightly higher or lower, but a trend cannot be identified. This result is also in line with the pooled approach estimated in the previous subsection. In the second row, The standard unemployment measures are replaced, and the equation is estimated with the first difference of the unemployment rate. In all model specifications, the coefficient is insignificant and not different from zero. This result indicates that the short-term variation of the unemployment rate is not that important and therefore the effect on the wage elasticity is insignificant.

The next two rows give the results for the performance curves. In the third row estimation is conducted with the so-called uncorrected performance indicators, the foruth row shows the results for the corrected indicators.[152] As discussed in chapter 7, the main

---

[150] In this case, high unemployment rates stand for low performance and vice versa. To conduct comparative elasticities with the performance indicator from the benchmarking model, these indicators must be transformed, because in its original definition the best-performing regions have high indicator values, whereas low-performing regions have low values. The transformation is carried out by subtracting the indicator value of a region from the highest value in the respective indicator category.

[151] Unlike in the previous approach, lagged values are applied. Several sensitivity tests were run in the previous section, which are not all documented here. In general, the results do not differ substantially.

[152] 'Uncorrected' means that this indicator has been computed without consideration of additional regional macro-indicators, which means that exogenous economic factors are not excludes. In the corrected indicator,

issue of political importance is whether to consider further regional controls. From a theoretical point of view, an important advantage of the yardstick model is exactly this consideration: the effects of regional exogenous factors.

So why should we use these two measures as alternatives? The answer is quite simple: although the theoretical aspect is clear and the political discussion is somewhat confusing, with my analysis we can add a piece to the puzzle and answer the question of whether the difference is of any relevance in connection with wage-setting in a region. Hence, we can answer the question of whether the impact on the wage level of an individual is of any relevance. What we cannot say is whether the kind of estimation method we use is better, worse, or even irrelevant. The ranking of regions varies depending on whether corrected or uncorrected measures are used.

The columns labelled *i1* to *i4* give the coefficients for the respective partial performance measures. The standard estimation generally shows significantly lower elasticities than is the case for the different unemployment figures, with values between –.0004 and –.047. This is not astonishing as it means that the performance curve is much flatter than the wage curve and ALMP has – if at all – a much lower effect on individual wages than the overall variation of the unemployment rate measured in the wage curve. However, differences in the design of labour market policies and in the resulting difference in relative performance do have an impact on regional wages between 0.04% and 4.7% in my yearly analysis; thus, one can state that active labour market policies matter with respect to individual remuneration from the perspective of individuals in the labour force.

The six columns show the results for the different indicators. The speed of integration (*ind1*) has a statistically significant impact on real wages, meaning that high indicator values are connected with lower wages. In turn, this means that regional labour markets with more inflow into employment is connected with lower significantly lower wages. From a theoretical perspective this is in line with our expectations: improved matching results in stronger competition in the labour market. The segmentation effect or the qualification gap between employed and unemployed is lowered an they compete in the same market. As I expect that improved reintegration is an effect of successful ALMP, this has a wage pressure effect. In the OLS model, this is even higher for the corrected performance curve. The regional fixed effect model however, shows insignificant results. This is an indicator for the hypothesis, that regional effects are measured differently in the corrected indicator model, and that the correction of regions via fixed effects therefore gives diverging results.

---

exogenous economic factors are mentioned and the performance more specifically mentions the 'real' ALMP effect. For a detailed discussion of the indicators, see chapter 7.

Indicator 2 and 3 are statistically insignificant for all cases. Whereas indicator 4, the sustainability of reintegration also shows statistically significant results for the uncorrected model. Indicator 2, which describes the impact of mid-term unemployment duration, and indicator 3, which measures regional performance in long-term unemployment, are not very important. With the exception of one model (OLS with a corrected performance indicator), the elasticities have no statistical significance. Thus, the impact of changes in long-term unemployment on the individual wage in a region is not significant. This result, in connection with the first one, makes sense: long-term unemployed persons are more difficult to reintegrate into the labour market, as their skills do not fit or no longer directly fit the needs of firms. They do not directly compete with the employed or short-term unemployed with the result that improved reintegration has no significant effect on individual wages in regions. This is also in line with the insider-outsider perspective where long-term unemployed are not direct competitors on the labour market and thus do not have any impact on the wage-setting process.

Indicator 4 measures the sustainability of the reintegration. These measures are again of statistical significance in the uncorrected performance curve, regardless of whether they are measured with the standard model or additional regional fixed effects. All of the measures are negative and therefore indicate that in poorly performing regions with low sustainable reintegration, wages are significantly higher than in regions with higher sustainability. However, further implications are difficult to draw, and more research would be needed to provide results that are more reliable.[153]

[153] The dynamic effect is not mentioned in this analysis; this aspect would require more research.

Table 48: Elasticities for different indicators (2000)

	lnu	lneu	i1	i2	i3	i4	g1	g2
	log of regional unemployment	log of extended unemployment	Speed of reintegration	Avoidance of long-term unemployment > 6 months	Avoidance of long-term unemployment > 24 months	Sustainability of reintegration	Weighting: 50-20-20-10	Weighting 25-25-25-25
OLS								
Wage curve	-0.083** (-6.18)	-0.088** (-6.44)						
First difference	-0.004 (-0.30)	-0.013 (-0.29)						
Performance curve			-0.009** (-3.39)	-0.002 (-0.55)	-0.001 (-0.72)	-0.005** (-2.78)	-0.006** (-3.31)	-0.004** (-5.29)
Corrected performance curve			-0.013** (-2.46)	-0.004 (-1.01)	-0.006** (-1.99)	-0.001 (-0.42)	-0.006** (-2.57)	-0.004* (-1.86)
Regional fixed effect								
Wage curve	-0.086** (-4.42)	-0.094** (-4.84)						
First difference	0.011 (-0.72)	0.017 (-.038)						
Performance curve			-0.006** (-2.25)	-0.002 (-0.49)	-0.002 (-0.87)	-0.005** (-2.17)	-0.005** (-2.53)	-0.003** (-4.00)
Corrected performance curve			-0.008 (-1.35)	-0.002 (-0.50)	-0.003 (-0.87)	-0.001 (-0.33)	-0.004 (-1.60)	-0.004* (-1.66)

Source: German Socio-economic Panel, German Federal Employment Agency; own calculations. * significant at 5%; ** significant at 1%.

Up to here partial effects of the four indicators were discussed. The following two columns show the results of the overall performance indicators. Two alternatives for an elasticity of integrated indicators are estimated on the basis of the results of the performance measure in chapter 7. The coefficients are depicted in the last two columns of table 48 (*g1* and *g2*). On the basis of two weighting schemes, these variables integrate all four target measures. The first indicator (*g1*) gives the first target (*ind1*) the highest weight, and the fourth indicator (*ind4*) the lowest weight, whereas in *g2* all targets of effectiveness have the same weight. These estimated coefficients are statistically significant, with negative signs in three out of four model specifications. The results are not surprising, as the coefficients are in the range of the target indicators discussed earlier.

With the regional fixed effect model, which means correcting for regional differences I find lower coefficients compared to the OLS model. On the other hand, I cannot observe significant differences in the results between corrected and uncorrected performance indicator. This is perhaps a hint that the regional correction of exogenous factors in the performance indicator can be improved. If I assume that this is the case and the if I additionally assume that the regional fixed effect captures these differences more precise, I can conclude that the negative wage effect of successful ALMP depends more on exogenous factors than on the measures on PES-performance.

Another important point of interest here is the difference between the two indicators. The first total indicator with the highest weight on the speed of reintegration has a slightly higher coefficient than the evenly distributed one. Although the difference is quite small, one can conclude that labour markets with better performance in reintegration have higher wage elasticity than those which emphasize sustainability or the avoidance of long-term unemployment. This can be interpreted to the mean that regional labour market policies with a relatively better reintegration of unemployed persons in terms of turnover have a more negative impact on wage-setting in the labour market.

To sum up the results I can conclude that the regional performance of public employment services does have a small but significant effect on wages: wages are lowered as competition rises on the labour market. On the other hand this indicates the positive effect that ALMP does have a positive effect on the integration of unemployed. However, this is only the case for short term unemployed. For long-term unemployed no significant wage effect can be identified. As the differences are quite small, and the estimations are reduced to a one-year cross-section, it can only be said that wages are reduced through better PES performance, but no conclusion can be drawn on the wage level, which means the positive effect of lowering unemployment through effective ALMP. Therefore, further tests are recommended to make more reliable, as well as more powerful statements on the

impact of individual wages. However, the sensitivity of these results aside, three main conclusions can be drawn: First, active labour market policies matter; second, the wage pressure is increased; and third, active labour market policies have an impact on individual wages in regions. Therefore, effective labour market policies can improve regional labour markets. The question, if it is to the 'price' of lower wages, or if wages rise – especially over time – is both possible.

8.4 Conclusion

The main question pursued in this chapter was whether active labour market policies have an impact on individual wages in regions. First, the impact of ALMP input was evaluated with the estimation of an extended efficiency wage approach. The overall impact of ALMP and the impact of different ALMP measures were estimated. In a second step, the performance of regional labour markets and regional labour market policies were evaluated. The impact of regional PES performance (i.e. labour market policy outcome) on regional wages was discussed in the light of the assumption that regions with better-performing public employment services have a stronger competition in the labour market indicated by higher elasticities. The benchmarking indicators from chapter 7 were taken up, incorporated into the wage-curve equation, and used in place of the unemployment measures.

The analyses on the extended wage curve have shown that there is a substantial difference between standard wage curves and extended wage curves considering active measures. The main conclusions are that active labour market policies do matter and that the impact on wage-setting is ambigious. On the one hand, ALMP improves wage pressure indicated by higher elasticities. On the other hand, there is an upward trend of wages through reduced unemployment. Higher wage pressure indicated by higher elasticites is the case depending on labour market conditions.

In western Germany, higher elasticities are observed, for the most part on a higher level, which means that the extended wage curve is above the standard wage curve in all regions. When different measures are analysed, I can observe that the effect of training measures is stronger than that of job creation schemes. For eastern Germany, the results are weaker, and the short-term training measures show a positive coefficient, indicating that these measures have a positive impact on wage-setting and that wages are higher.

A wage curve could also be identified for the yearly estimations. Again, the hypothesis is supported that higher shares of active measures increase the wage pressure. However, a

unique pattern cannot be observed: there is significant variation between the five years, which are characterized by the reform process undertaken during that period. It can thus be argued, first, that changes in labour market policies have an impact on individual wages in regions, and, second,[154] that the lack of a clear pattern might be caused by adjustments in the reform process.

In the second part of this chapter regional performance was focused. The performance of regional labour markets measured by unemployment categories does not exhibit a clear pattern, but the coefficients of the active measures are negative for most measures and specifications. This outcome again implies that active labour market measures do not have a strong impact on wage pressure, regardless of the performance of regional labour markets. Irrespective of the type of measure and of the unemployment in a region, active measures for the most part increase competition in the labour market slightly. The use of the extended unemployment rate rather than the standard unemployment rate increases the wage-unemployment elasticity, indicating that the participants of active measures are not 'parked' in measures in order to disburden the labour market, but having a significant impact by particvipating in active measures.

The performance curves of regional labour market policies show a modest but statistically significant pattern of negative elasticities. However, the coefficients are significantly smaller than the wage elasticity on unemployment indicating that the PES performance has a muchg lower impact than regional unemployment figures. The speed of reintegration, in particular, indicates that regional labour markets with functioning placement are faced with slightly lower individual wages compared to worse performing regions. However, as the analysis is static, I cannot drawn any conclusion on the positive impact of unemployment reduction on wages. The impact of long-term unemployment on regional wages is not very high. From an insider-outsider perspective, therefore, they are not direct competitors on the labour market. This result supports the reliability of former estimations: active labour market policies account for one part of the wage elasticity in regions. Furthermore, these policies, if effective, improve regional wages. A downward pressure of even a crowding-out effect cannot be identified.

[154] And apart from the restrictions of the reliability estimation of the results.

9 Concluding remarks

In a globalized economy, two empirical facts are salient : Performance is not evenly spread but characterized by a high degree of regional disparities within countries, and the importance of knowledge in an information-based economy is growing. These phenomena and their consequences are thoroughly discussed in the literature of new regional economics. Its basic conclusion is that regional agglomerations are not necessarily consistent with national borders nor with regions defined by other administrative characteristics. With shrinking transport costs, criteria like infrastructure, geographical proximity to competitors, and the availability of an experienced and skilled workforce are more important than criteria like access to natural resources. But what are the consequences for the labour market? What are the implications for wage levels and unemployment, or for qualifications? And what effect will these dynamic environments have on labour market policies? This thesis has focused on these questions: I have dealt with the interaction of wages, unemployment, qualifications, and the role of labour market policies. In theoretical terms, the study is based on the wage curve; the empirical work is based on data from regions in Germany.

In short, the wage curve describes the dependency of individual real wage levels on unemployment. Blanchflower and Oswald (1994) postulate that a constant wage curve exists whereby wages tend to decrease by 10% with a doubling of unemployment. The wage curve challenges the neoclassical assumptions of costless mobility and convergence in equilibrium over time. Involuntary unemployment and differences in real wages exist in equilibrium. I have discussed some of the reasons in this thesis: Regional mobility and the ability to commute are limited, and thus there is no convergence over time; regional labour markets do not clear; stronger regions have low unemployment and higher individual wage levels, whereas weaker regions tend to have high unemployment and lower individual wage levels. I have extended the wage curve by including qualifications and the impact of active labour market policies in the model. I have also dealt with the innovative potential of the wage curve, as well as the integration of a micro (individual wages and qualifications) and macro (unemployment) perspective in regional labour markets, and extended the approach with a qualification-specific and an institutional perspective. In short, my empirical results indicate that in fact individual wages in Germany differ substantially between regions. There is a wage curve in Germany, but I found significant differences in these elasticities: wage curves differ by qualification level and labour market policies. These results have a wide range of policy implications: qualifications and active labour market policies can

improve labour market performance. I shall conclude by reviewing these results, discussing policy implications, and suggesting further research topics.

In the theoretical section, I gave an overview of macroeconomic theories, emphasized the relevance of regions, and discussed the role of rigidities. The wage curve approach based on the work of Blanchflower and Oswald (1994) was introduced, and an efficiency wage model was examined. I have shown that the wage curve model fits well with the questions pursued: the impact of qualifications and active labour market policies on regional wage levels can be analysed by extending the model. This is the theoretical framework of the subsequent empirical analyses. I have shown that ALMP can have a positive effect on overall unemployment, that the impact on wage levels is ambiguous, and that the wage elasticities are higher. Furthermore, I have introduced a benchmarking model to evaluate the performance of regional public employment services. In a final stage, the efficiency wage model and the performance model were integrated, and a performance curve was developed. This model has a structure comparable to the wage curve showing a downward-sloping curve, indicating that better-performing regional ALMP can result in relatively lower wages caused by stronger competition in the labour market. However, the model also shows that the overall effect on wage levels cannot be defined.

The empirical part of this thesis has four sections. Descriptive analyses introduce relevant variables, and a discussion of the adequate definition of regional labour markets follows. Some stylized facts on the role of regions from a European perspective were provided, and the German labour market was analysed in its regional dimension. I demonstrated the role of unemployment, qualifications, and income, as well as the importance and development of active labour market measures. Three alternative aggregation levels for Germany are adequate to define labour markets. The administrative federal state level is quite rough in its delimitation, and the two functional aggregation levels – 97 economic regions and 171 agency regions – draw different pictures of regional labour markets. Whereas the definition of the first focuses on the general economic structure, the latter specifically includes aspects of the labour force. In sum, it can be concluded that regions do matter in Germany, and that labour market performance differs. There is a clear difference not only between eastern and western Germany but also between regions. Unemployment varies substantially, as does remuneration, and different regional levels of aggregation result in different figures.

But is there also a German wage curve? The answer is 'Yes, but …' Blanchflower and Oswald's hypothesis of a unique wage-unemployment elasticity independent of time, structure of the labour force, and institutional background cannot be fully verified. Diverging elasticities are observed. Significance, as well as elasticity, varies depending on

different model specifications, regional aggregation levels, and labour force specifications. In a way, these results are in line with several other studies both for Germany and for other industrialized countries. There is in fact a clear negative wage-unemployment relationship on the regional level. When examining the German case in more detail, I find a somewhat differentiated picture compared to that of previous studies: First, the difference between eastern and western Germany is significant because for eastern Germany the trend is a smaller elasticity. However, even here a significant relationship is observed. It should be noted, however, that many of the earlier studies use data from the early to mid-1990s, whereas the studies presented here cover an eight-year period from the mid-1990s to the middle of this decade, giving more up-to-date results.

Particularly for eastern Germany, this fact is crucial: First, if a concave wage curve is assumed, the elasticity depends on where one is on the curve. At a point with relatively low wages and relatively high unemployment, as is the case in eastern Germany, a decrease of unemployment by one percentage point results in a lower increase of wages than in the case of a low-unemployment, high-wage region. Second, the transition from the former socialist system to the social market economy has strongly affected the regional labour market and its institutions. Therefore, one can expect that these forces influence wage-setting and thus differ from the established system in western Germany. The third argument takes a similar approach but is rooted more in the individual perspective: as a consequence of the transition, the expectations of individuals in eastern and western Germany may differ, as they are 'bounded' in their rationality. In terms of the efficiency wage model, this can involve differences in expected effort or shirking.

Is this result disappointing? I do not think so. In fact, it even should be interpreted in the opposite way: First, an important claim of the wage curve model is corroborated by the negative wage-unemployment relationship. This indicates – apart from the free market model – that in a monopolistic labour market structure, lower wages do not affect a decline in unemployment. However, if unemployment declines in a region, one can expect a rise in regional wage levels. Second, one can interpret differences by region by taking into account different institutional and labour market settings: there is the possibility of differences in wage elasticity between labour subgroups, for example by qualifications or unemployment level. The results suggest that other factors such as structure of the labour force (qualifications) and institutions (labour market policies) do possibly matter, and hence that labour market policies matter and have an impact on wages.

With the estimation of qualification-specific wage curves, I analyse differences in wage responsiveness to regional unemployment in specific labour market subgroups. The background of such an analysis is that qualifications and skills are critical in developed

economies, and an important task is to deepen knowledge of skill needs and their impact, for example through shortages. These analyses underline that Blanchflower and Oswald's hypothesis of the existence of a 'general rule' of a unique wage curve has not been verified. Instead, what I have been able to observe is an alleviated form of wage curve, which shows different elasticities by qualification-specific labour market subgroups. Obviously, the differences in elasticities are not solely due to regional differences in the overall unemployment rate. Unemployment matters, but it is not the sole explanation of wage differentials. Analyses of eastern and western Germany in particular indicate that they partly follow other or additional rules. Subgroups with higher qualifications, , show higher variation in higher-qualification groups. The same holds true with respect to the actual occupational position. This outcome clearly indicates that the wages of lower-skilled workers are less volatile with respect to the unemployment figures in regions, and that competition between highly qualified people is greater.

Higher qualifications make employees more dependent from regional labour market condition; their remuneration tends to be related to their actual effort when the risk of becoming unemployed is higher. Furthermore larger firms show higher wage elasticities, which is counterintuitive from to the bargaining theory: according to this larger firms are normally strongly related to collective agreements Because the bargaining power of these employees is higher, one might expect that their wages are less volatile with respect to regional unemployment levels. In the light of efficiency wage theory, however, this result makes sense: there is a selection bias for people working in large firms; the more qualified/motivated work in large firms with higher career perspective; they are willing and/or able to make more effort.

In sum, these results clearly indicate that, especially for higher-skilled workers, wages vary in accordance with regional labour market performance. Lower unemployment does not improve the wages of the low-skilled. Basically, because the level of unemployment is higher, the chances of finding employment are higher. Any variation can be attributed tp higher qualifications: the better qualified earn significantly more in regions with low unemployment.

Given the results showing that unemployment is responsible for wage differentials, and that qualification levels have a further substantial impact, what impact can policies make? I pursued this question first by asking how the performance of regional public employment services can be measured, and then evaluating the impact of active measures and PES performance on wages. An instrument to measure relative effectiveness was discussed, drawing on the example of an implementation study for Switzerland, which showed that objective measures can make a substantial contribution to performance

improvement. However, problems emerged with implementation, and as a result, acceptance decreased dramatically. The main reason for this outcome was that political sensitivity and the role of public discussion were underestimated. It is possible to develop reliable regression models to compute corrected indicators that give a reasonable indication of the relative performance of employment offices. But an unsatisfactory feature of this Swiss approach is that it measures performance on the basis of four normative indicators; this measure is therefore never purely objective – it depends on how performance is defined.

How do active policies impact wages? To answer this question, extended wage curves including ALMP were estimated, and the impact of regional performance on individual wages was analysed. I showed that ALMP and the performance of regional PES have a significant impact on wage curves. The impact on wage-setting is ambiguous. On the one hand, ALMP increase wage pressure, as indicated by higher elasticities. On the other hand, there is an upward trend of wages through reduced unemployment. In western Germany, higher elasticities are observed, for the most part on a higher level, which means that the extended wage curve is above the standard wage curve in all regions: wages are higher. In view of the different kinds of measures, the effect of training is significantly stronger than that of job creation schemes. For eastern Germany, the results are weaker. Over the short term, training measures show a positive coefficient: many training measures partly improve wages with rising unemployment, which clearly indicates that regions with very high and structural unemployment require different policies. A wage curve can also be identified for the yearly estimations, but a unique pattern cannot be observed: there is significant variation between the five years of continuous reforms in the first half of this decade. It can thus be argued that changes in labour market policies have an impact on individual wages in regions, and that the lack of a clear pattern might be due to adjustments in the reform process that are difficult to observe.

The performance of regional labour markets as measured by unemployment categories shows clear wage curve patterns. However, irrespective of the type of measure and of the unemployment in a region, active measures slightly increase competition in the labour market: more employable people compete for the same number of jobs, and unemployment and wages decline. Further analyses indicate that the participants in active labour market measures are not 'parked' there in order to disburden the labour market, but rather make a significant impact through their participation.

The performance curves measuring the relation of regional PES performance and individual wages show a modest but statistically significant pattern of negative elasticities. The speed of reintegration indicates that regional labour markets with functioning

placement are faced with slightly higher wage elasticities in comparison with poorly performing regions, leading to lower individual wages caused by better performance. However, because the analysis is static, I cannot draw any conclusions about a potential positive impact of unemployment reduction on wages. The impact of long-term unemployment on regional wages is not substantial. From an insider-outsider perspective, therefore, they are not direct competitors on the labour market. This result supports the reliability of previous estimations: active labour market policies account for one part of the wage elasticity in regions. Furthermore, these policies, if effective, improve regional wages. A downward pressure of even a crowding-out effect cannot be identified.

In sum, a wage curve is evident in Germany. And despite the fact that unionization is relatively high in Germany and collective agreements are often punished, as they apparently prevent proper labour market adjustment, wages vary between regions because of differences in unemployment figures. Wages are significantly affected by differences in regional labour market performance; high unemployment reduces individual wages; and collective bargaining seems not to undermine this mechanism. These results have substantial policy implications.

The analyses clearly indicate that diverging regional labour market figures are not 'given by nature' or governed by economic performance in itself. A prospering economy is a precondition for a functioning labour market – and the result for eastern Germany underline this fact. However, a healthy economy is not sufficient: regionally adapted labour market policies that improve qualifications can contribute to overall improved labour market performance. In this respect, qualification measures are more successful than job creation schemes. A downward pressure is a possible outcome – at least in the short term; however, the effect is not serious, and a crowding-out effect induced by ALMP cannot be observed. The level of qualifications plays a prominent role in this mechanism: Higher qualifications improve wages, and competition in the labour market is greater in regions with low unemployment, leading to some wage pressure. However, overall wage levels are higher, and greater competition in the labour market improves wages. Therefore, policymakers have two incentives to promote and facilitate qualifications: first enforce education and further training which continuously improve and update the knowledge and skills of the individual and ensures employability. Second support during transitional phases, including those from school to work as well as those from unemployment and other forms of inactivity.

As mentioned, qualifications are important, but qualifications are not a unique product. Regional labour markets can differ substantially, and so too can the demand for qualifications and skills. It is crucial to have a clear picture of what kind of specific

qualifications are required. A thorough analysis of future skill needs helps individuals make longer-term decisions about their education needs. Such an analysis is also essential for the promotion of the improvement of qualifications among the unemployed and other disadvantaged groups in the labour market.

Performance-based incentive systems for regional public employment services provide a framework for implementing market mechanisms in a public institution that is faced with rapidly changing requirements in globalized labour markets. They contribute to more transparency and enforce learning processes. Moreover, it is constructive to evaluate the regional performance of institutions in a way that is more sophisticated than, for example, purely descriptive benchmarking indicators. Therefore, if other countries plan to introduce a comparable system, the sensitivity of the analyses should always be kept in mind and mentioned in the implementation process. Although the indicators are error-prone and thus difficult to directly link to an incentive scheme, they provide a picture of the regional performance of public employment services and can support policymakers in their information-based decision-making process.

The estimations of performance curves gave further insight into the functioning of regional labour markets; this kind of analysis provides sound information for analysing the effectiveness of labour market policies. The results underline the conclusion that active labour market policies provided by effective employment services encourage competition on the regional labour market in such a way that in high and/or in low unemployment regions, the wage pressure rises. Moreover, ALMP can improve wages and matching in regional labour markets. The performance-based wage curves of regional labour market policies support this finding.

The wage curve analyses open up a broad field of further research topics, both methodologically and empirically. In methodological terms, inclusion of a multilevel component would be beneficial. Current methodological advancements, such as generalized linear latent and mixed models, provide a number of improvements. Furthermore, analyses with more detailed information on qualifications, on the one hand, and firm-specific information, on the other, could provide results that are more detailed, especially when qualification-based submarkets are analysed. When this kind of analysis is taken one step further, one might think of comparative analyses between specified regions to identify patterns, for example in accordance with labour market or regional economic policies. A possible data resource for this kind of analysis could be a linked employer–employee data set, such as the one provided by the IAB.

The analyses of the performance-based wage curves were restricted to western Germany and were based on a cross-sectional perspective. With improved indicators, year-by-year comparison or the above-proposed 'moving window' with cross-sections could provide more insight into a dynamic perspective, as changes in policies over years could be observed. Another question would be how to fully integrate the performance of regional labour market institutions into the wage curve model; one possibility is to combine unemployment figures and performance indicators. Last but not least, one further advantage of household panels is their potential for international comparative research. A promising research field would be to use transnational data resources such as the European Community Household Panel. The main disadvantage of this approach, however, is that the regional information is quite limited. A reasonable alternative would be to use national household panels such as the British Household Panel Survey and the Dutch Household Panel.

Appendix

Table A 1: ISCO-88 classification, three-digit

MAJOR GROUP 1: LEGISLATORS, SENIOR OFFICIALS, AND MANAGERS	
11	Legislators and senior officials
111	Legislators
112	Senior government officials
113	Traditional chiefs and heads of villages
114	Senior officials of special-interest organizations
12	Corporate managers. This group is intended to include persons who, as directors, chief executives or department managers, manage enterprises or organizations, or departments, requiring a total of three or more managers
121	Directors and chief executives
122	Production and operations department managers
123	Other department managers
13	General managers (This group is intended to include persons who manage enterprises, or in some cases organizations, on their own behalf, or on behalf of the proprietor, with some non-managerial help and the assistance of no more than one other manager who should also be classified in this sub-major group as, in most cases, the tasks will be broader than those of a specialized manager in a larger enterprise or organization. Non-managerial staff should be classified according to their specific tasks.)
131	General managers
MAJOR GROUP 2: PROFESSIONALS	
21	Physical, mathematical and engineering science professionals
211	physicists, chemists and related professionals
212	Mathematicians, statisticians and related professionals
213	Computing professionals
214	Architects, engineers and related professionals
22	Life science and health professionals
221	Life science professionals
222	Health professionals (except nursing)
223	Nursing and midwifery professionals
23	Teaching professionals
231	College, university and higher education teaching professionals
232	Secondary education teaching professionals
233	Primary and pre-primary education teaching professionals
234	Special education teaching professionals
235	Other teaching professionals
24	Other professionals
241	Business professionals
242	Legal professionals
243	Archivists, librarians and related information professionals
244	Social science and related professionals
245	Writers and creative or performing artists
246	Religious professionals
MAJOR GROUP 3: TECHNICIANS AND ASSOCIATE PROFESSIONALS	
31	Physical and engineering science associate professionals
311	Physical and engineering science technicians
312	Computer associate professionals
313	Optical and electronic equipment operators

314	Ship and aircraft controllers and technicians
315	Safety and quality inspectors
32	Life science and health associate professionals
321	Life science technicians and related associate professionals
322	Modern health associate professionals (except nursing)
323	Nursing and midwifery associate professionals
324	Traditional medicine practitioners and faith healers
33	Teaching associate professionals
331	Primary education teaching associate professionals
332	Pre-primary education teaching associate professionals
333	Special education teaching associate professionals
334	Other teaching associate professionals
34	Other associate professionals
342	Business services agents and trade brokers
343	Administrative associate professionals
344	Customs, tax and related government associate professionals
345	Police inspectors and detectives
346	Social work associate professionals
347	Artistic, entertainment and sports associate professionals
348	Religious associate professionals
MAJOR GROUP 4: CLERKS	
41	Office clerks
411	Secretaries and keyboard-operating clerks
412	Numerical clerks
413	Material-recording and transport clerks
414	Library, mail and related clerks
419	Other office clerks
42	Customer services clerks
421	Cashiers, tellers and related clerks
422	Client information clerks
MAJOR GROUP 5: SERVICE WORKERS AND SHOP AND MARKET SALES WORKERS	
51	Personal and protective services workers
511	Travel attendants and related workers
512	Housekeeping and restaurant services workers
513	Personal care and related workers
514	Other personal services workers
515	Astrologers, fortune-tellers, and related workers
516	Protective services workers
52	Models, salespersons and demonstrators
521	Fashion and other models
522	Shop salespersons and demonstrators
523	Stall and market salespersons
MAJOR GROUP 6: SKILLED AGRICULTURAL AND FISHERY WORKERS	
61	Market-oriented skilled agricultural and fishery workers
611	Market gardeners and crop growers
612	Market-oriented animal producers and related workers
613	Market-oriented crop and animal producers
614	Forestry and related workers
615	Fishery workers, hunters and trappers
62	Subsistence agricultural and fishery workers
621	Subsistence agricultural and fishery workers

MAJOR GROUP 7: CRAFT AND RELATED TRADES WORKERS	
71	Extraction and building trades workers
711	Miners, shotfirers, stone cutters and carvers
712	Building frame and related trades workers
713	Building finishers and related trades workers
714	Painters, building structure cleaners and related trades workers
72	Metal, machinery and related trades workers
721	Metal moulders, welders, sheet-metal workers, structural metal preparers, and related trades workers
722	Blacksmiths, toolmakers and related trades workers
723	Machinery mechanics and fitters
724	Electrical and electronic equipment mechanics and fitters
73	Precision, handicraft, printing and related trades workers
731	Precision workers in metal and related materials
732	Potters, glassmakers and related trades workers
733	Handicraft workers in wood, textiles, leather, and related materials
734	Printing and related trades workers
74	Other craft and related trades workers
741	Food processing and related trades workers
742	Wood treaters, cabinetmakers and related trades workers
743	Textile, garment and related trades workers
744	Pelt, leather and shoemaking trades workers
MAJOR GROUP 8: PLANT AND MACHINE OPERATORS AND ASSEMBLERS	
81	Stationary plant and related operators
811	Mining- and mineral-processing plant operators
812	Metal-processing plant operators
813	Glass, ceramics and related plant operators
814	Wood-processing and papermaking plant operators
815	Chemical-processing-plant operators
816	Power-production and related plant operators
817	Automated-assembly-line and industrial-robot operators
82	Machine operators and assemblers
821	Metal- and mineral-products machine operators
822	Chemical-products machine operators
823	Rubber- and plastic-products machine operators
824	Wood-products machine operators
825	Printing, binding, and paper-products machine operators
826	Textile, fur, and leather products machine operators
827	Food and related products machine operators
828	Assemblers
829	Other machine operators and assemblers
83	Drivers and mobile-plant operators
832	Motor-vehicle drivers
833	Agricultural and other mobile-plant operators
834	Ships' deck crews and related workers
MAJOR GROUP 9: ELEMENTARY OCCUPATIONS	
91	Sales and services elementary occupations
911	Street vendors and related workers
912	Shoe cleaning and other street services elementary occupations
913	Domestic and related helpers, cleaners and launderers
914	Building caretakers, window and related cleaners
915	Messengers, porters, doorkeepers and related workers

916	Garbage collectors and related labourers
92	Agricultural, fishery and related labourers
921	Agricultural, fishery and related labourers
93	Labourers in mining, construction, manufacturing and transport
931	Mining and construction labourers
932	Manufacturing labourers
933	Transport labourers and freight handlers
MAJOR GROUP 0: ARMED FORCES	
01	Armed forces
011	Armed forces

Source: ILO (1990).

Table A2: NACE categories

A	Agriculture, hunting, and forestry
B	Fishing
C	Mining and quarrying
D	Manufacturing
E	Electricity, gas and water supply
F	Construction
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
H	Hotels and restaurants
I	Transport, storage and communications
J	Financial intermediation
K	Real estate, renting and business activities
L	Public administration and defence; compulsory social security
M	Education
N	Health and social work
O	Other community, social and personal service activities
P	Private households with employed persons
Q	Extra-territorial organizations and bodies

Source: United Nations Statistical Division. For a more detailed breakdown, see http://unstats.un.org.

Table A3: Ranking of regional unemployment rate on agency level by regional unemployment rate, 2004

	Agency	UE rate			Agency	UE rate
1	Freising	4.8		47	Hanau	8.1
2	Ludwigsburg	5.4		48	Verden	8.1
3	Donauwoerth	5.5		49	Mainz	8.2
4	Ravensburg	5.6		50	Deggendorf	8.2
5	Goeppingen	5.8		51	Bamberg	8.2
6	Landshut	5.9		52	Coesfeld	8.3
7	Waiblingen	5.9		53	Fulda	8.3
8	Weilheim	6.0		54	Saarlouis	8.4
9	Rottweil	6.1		55	Siegen	8.4
10	Nagold	6.1		56	Weissenburg	8.4
11	Reutlingen	6.2		57	Frankfurt	8.4
12	Loerrach	6.3		58	Darmstadt	8.5
13	Rastatt	6.3		59	Nienburg	8.5
14	Ingolstadt	6.3		60	Schweinfurt	8.6
15	Traunstein	6.5		61	Mayen	8.6
16	Schwaebisch Hall	6.6		62	Ahlen	8.7
17	Rosenheim	6.7		63	Nordhorn	8.7
18	Munich	6.8		64	Osnabrück	8.8
19	Offenburg	6.8		65	Limburg	8.8
20	Freiburg	6.9		66	Ludwigshafen	8.9
21	Ulm	7.1		67	Bad Oldesloe	8.9
22	Würzburg	7.1		68	Meschede	9.0
23	Memmingen	7.1		69	Augsburg	9.0
24	Kempten	7.1		70	Schwandorf	9.1
25	Konstanz	7.2		71	Wiesbaden	9.2
26	Trier	7.2		72	Wetzlar	9.3
27	Regensburg	7.3		73	Muenster	9.3
28	Stuttgart	7.3		74	Wesel	9.4
29	Tauberbischofsheim	7.4		75	Celle	9.4
30	Heilbronn	7.4		76	Lueneburg	9.4
31	Ansbach	7.4		77	Stade	9.5
32	Heidelberg	7.5		78	Neunkirchen	9.5
33	Villingen-Schwenn.	7.5		79	Neuwied	9.5
34	Landau	7.5		80	Weiden	9.5
35	Montabaur	7.5		81	Bruehl	9.6
36	Karlsruhe	7.5		82	Giessen	9.6
37	Koblenz	7.6		83	Korbach	9.7
38	Vechta	7.7		84	Kaiserslautern	9.8
39	Pforzheim	7.8		85	Paderborn	9.9
40	Rheine	7.9		86	Hildesheim	9.9
41	Balingen	7.9		87	Passau	9.9
42	Aalen	7.9		88	Bergisch Gladbach	9.9
43	Aschaffenburg	7.9		89	Bad Kreuznach	9.9
44	Bonn	7.9		90	Mannheim	9.9
45	Pfarrkirchen	8.0		91	Duesseldorf	10.0
46	Marburg	8.1		92	Helmstedt	10.0
93	Neumuenster	10.1		135	Emden	13.3

94	Herford	10.1		136	Essen	13.4
95	Elmshorn	10.1		137	Bochum	14.3
96	Iserlohn	10.2		138	Bremerhaven	15.1
97	Nuernberg	10.2		139	Dresden	15.4
98	Soest	10.3		140	Duisburg	15.4
99	Bad Hersfeld	10.4		141	Potsdam	15.5
100	Offenbach	10.4		142	Suhl	15.6
101	Solingen	10.6		143	Gotha	16.0
102	Münchengladbach	10.7		144	Dortmund	16.2
103	Krefeld	10.8		145	Jena	16.7
104	Dueren	10.8		146	Schwerin	16.8
105	Bayreuth	11.0		147	Plauen	17.3
106	Hamburg	11.0		148	Pirna	17.3
107	Detmold	11.1		149	Gelsenkirchen	17.6
108	Oldenburg	11.1		150	Gera	18.8
109	Hagen	11.3		151	Chemnitz	18.8
110	Flensburg	11.4		152	Zwickau	19.3
111	Coburg	11.5		153	Magdeburg	19.5
112	Saarbruecken	11.6		154	Oschatz	19.9
113	Aachen	11.7		155	Erfurt	20.0
114	Kassel	11.8		156	Berlin-Ost	20.1
115	Goslar	11.9		157	Halberstadt	20.2
116	Braunschweig	11.9		158	Riesa	20.2
117	Wuppertal	12.0		159	Leipzig	20.6
118	Oberhausen	12.1		160	Annaberg	20.7
119	Leer	12.1		161	Halle	20.8
120	Bielefeld	12.2		162	Frankfurt an der Oder	20.9
121	Kiel	12.4		163	Neuruppin	21.1
122	Pirmasens	12.4		164	Dessau	21.2
123	Hameln	12.5		165	Nordhausen	21.3
124	Hof	12.5		166	Wittenberg	21.4
125	Hanover	12.5		167	Rostock	21.9
126	Goettingen	12.5		168	Stendal	22.6
127	Bremen	12.6		169	Bautzen	23.2
128	Recklinghausen	12.8		170	Altenburg	23.3
129	Heide	12.8		171	Eberswalde	23.3
130	Wilhelmshaven	13.0		172	Cottbus	23.6
131	Uelzen	13.0		173	Merseburg	24.4
132	Luebeck	13.1		174	Stralsund	24.6
133	Cologne	13.1		175	Sangerhausen	26.8
134	Hamm	13.2		176	Neubrandenburg	27.3

Source: Federal Employment Agency.

Table A4: Regressions of the four indicators

	Uncorrected indicator model				Indicator model corrected with exogenous factors			
	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 1	Indicator 2	Indicator 3	Indicator 4
Unemployment	57.869** (-13.46)	0.319** (-9.24)	49.156** (-15.89)	13.702* (-2.28)	32.660** (-6.32)	0.259** (-4.83)	35.766** (-9.63)	23.830** (-4.00)
Vacancies					-0.942** (-5.97)	-0.004* (-2.26)	-0.216 (-1.91)	0.225 (-1.24)
Female					-1.511 (-0.73)	-0.042 (-1.96)	-3.324* (-2.23)	-2.41) (-1.01)
Foreign					1.581 (-1.32)	-0.001 (-0.10)	1.454 -1.69)	-2.15) (-1.56)
Low-skilled					-15.145** (-4.27)	-0.108* (-2.93)	1.272 (-0.50)	9.399* (-2.3)
Service					-12.320** (-3.83)	-0.053 (-1.58)	-3.324 (-1.44)	5.531 (-1.49)
Industry					-27.174** (-4.58)	-0.092 (-1.49)	4.103 (-0.96)	37.925** (-5.54)
Construction					-2.799 (-0.85)	-0.021 (-0.60)	-0.497 (-0.21)	-3.666) (-0.96)
Basic					-3.485 (-0.94)	-0.008 (-0.21)	1.713 (-0.64)	-4.755 (-1.11)
Blue-collar					4.378 -1.67	0.046 (-1.68)	-8.646** (-4.58)	-14.646** (-4.83)
Skilled					0.031 -0.27	0.001 (-1.26)	0.052 (-0.64)	0.203 -1.56)
Constant	2.966** (-11.35	0.872** (-415.46)	-0.088 (-0.47)	3.338** (-9.13)	19.768** (-4.47)	0.973** (-21.17)	4.884 (-1.53)	1.744 (-0.34)
R2	0.566	0.381	0.645	0.36	0.821	0.572	0.854	0.730
N	141	141	141	141	141	141	141	141

Source: Federal Employment Agency; own calculation. * significant at 5%; ** significant at 1%.

Table A 5: Performance-based ranking of 141 western German agencies, 1999

id	name	ind1	ind2	ind3	gind1	gind3
1	Frankfurt	120.5	99.0	173.6	138.3	141.7
2	Stuttgart	127.9	99.1	166.3	137.7	139.9
3	Düsseldorf	110.0	99.2	189.4	130.8	147.0
4	Helmstedt	117.2	98.6	157.4	124.6	132.7
5	Bergisch Gladbadbach	123.2	99.0	124.7	120.6	117.9
6	Munich	112.0	99.3	157.0	120.2	131.3
7	Bielefeld	110.6	99.7	139.9	118.9	122.5
8	Reutlingen	128.6	99.6	99.0	118.3	106.5
9	Heilbronn	123.2	98.6	112.2	117.7	111.6
10	Darmstadt	123.5	99.3	105.6	117.2	108.5
11	Bonn	122.3	100.6	98.9	116.6	105.2
12	Heidelberg	126.8	100.3	106.7	116.2	110.1
13	Cologne	97.9	100.3	146.9	115.8	123.0
14	Saarbrücken	114.2	99.2	111.5	114.5	109.1
15	Mannheim	113.4	99.7	141.1	114.2	123.8
16	Wiesbaden	111.6	99.0	116.9	114.1	111.1
17	Essen	110.3	99.6	122.0	113.7	113.5
18	Karlsruhe	111.6	99.7	119.9	113.6	112.8
19	Ulm	108.8	99.5	121.8	113.4	113.0
20	Hanau	126.9	99.7	97.5	113.3	105.4
21	Aalen	112.4	98.7	121.5	113.1	113.5
22	Siegen	111.8	99.5	116.4	113.0	111.0
23	Bochum	117.1	99.0	107.0	112.7	107.5
24	Wuppertal	106.3	99.5	126.0	112.7	114.4
25	Hanover	94.2	101.2	151.5	112.5	124.6
26	Offenburg	114.8	99.7	105.8	112.1	106.5
27	Münster	93.8	101.2	128.4	111.9	112.9
28	Rastatt	104.0	100.2	140.9	111.3	121.5
29	Krefeld	113.0	98.6	111.1	111.1	108.4
30	Mainz	111.0	100.1	112.1	111.0	108.8
31	Dortmund	115.0	99.4	102.2	110.1	104.7
32	Aachen	117.0	98.4	97.7	109.3	102.7
33	Wetzlar	115.2	99.6	103.3	108.8	105.4
34	Waiblingen	109.6	99.4	106.7	108.8	105.6
35	Braunschweig	104.0	99.8	120.9	108.8	111.4
36	Wesel	120.5	98.5	87.0	108.5	98.2
37	Ludwigsburg	102.9	99.5	112.4	108.0	106.8
38	Freiburg	112.0	100.2	93.7	107.8	99.9
39	Göppingen	109.4	99.4	109.3	107.6	106.9
40	Hamburg	102.2	99.9	117.7	107.3	109.4
41	Nuremberg	95.2	100.3	139.2	107.3	118.5
42	Düren	115.2	99.0	90.1	107.2	98.6
43	Iserlohn	100.2	99.4	104.9	106.7	102.4
44	Lörrach	116.7	99.8	101.0	106.4	104.7
45	Aschaffenburg	104.0	99.9	118.7	105.9	110.3
46	Rottweil	96.8	100.6	125.3	105.6	112.0

47	Ludwigshafen	101.1	100.0	109.5	105.6	105.0
48	Hagen	100.7	99.7	109.3	105.5	104.8
49	Bamberg	109.3	99.5	107.5	105.4	106.0
50	Ingolstadt	103.9	99.9	117.6	105.0	109.7
51	Solingen	99.4	99.5	115.1	104.9	107.3
52	Recklinghausen	113.9	99.0	90.5	104.7	98.5
53	Bremen	94.3	100.6	122.5	104.5	110.0
54	Mönchengladbach	105.7	99.8	100.7	104.4	101.7
55	Coburg	88.4	100.6	148.8	104.2	121.7
56	Fulda	96.4	100.0	124.3	104.0	111.2
57	Pforzheim	102.1	100.0	106.1	103.6	103.6
58	Kassel	99.1	100.2	114.6	103.6	107.1
59	Hildesheim	110.2	99.1	91.7	103.5	98.2
60	Balingen	101.9	99.6	108.0	103.4	104.4
61	Herford	95.9	99.8	117.1	103.3	107.5
62	Konstanz	107.5	100.1	90.9	102.6	97.3
63	Ravensburg	98.7	100.4	101.9	102.6	100.7
64	Gießen	107.6	100.1	93.1	102.2	98.5
65	Donauwörth	94.1	99.7	122.1	102.2	109.5
66	Tauberbischofsheim	105.6	100.1	91.4	101.8	97.1
67	Coesfeld	104.3	99.6	89.9	101.7	95.9
68	Villingen-Schwenningen	96.0	100.0	109.7	101.6	103.8
69	Meschede	100.4	99.9	94.4	101.4	97.3
70	Offenbach	102.4	99.5	97.5	101.1	99.2
71	Oberhausen	99.4	100.0	101.6	101.0	100.7
72	Regensburg	90.2	100.2	124.8	101.0	110.0
73	Duisburg	100.7	99.8	96.5	100.9	98.4
74	Brühl	109.1	100.0	76.8	100.9	90.7
75	Neunkirchen	106.9	100.3	80.3	100.9	91.9
76	Ahlen	101.1	100.5	90.2	100.9	95.5
77	Osnabrück	99.8	100.7	93.9	100.8	97.1
78	Landau	104.3	100.1	90.4	100.7	96.3
79	Soest	100.3	100.5	94.6	100.6	97.5
80	Schwäbisch Hall	93.0	102.2	101.4	100.2	99.5
81	Gelsenkirchen	103.5	99.5	90.7	100.0	96.1
82	Bad Kreuznach	103.4	99.4	94.6	99.5	98.0
83	Pirmasens	102.8	100.6	92.4	99.0	97.0
84	Göttingen	94.0	100.3	114.0	98.5	105.6
85	Trier	104.1	100.7	90.2	98.4	96.3
86	Memmingen	96.5	99.2	106.4	98.1	102.1
87	Neuwied	104.8	100.1	81.5	98.0	92.0
88	Paderborn	96.6	101.0	96.9	97.9	97.8
89	Koblenz	94.4	101.9	103.7	97.8	100.9
90	Kiel	103.4	100.4	85.6	97.8	93.8
91	Kaiserslautern	98.8	100.2	95.7	97.8	97.6
92	Detmold	96.5	100.2	97.0	97.6	97.6
93	Hamm	100.5	100.3	89.5	97.5	95.0
94	Landshut	88.1	99.8	121.0	97.4	107.5
95	Elmshorn	103.0	100.0	87.9	97.2	94.7

96	Saarlouis	102.5	99.6	82.3	96.7	91.7
97	Schweinfurt	89.9	99.9	115.7	96.7	105.3
98	Bad Hersfeld	88.6	100.7	112.5	96.3	103.6
99	Verden	99.8	101.0	81.3	95.7	90.8
100	Würzburg	94.0	101.1	92.7	95.7	95.1
101	Oldenburg	97.9	99.9	88.6	95.3	93.7
102	Rheine	95.0	100.8	85.7	95.2	91.8
103	Pfarrkirchen	88.9	99.8	104.6	95.1	99.5
104	Augsburg	89.0	99.1	106.2	94.1	100.2
105	Goslar	91.3	100.9	100.5	93.8	98.3
106	Hof	77.8	100.3	122.7	93.3	105.9
107	Rosenheim	93.3	100.1	94.3	93.3	95.5
108	Bad Oldesloe	97.9	100.5	80.6	93.3	89.9
109	Hameln	91.6	100.2	94.9	92.6	95.4
110	Lüneburg	102.3	100.1	72.6	92.6	86.9
111	Freising	86.3	100.1	98.2	92.4	95.7
112	Weißenburg	86.4	99.7	104.0	91.9	98.5
113	Mayen	94.4	100.2	83.5	91.6	90.4
114	Celle	96.1	99.8	79.0	91.5	88.5
115	Ansbach	85.1	99.8	101.9	91.3	97.2
116	Bayreuth	82.6	99.8	108.1	91.2	99.7
117	Kempten	88.4	99.3	95.8	90.9	94.8
118	Nagold	84.8	100.1	92.1	90.3	92.3
119	Korbach	83.8	101.6	94.9	89.6	93.8
120	Nordhorn	90.4	100.0	80.7	89.5	87.9
121	Lübeck	84.4	101.1	89.2	88.7	91.0
122	Stade	90.8	100.5	75.9	88.6	85.8
123	Weilheim	82.1	100.2	101.6	88.5	96.4
124	Neumünster	91.9	100.6	79.7	88.4	88.0
125	Schwandorf	79.6	98.7	106.0	88.3	97.6
126	Wilhelmshaven	85.7	100.1	82.1	87.8	87.5
127	Montabaur	91.9	100.7	75.8	87.7	86.0
128	Weiden	74.8	100.5	110.2	86.9	98.9
129	Uelzen	88.8	100.3	77.2	86.6	85.9
130	Traunstein	76.1	99.6	108.5	86.2	98.1
131	Marburg	85.5	101.1	74.1	85.7	83.7
132	Deggendorf	74.9	99.7	98.0	85.2	92.7
133	Limburg	86.1	101.6	73.3	85.0	83.6
134	Vechta	81.8	100.4	82.3	84.1	86.7
135	Flensburg	83.2	101.6	73.6	83.8	83.0
136	Bremerhaven	82.8	100.0	77.2	83.5	84.3
137	Nienburg	81.7	100.4	75.8	82.9	83.4
138	Emden	79.3	101.5	75.4	82.4	82.9
139	Leer	81.3	101.1	68.0	80.2	79.6
140	Heide	79.3	101.9	67.9	79.4	79.2
141	Passau	67.7	100.4	87.2	78.3	85.6

Bibliography

Adamaite, L. (2000). Does Latvia have a wage curve? Working Papers. EuroFaculty. Latvia, University of Latvia.

Anger, S. (2006). Overtime Work in Germany – the Investment Character of Unpaid Hours. Aachen, Shaker.

Bade, F.–J. (1987). Regionale Beschäftigungsentwicklung und produktionsorientierte Dienstleistungen. Berlin, Dunker & Humblodt.

Bajo, O., I. Rabada´n, et al. (1999). "Regional wage flexibility in Spain, 1989–1992." Instituto de Estudios Fiscales del Ministerio de Hacienda. Working paper.

Baltagi, B. H. (1995). Econometric analysis of panel data. New York, John Wiley & Sons.

Baltagi, B. H. and U. Blien (1998). "The German wage curve: Evidence from the IAB Employment Sample." Economics Letters 61(2): 135–142.

Baltagi, B. H., U. Blien, et al. (2000). "The East German wage curve 1993–1998." Economics Letters 69(1): 25–31.

Bårdsen, G., J. Doornik, et al. (2004). "A European-type wage equation from an American-style labour market: Evidence from a panel of Norwegian manufacturing industries in the 1930s." Bank of Norway Research Department, Working Paper No. 2004/04.

Barth, E., B. Bratsberg, et al. (2002). Explaining variations in the wage curves: Theory and evidence. Oslo, Department of Economics, University of Oslo.

Barth, E. and C. Lucifora (2006). "Wage dispersion, markets and institutions: The effects of the boom in education on the wage structure." IZA Discussion Paper (2181).

Basu, S., S. Estrin, et al. (1995). "Employment and wage behaviour of enterprises in transitional economies." William Davidson Institute, Working Paper No. 114, University of Michigan.

Basu, S., S. Estrin, et al. (2000). "Employment and wages in enterprises under communism and in transition: Evidence from central Europe and Russia." Centre for New and Emerging Markets, Discussion Paper Series Number 7, London Business School.

Beblo, M. and E. Wolf (2003). "Sind es die Erwerbsunterbrechungen? Ein Erklärungsbeitrag zum Lohnunterschied zwischen Frauen und Männern in deutschland." Materialien aus der Arbeitsmarkt- und Berufsforschung 4: 560–597.

Becker, G. S. (1964). Human capital. New York, Columbia University Press.

Becker, G. S. (1975). Human capital: A theoretical and empirical analysis with special reference to education. Chicago: The University of Chicago Press.

Bell, B., S. Nickell, et al. (2002). "Wage equations, wage curves and all that." Labour Economics 9(3): 341–360.

Bellmann, L. (2002). "Das IAB-Betriebspanel – Konzeption und Anwendungsbereiche." Allgemeines Statistisches Archiv (ASTA) 86(2): 177–188.

Bellmann, L. and U. Blien (1996). "Die Lohnkurve in den neunziger Jahren: Der Zusammenhang zwischen regionalen Durchschnittslöhnen und regionaler Arbeitslosigkeit in einer Mehrebenenanalyse mit dem IAB-Betriebspanel." MitAB 29(3): 455–459.

Bellmann, L. and U. Blien (2001). "Wage curve analyses of establishment data from Western Germany." Industrial and Labor Relations Review 54(4): 851–863.

Bertelsmann-Stiftung, Hans-Böckler-Stiftung, et al. (2001). Benchmarking in der lokalen Beschäftigungsförderung: Recherche und Assessment bestehender Benchmarking-Ansätze. Gütersloh, Verlag Bertelsmann Stiftung.

Bewely, T. F. (1999). Why wages don't fall during recessions. Cambridge, MA, Harvard University Press.

Black, A. J. and F. R. FitzRoy (2000). "Earning curves and wage curves." 47(5): 471–486.

Blackaby, D. H. and D. N. Manning (1992). "Regional earnings and unemployment – a simultaneous approach." Oxford Bulletin of Economics and Statistics 54: 481–501.

Blanchard, O. and L. F. Katz (1999). "Wage dynamics: Reconciling theory and evidence." NBER Working Paper (6924).

Blanchard, O. and National Bureau of Economic Research (2005). European unemployment: The evolution of facts and ideas. Cambridge, MA, National Bureau of Economic Research.

Blanchflower, D. (2001). "Unemployment, well-being and wage curves in Eastern and Central Europe." Journal of the Japanese and International Economies Volume 15, Issue 4, December 2001, Pages 364-402.

Blanchflower, D. and A. Oswald (1990). "The wage curve." Scandinavian Journal of Economics 92(2): 215–235.

Blanchflower, D. and A. Oswald (1994a). "Estimating a wage curve for Britain 1973–90." The Economic Journal 104 (September): 1025–1043.

Blanchflower, D. and A. Oswald (1994b). The wage curve. Cambridge, MA, MIT Press.

Blanchflower, D. and A. Oswald (1996). "Effizienzentlohnung und die Deutsche Lohnkurve." MitAB 29(3): 460–466.

Blanchflower, D. and A. Oswald (2000). "International wage curves", in: "Differences and changes in wage structures". R. Freeman and L. Katz. Chicago, University of Chicago Press and NBER.

Blanchflower, D. and A. Oswald (2000). International wage curves. In: "Differences and changes in wage structures", edited by R. Freeman and L. Katz. Chicago, University of Chicago Press and NBER.

Blanchflower, D. and A. Oswald (2005). "The wage curve reloaded." IZA Discussion Paper (No. 1665).

Blien, U. (1996). "Die Lohnkurve – eine Einführung zu den Workshop-Beiträgen." MitAB 29(3): 455–459.

Blien, U. (2001). Arbeitslosigkeit und Entlohnung auf regionalen Arbeitsmärkten. Heidelberg, Physika Verlag.

Blien, U., A. Haas, et al. (2003). "Regionale Beschäftigungsentwicklung und regionaler Lohn in Ostdeutschland." MitAB 36(4): 476–491.

Blien, U., F. Hirschenauer, et al. (2004). "Typisierung von Bezirken der Agentur für Arbeit." Zeitschrift für Arbeitsmarktforschung 2: 146–175.

Blien, U., F. Hirschenauer (2005). "Vergleichstypen 2005: Neufassung der Regionaltypisierung für Vergleiche zwischen Agenturbezirken." IAB Forschungsbericht.

Brunstad, R. J. and J. M. Dyrstad (1997). "Booming sector and wage effects: An empirical analysis on Norwegian data." Oxford Economic Papers 49(1): 89–103.

Bruttel, O. (2005). Die Privatisierung der öffentlichen Arbeitsvermittlung: Australien, Niederlanden und Großbritannien – ein Vergleich aus neo-institutionenökonomischer Perspektive. Baden-Baden, Nomos Verlag.

Buscher, H. (2003). "Gibt es eine Lohnkurve in den neuen Bundesländern?" Mitteilungen aus der Arbeitsmarkt- und Berufsforschung 36(4): 439–460.

Büttner, T. (1999). "The effect of unemployment, aggregate wages, and spatial contiguity on local wages: An investigation with German district level data." Papers in Regional Science 78(1): 47–67.

Büttner, T. and H. Prey (1998). "Does active labour market policy affect structural unemployment? An empirical investigation for West German regions." Zeitschrift für Wirtschafts- und Sozialwissenschaften (118): 389–413.

Campbell, C. and J. M. Orszag (1998). "A model of the wage curve." Economic Letters 59(1): 119–125.

Canziani, P. (1997). The wage curve in Italy and Spain. Are European wages flexible? Discussion Paper No. 375, Centre for Economic Performance.

Card, D. (1995). "The wage curve: A review." Journal of Economic Literature 33: 785–799.

Carlin, W. and D. Soskice (1990). "Macroeconomics and the wage bargain: A modern approach to employment, and the exchange rate inflation". Oxford, UK, Oxford University Press.

Carruth, A. A. and A. J. Oswald (1989). "Pay determination and industrial prosperity". Oxford, UK, Clarendon Press.

Chiarini, B. and P. Piselli (1997). "Wage setting, wage curve and Phillips curve: The Italian evidence." Scottish Journal of Political Economy 44(5): 545–565.

Collier, B. (2000). "The UK wage curve: New evidence from the British Household Panel Survey". Discussion Paper. Kent, University of Kent, Department of Economics.

Delteil, V., A. Pailhé, et al. (2004). "Comparing individual wage determinants in Western and Central Europe: On the way to convergence? The cases of France and Hungary." Journal of Comparative Economics 32: 482–499.

DIW – German Institute for Economic Research (2003). "Kurzinformation zum SOEP Geo-Code", Berlin: DIW.

DIW – German Institute for Economic Research (2004). The German Socio-Economic Panel – Living in Germany, Berlin: DIW.

Dixit, A. K. and J. E. Stiglitz. "Monopolistic Competition and optimum product diversity", The American Economic Review, Vol. 67, No. 3 (Jun., 1977), pp. 297-308

Donk, L. v. and J. de Koning (2007). "Meditation services and the outflow from short-term unemployment : average and relative effectiveness of public employment offices", in: "The Evaluation of active labour market policies: measures, public private partnerships and benchmarking", edited by J. de Koning, Cheltenham, UK und Northampton, MA, USA: Edward Elgar, S. 275-308.

Dornbusch, R., S. Fischer, et al. (2001). Macroeconomics. Boston, MA, McGraw-Hill.

Duffy, F. and P. P. Walsh (2000). "A regional analysis of wage determination in Poland." Katholieke Universiteit Leuven, LICOS Centre for Transition Economics, Discussion Paper 87/2000.

Duffy, F. and P. P. Walsh (2002). "Individual pay and outside options: Evidence from the Polish Labour Force Survey." Centre for Economic Reform and Transformation, School of Management, Heriot-Watt University, Discussion Paper 2002/01.

Dyrstad, J. M. and K. Johansen (2000). "Regional wage responses to unemployment and profitability: Empirical evidence from Norwegian manufacturing industries." Oxford Bulletin of Economics and Statistics.

Edin, P. A. and B. Holmlund (1989). "The unemployment elasticity of pay: Evidence from Swedish micro-data." Working paper, University of Uppsala, Sweden.

Edin, P. A., B. Holmlund, et al. (1994). "Wage behaviour and labour market programs in Sweden: Evidence from micro data. " In: "Labour markets and economic performance in Europe, Japan and the United States", edited by T. Tachibanaki. New York, Macmillan.

Elhorst, J. P. (2003). "The Mystery of Regional Unemployment Differentials: Theoretical and Empirical Explanations." Journal of Economic Surveys 17(5): 709.

Elhorst, J. P., U. Blien, et al. (2003). New evidence on the wage curve. A spatial panel approach. Lisbon, EALE.

Estevão, M. and N. Nargis (2001). "Wage moderation in France." IMF Working Paper WP01, European I Department.

Falch, T. (2001). "Decentralized public sector wage determination: Wage curve and wage comparison for Norwegian teachers in the Pre-WW2 Period." Labour 15(3): 343–369.

Fischer, P.A. and T. Straubhaar (1994). "Ökonomische Integration und Migration in einem gemeinsamen Markt, Paul Haupt, Bern.

Franz, W. (2003). Arbeitsmarkttheorie. Springer-Verlag; Auflage: 5.

Franz, W. and F. Pfeiffer (2006). "Reasons for wage rigidity in Germany." Labour

20(3): 255–284.

Freeman, R. B. (2005). "Labour market institutions without blinders: The debate over flexibility and labour market performance." International Economic Journal, Volume 19, Issue 2 June 2005 , pp. 129 – 145.

Friedman, M. (1967). "The role of monetary policy." American Economic Review 58: 1159–1183.

Führ, C. (1998). Handbuch der deutschen Bildungsgeschichte 1945 bis zur Gegenwart. München: Beck.

Fujita, M., P. Krugman and Venables (1999). The spatial economy: Cities, regions, and international trade. Cambridge, MA, MIT Press.

García-Mainar, I. and V. M. Montuenga-Gómez (2003). "The Spanish wage curve: 1994–1996." Regional Studies 37(9).

Gerlach, K. and R. Schettkat (1995). Determinanten der Lohnbildung – Theoretische und empirische Untersuchungen. Berlin, Edition Sigma.

Gianella, C. (2002). "Wages and local unemployment rates." Economie et Prevision, 155 (July–Sept): 1–12.

Galušcák, K. and D. Münich (2002). "Microfoundations of the Wage Inflation in the Czech Republic." Czech National Bank, Na príkope 28, 115 03 Praha, Czech Republic.

Glaude, M. and J. L. L'Héritier (1993). "Salaire et taux de chômage local, salaires et carrière incomplète, salaire et niveau de vie, trois études statistiques sur données individuelles." Revue de l'OFCE, No. 89.

Gordon, I. (2002). "Regional Policy Evaluation and Labour Market Adjustment." In: "Regional Policies and Competitive Advantage", edited by B. Johansson, C. Karlsson and R. R. Stough. Cheltenham/Northampton: Edward Elgar.

Graafland, J. J. (1992). "From Phillips curve to wage curve." De Economist 140(4): 501–514.

Groot, W. and E. Mekkelholt (1992). "Further evidence on the wage curve." Economic Lettres 38: 355–359.

Güth, W. (1995). "On ultimatum bargaining: A personal review." Journal of Economic Behavior and Organization 27: 329 – 344.

Harris, J.R. and M.P. Todaro (1970). Migration, unemployment and development: A two-sector analysis" The American Economic Review, 60(1), pp. 126-142.

Henneberger, F. and S. Sudjana (2003). "Arbeitsvermittlung in Deutschland und der Schweiz: Zum Verhältnis zwischen privater und öffentlich-rechtlicher Vermittlungstätigkeit." Recht der Arbeit – Zeitschrift für die Wissenschaft und Praxis des gesamten Arbeitsrechts 1(56).

Hicks, J. R. and J.M. Keynes (1937). "Mr. Keynes and the "classics": A suggested interpretation." In: "Readings in macroeconomics", edited by Edited by David Cass and Lionel W. McKenzie.

Hilbert, C. (2004). Ein anreizkompatibles Kontrollinstrument der regionalen Arbeitsvermittlung: Das Modell Schweiz und dessen Potenzial für die Bundesrepublik. In: Arbeitsmarktpolitik und Strukturwandel: Empirische Analysen, edited by G. Schmid, M. Gangl and P. Kupka. Nuremberg, IAB.

Hilbert, C.: "Performanzmessung und Anreize in der regionalen Arbeitsvermittlung: Der Schweizer Ansatz und eine Modellrechung für Deutschland", Zeitschrift für Evaluation (ZfEv) 1/2005, S. 29-47.

Hilbert, C. and R. Mytzek (2002). "Strategische und methodische Ansatzpunkte zur Ermittlung des regionalen Qualifikationsbedarfs." WZB- Discussion Paper FS I 02-211.

Hilbert, C. and K. Schömann (2004). The need for early identification of future skill requirements in the European Union. In: Identifying skill needs for the future: From research to policy and practice, edited by S. L. Schmidt, O. Strietska-Illina, M. Tessaring and B. Dworschak. Thessaloniki, Cedefop.

Holmlund, B. and P. Skedinger (1990). Wage bargaining and wage drift: Evidence from the Swedish wood industry. In: Wage formation and macroeconomic policy in the Nordic countries. edited by L. Calmfors, Oxford, UK, Oxford University Press: 363–388.

Huitfeldt, H. (2001). "Unemployment, labour market programmes and wage determination: Evidence from the Czech and Slovak Republics." Department of Economics, Uppsala University.

Iara, A. and I. Traistaru (2004). "How flexible are wages in EU accession countries?" Labour Economics, 11(4): 431–450.

Ilkkaracan, I. (2002). An alternative non-linear model of the wage curve and some empirical evidence from the U.S. New York, New School for Social Research.

ILO – International Labor Organization (1990). ISCO-88: International Standard Classification of Occupations. Geneva, ILO.

Imboden, C., K. Baumann, et al. (1999a). "Leistungsauftrag und Anreizmechanismen für die RAV." BWA Schriftenreihe Beiträge zur Arbeitsmarktpolitik (No. 17).

Imboden, C., K. Baumann, et al. (1999b). "RAV Evaluationsstudie." BWA Schriftenreihe Beiträge zur Arbeitsmarktpolitik (No. 14).

Janssens, S. and J. Konings (1998). "One more wage curve: The case of Belgium." Economic Letters 60(2): 223–228.

Jimeno, J. and S. Bentolila (1998). "Regional unemployment persistence (Spain, 1976–1994)." Labour Economics, 5: 25–51.

Johansen, B., C. Karlsson, and R. R. Stough (eds.). (2002). Regional policies and competitive advantage. Cheltenham/Northampton, Edward Elgar.

Johansen, K. (1995). "Norwegian wage curves." Oxford Bulletin of Economics and Statistics 57(2): 229–247.

Johansen, K. (1997). "The wage curve: Convexity, kinks and composition effects." Applied Economics 29: 71–78.

Johansen, K. (1999). "Wage flexibility for skilled and unskilled workers – new evidence on the Norwegian wage curve." Labour 13(2): 413–432.

Johansen, K., R. Kristen, et al. (2001). "Firm profitability, regional unemployment and human capital in wage determination." Applied Economics 33(1): 113–121.

Kahnemann, D. (2003). "A psychological perspective on economics." American Economic Review – Papers and Proceedings 93(3): 162–168.

Kallai, E. and I. Traistaru (2001). "Characteristics and trends of regional labour markets in transition economies: Empirical evidence from Romania." LICOS Discussion Paper 72/2001, Katholieke Universiteit Leuven.

Karlsson, C. and R. Stough (2002). "Regional policy evaluation in the new economic geography." In: Regional policies and competitive advantage, edited by B. Johansson, C. Karlsson and R. R. Stough. Cheltenham/Northampton, Edward Elgar.

Kemmerling, A. and O. Bruttel (2006). "New politics in German labour market policy? The implications of the recent Hartz reforms for the German welfare state." West European Politics 29(1): 90–112.

Kennedy, P. (1998). Econometrics. Cambridge, MA, MIT Press.

Kertesi, G. and J. Kollo (1997). "The birth of the 'wage curve' in Hungary, 1989–95." William Davidson Institute Working Paper 104, University of Michigan Business School.

Kertesi, G. and J. Kollo (1999). "Unemployment, wage push and the labour cost competitiveness of regions: The case of Hungary, 1986–1996." Budapest Working Papers on the Labor Market 1999/5.

Keynes, J. M. (1937). "The general theory of employment." Quarterly Journal of Economics, 51 (2), pp. 209-223.

Kölling, A. (2000). "European data watch – the IAB-establishment panel." Schmollers Jahrbuch (120): 291–300.

Kollo, J. (1998). Three stages of Hungary's labour market transition. In: Enterprise restructuring and unemployment models in transition, edited by S. Commander. Washington D.C., World Bank.

Koning, J. de (2007). The evaluation of active labour market policies: Measures, public-private partnerships and benchmarking. Cheltenham, UK, Edward Elgar.

Koning, J. de, R. Layard, S. Nickell & N. Westergaard-Nielsen (2002). "Policies for full employment." London: Department for Works and Pensions.

Koning, J. de and H. Mosley (2001). Labour Market Policy and Unemployment: Impact and Process Evaluations in Selected Countries. Cheltenham, UK, Edward Elgar.

Kravchuk, R. S. and R. W. Schack (1996). "Designing effective performance measurement systems under the Government Performance and Results Act 1993." Public Administration Review 56(4): 348–358.

Krugman, P. (1991). Geography and trade. Cambridge, MA, MIT Press.

Launov, A., J. Wolff, et al. (2004). "Unemployment benefits and unemployment rates of low-skilled and elder workers in West Germany: A search equilibrium approach." IZA DP No. 1161.

Layard, R., S. Nickell, et al. (1991). Unemployment, macroeconomic performance and the labour market. Oxford, UK, Oxford University Press.

Lechner, M. (2002). "Eine wirkungsorientierte aktive Arbeitsmarktpolitik in Deutschland und der Schweiz: Eine Vision – zwei Realitäten." Perspektiven der Wirtschaftspolitik 3(2): 159–174.

Lenz, C., M. Egger, et al. (2001). Die Vereinbarung zwischen Bund und Kantonen über den Vollzug des Arbeitslosenversicherungsgesetzes in der Schweiz. Bundesamt für Statistik. Bern.

Lindbeck, A. (1992). "Macroeconomic theory and the labour market." European Economic Review 76: 209–235.

Lindbeck, A. and D. J. Snower (1988). "The insider-outsider theory of employment and unemployment." Cambridge (Mass.) and London: MIT Press.

Longhi, S., P. Nijkamp, et al. (2004). "Spatial heterogeneity and the wage curve revisited." Tinbergen Institute Discussion Paper 2004-054/3.

Mankiw, G. N., D. Romer, et al. (1992). "A contribution to the empirics of economic growth." Quarterly Journal of Economics 107(2): 407–437.

Mill, John Stuart: Principles of Political Economy with some of their Applications to Social Philosophy Published: London: Longmans, Green and Co., ed. William J. Ashley, 1909. Seventh edition. First published: 1848.

Montuenga, V., I. Garcia, et al. (2003). "Wage flexibility – evidence from five EU countries based on the wage curve." Economic Letters 78(2): 169–174.

Moulton, B. (1986). "Random group effects and the precision of regression estimates." Journal of Econometrics 32: 385–397.

Moulton, B. R. (1990). "An illustration of a pitfall in estimating the effects of aggregate variables on micro units." Review of Economics and Statistics (72): 334–338.

Müller, K.-U. and H. Mosley (2007). Benchmarking Employment Services in Germany. The Evaluation of Active Labour Market Policies: Measures, Public Private Partnerships and Benchmarking, Cheltenham, UK und Northampton, MA, USA: Edward Elgar, S. 275-308. J. d. Koning. UK und Northampton, MA, Edward Elgar: pp. 275-308.

Neugart, M. and K. Schömann (eds.). (2002). Forecasting labour markets in OECD countries: Measuring and tackling mismatches. Cheltenham, UK, Edward Elgar.

Nickell, S. and R. Layard (1999). Labour market institutions and economic performance. in: O. Ashenfelter & D. Card (ed.), Handbook of Labour Economics, edition 1, volume 3, chapter 46, pages 3029-3084, Elsevier.

Nicolaisen, S. and T. Tranaes (1996). "Wage curves for Denmark." Nationalokon Tidsskr 134(3): 223–237.

Nijkamp, P. and J. Poot (2005). "The last word on the wage curve? A meta-analytic assessment." Journal of Economic Surveys 19: 421–450.

NZZ (2001). "16 Kantone erhalten einen Bonus – Effiziente regionale Arbeitsvermittlung wird belohnt." Neue Züricher Zeitung, 09.05.2001.

OECD (2005). "Employment Outlook", Paris, OECD.

Paldam, M. (1990). "Comment on D. G. Blanchflower and A. J. Oswald, 'The wage curve.'" Scandinavian Journal of Economics (92): 237–242.

Pannenberg, M. and J. Schwarze (1996a). "Regionale Löhne und staatliche Qualifizierungsmaßnahmen – Eine erweiterte Lohnkurve für Ostdeutschland." MitAB 29(3): 494–497.

Pannenberg, M. and J. Schwarze (1996b). "Unemployment, labour market training programs and regional wages: An extended wage curve approach." DIW Discussion Papers (139).

Pannenberg, M. and J. Schwarze (1998a). "Labour market slack and the wage curve." Economics Letters 58(3): 351–354.

Pannenberg M. and J. Schwarze (1998b). 'Phillips curve' or 'wage curve': Is there really a puzzle? Evidence for West Germany. Bamberg, Sozial- und Wirtschaftswissenschaftlichen Fakultät der Universität: 13.

Pannenberg, M. and J. Schwarze (2000). "Wage dynamics and unemployment in Germany – evidence from regional panel data." Labour 14(4): 645–656.

Pekkarinen, T. (1998). The wage curve – Finnish evidence. Helsinki, Labour Institute for Economic Research.

Phillips, A. W. (1958). "The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1861–1957." Economica 25: 283–299.

Porter, M. E. (1990). The Competetive Advantage of Nations. New York, Free Press.

Porter, M. (2000). Location, clusters and company strategy. In: The Oxford Handbook of Economic Geography, edited by G. L. Clark, M. S. Gertler and M. P. Feldman. Oxford, UK, Oxford University Press.

Puhani, P. A. (2003). "The rise and fall of Swiss unemployment relative to demand shocks, wage rigidities and temporary immigrants." Discussion Paper No. 684 (January).

Rendtel, U. and J. Schwarze (1996). "Schätzungen von Lohnkurven für Westdeutschland mit einem verallgemeinerten Varianz-Komponenten-Modell." MitAB 29(3): 491–493.

Ricardo, David: On the Principles of Political Economy and Taxation Published: London: John Murray, 1821. Third edition. First published: 1817.

Robert, G. (2000). "Für eine wirkungsorientierte Arbeitslosenversicherung." Die Volkswirtschaft 4: 52–56.

Roberts, J. M. (1997). The wage curve and the Phillips curve. New York, Federal Reserve Board FEDS Paper No. 97-57.

Sanromá, E. and R. Ramos (2003). "Wage curves for Spain: evidence from the family budget survey." Universitat de Barcelona, Departament d'Econometria.

Schettkat, R. (2003). "Are institutional rigidities at the root of European unemployment?" Cambridge Journal of Economics 27:771-787.

Schleifer, A. (1985). "A theory of yardstick competition." Rand Journal of Economics 16: 319–327.

Schmid, G. (2002). Wege in die Vollbeschäftigung. Frankfurt am Main, Campus Verlag.

Schmid, G. (2006). "Social risk management through transitional labour markets." Socio-Economic Review 4(1): 1–33.

Schmid, G. and B. Gazier (2002). "The dynamics of full employment: Social integration through transitional labour markets." Cheltenham, UK und Northampton, MA, USA 2002, Edward Elgar.

Schmid, G., S. Speckesser, C. Hilbert (2001). Does active labour market policy matter? An aggregate impact analysis. In: Labour market policy and unemployment: Impact and process in selected European countries, edited by J. de Koning and H. Mosley. Cheltenham, UK, Edward Elgar.

Schömann, K. and C. Hilbert (1998). "The labour market for youth in Germany. A new target group for German labour market policies?" DIW Vierteljahreshefte 67(4): 272–285.

Schömann, K. and P. J. O'Connell (2002). Education, training and employment dynamics: transitional labour markets in the European Union. Cheltenham, UK, Edward Elgar.

Schütz, H. (2003). Controlling von Arbeitsverwaltungen im internationalen Vergleich. Berlin, WZB Discussion Paper, No. SP I 2003–103.

SECO (2002). Chronologie der Ereignisse bzgl. AVIG Revisionen. Bern, SECO.

Shapiro, C. and J. E. Stiglitz (1984). "Equilibrium unemployment as a worker discipline device." American Economic Review 74: 433–444.

Sheldon, G. (1998). Arbeitsmarktökonomie: Sockelarbeitslosigkeit, Erklärung und Therapieansätze. Economics Today. Neue Zürcher Zeitung: 117–136.

Sheldon, G. (2003). Die Entwicklung der Vermittlungseffizienz der regionalen Vermittlungszentren der Schweiz im Zeitraum 1998–2001. Bern, SECO Publikation Arbeitsmarktpolitik.

Siebert, H. (1997). "Labour market rigidities: At the root of unemployment in Europe." Journal of Economic Perspectives 11(3): 37–54.

Simon, H. (1955). "A behavioural model of rational choice." The Quarterly Journal of Economics 69: pp99-118.

Simoncic, M., L. Pfajfar, et al. (2004). "An estimate of the wage curve for Slovenia." Institute for Economic Research, University of Ljubljana.

Smith, Adam (1723-1790) Title: An Inquiry into the Nature and Causes of the Wealth of Nations Published: London: Methuen and Co., Ltd., ed. Edwin Cannan, 1904. Fifth edition. First published: 1776.

Solow, R. M. (1990). The labour market as a social institution. Cambridge, UK, Blackwell.

Stiglitz, J. E. and C. E. Walsh (2002). Principles of macroeconomics. New York, Norton.

Südekum, J. (2003). Agglomeration and regional unemployment disparities. Frankfurt am Main, Peter Lang.

Südekum, J. and U. Blien (2004). "Wages and Employment Growth: Disaggregated evidence for Western Germany." IZA Discussion Paper (1128).

Turunen, J. (1998). "Disaggregated wage curves in the United States: Evidence from panel data of young workers." Applied Economics 30 (December): 1665–1677.

Wagner, J. (1994). "German wage curves." Economic Letters 44: 307–311.

Werding, M. (2006). Structural unemployment in western Europe: Reasons and remedies. Cambridge, MA, MIT Press.

Williamson, O. (1988). "The economies of organization: The transaction cost approach." American Journal of Sociology 87: 548–577.

Winter-Ebmer, R. (1996). "Wage curve, unemployment duration and compensating differentials." Labour Economics 3(4): 425–434.

Wooldridge, J. M. (2003). Introductory econometrics: A modern approach. Cincinnati, OH, South-Western College Publishing.

Wulfsberg, F. (1997). "An application of wage bargaining models to Norwegian panel data." Oxford Economic Papers 49(3): 419–440.