How federal social policies influence spatial income inequalities in Germany

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Abstract

The reduction of income disparities among regions is a basic target of German regional policy – accompanied by policies of the European Union. This paper assesses the regional redistributive effect of federal unemployment and pension insurance by comparing the distribution of gross income from dependent employment and post social insurance income at the small-area level, based on commonly used inequality measures. The results reveal large regional redistributive effects across regions and show how parameters of eligibility and financing may influence the spatial income distribution.

1 Introduction

In Germany as well as in the European Union, equalising cross-regional disparities in living standards is an important policy target, which is anchored in the constitution. Particularly after the German reunification it gained importance in political discussion as a consequence of large economic differences between eastern and western Germany. Because of eastern Germany's ailing economy the government has provided a lot of financial support to improve the economic situation and to stabilise market income. Several systems and instruments of federal policy try to equalise the regional economic and financial disparities. For example, from 1990 to 2007 the German "Joint Task for Improving the Regional Economic Structure" (Gemeinschaftsaufgabe "Verbesserung der regionalen Wirtschaftsstruktur") provided a total of 34 billion Euros for investment grants to the eastern states (BMVBS, 2007: 34). Substantial structural funds have additionally been provided by the European Commission to equalise the living and working conditions in the two parts of Germany. However, disparities in labour productivity and unemployment still remain high.

Furthermore, the German welfare state influences the regional distribution of post-government income to a great extent although social policies in Germany are mainly constituted at the federal and not at the regional level. Analyses focusing on benefits of federal budgets emphasize the regional redistributive and stabilising effects of federal tax benefit systems on regional income. Because economic disparities between German regions have been persistent over the last decades, shocks in disposable income of regions are diminished by the federal tax and transfer system. Thus, the welfare state provides indirect regional subsidies from prospering regions to economically weak regions. Germany's federal social security system, financed mainly by contributions, plays a decisive role in this process of indirect regional income redistribution.

Firstly, the national social insurance system is the most important element of the German welfare state. In 2005 the share of contributions to social insurance as a percentage of the gross domestic product in Germany was 13.9 per cent, whereas in the other OECD countries it was much lower at 9.2 per cent on average. The share of the tax revenues (as a percentage of the gross domestic product) was lower in Germany, at 20.9 per cent, than in the OECD countries at 26.9 per cent (OECD, 2007: 19, 28, 73). Expenditure on social insurance amounted to almost 70 per cent of all federal expenditure on social policies in the year 2005 (Statistisches Bundesamt, 2008).

Secondly, unlike the mentioned instruments of direct financial support, the system of social security is not directly subject to the different interests of the federal subdivisions like states or districts in the political process. Although the German states contribute to and benefit from the social security system to different extents,

there is consensus about the basic necessity to guarantee the same amount of social insurance in all German regions.

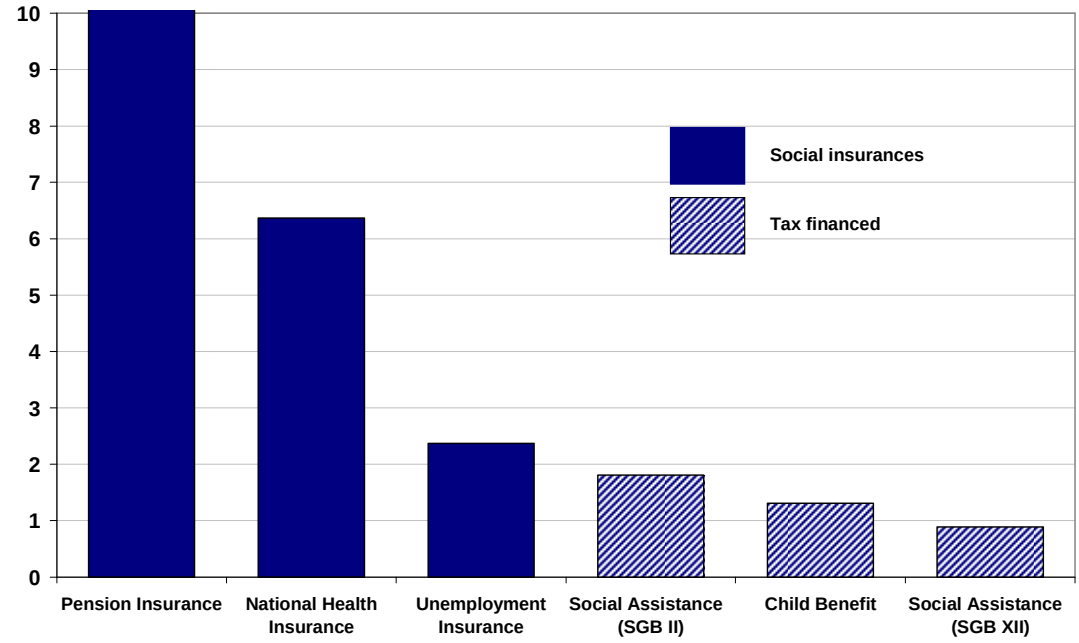
This paper analyses how, due to large regional economic disparities, payments from social insurance reduce inter-regional income disparities. With regard to the income of employees it is obvious that regional differences between eastern and western Germany are gradually disappearing and that low-income regions can be found in some parts of western Germany as well. The study is based on data of 439 administrative districts in Germany of the year 2003 from different sources.

The paper is organised as follows. The next section provides a brief introduction to the social security system ín Germany. Section 3 reviews the empirical research on this topic. Following this, section 4 discusses the potential regional redistributive effects of social security on the spatial income distribution. In section 5 the data and methodology are described. The empirical results are presented in section 6. First, inequality measures for the regional earned income are presented. Second, the results for regional income after pension and unemployment insurance are described. Finally, section 7 concludes.

2 General features of the social security system in Germany

The social security system in Germany mainly consists of social insurance and tax financed welfare programs. Fig. 1 gives an impression of the size of major public social expenditures in Germany.

Fig. 1. Major public social expenditure as a percentage of gross domestic product 2005



Source: German Federal Statistical Office

In comparison to other European countries total expenditure for social policies is much higher in Germany. In 2005 it amounts to 31 per cent of the gross domestic product (about 700 billion euro) (Statistisches Bundesamt, 2008). Social services and income support are mainly provided by social insurances. The three major parts of social insurance are national pension, health and unemployment insurance. Together they add up to almost 20 per cent. Important tax financed programmes are means-tested social assistance for unemployed people (SGB II), national child benefit, and means-tested social benefits for older people (SGB XII). The figure reveals that unemployment and pension insurance are two dominant parts of the overall social system. In contrast to the national health insurance they mainly provide income support.

Both pension insurance and unemployment insurance are financed mainly by statutory contributions from employers and employees. The pension insurance is a pay-as-you-go system. This means that all pension payments of one year are financed by contributions[1] to the pension insurance of the same year. The

[1] Besides contributions from employers and employees the state pension insurance is additionally financed by federal grants.

contributions are calculated as a percentage of the gross wages, individual risks are not considered. In 2003 the contribution rate for pension insurance was 19.5 per cent of gross wages and 6.5 per cent for unemployment insurance. As a result of reforms of the welfare system in the following years the contribution rate for unemployment insurance was reduced to 4.2 per cent in 2007, to 3.3 per cent in 2008 and to 2.8 per cent in 2009.

Due to obligatory contributions to the pension and unemployment insurance only employees are eligible for payments of these insurances while self-employed and civil servants have no entitlements. Therefore the analysis focuses on employees and their payments to and from these two insurances. The pension payments depend on the amount of former wages and the duration of the former employment. Besides, the acknowledgement of a contribution period for parenting, and early retirement pensions are further elements of the pension insurance. The unemployment benefits also depend on former wage income. Unemployed with children are entitled to unemployment benefits of 67 per cent of their last net income and unemployed without children are entitled to 60 per cent. In 2003 these benefits could be paid for at least 6 months up to 32 months, depending on age and duration of the former employment.

3 Recent empirical literature

In recent years several studies have been conducted on income distribution and wage inequalities in Germany.

Studies based on survey data for individuals or households such as the German Socio-Economic Panel (SOEP) or the German Income and Expenditure Survey (EVS) (Bach et al. 2007; Gernandt and Pfeiffer 2007; Frick and Goebel 2008; Biewen 2005; Becker and Hauser 2003; Schwarze 1996) are dominated by east-west comparisons or refer to inequalities between German states.

Macroeconomic data obtained from the national account allows focusing on small area levels like the district level. These studies, known from the convergence literature, make use of income measures like gross domestic product (GDP) per capita, gross value added (GVA) (Colavecchio et al. 2005; Brakman et al. 2004) or disposable income (Kosfeld et al. 2007; Brenke 2006). A disadvantage of these gross measures is that they are recorded at state level and disaggregated to district level by samples afterwards. This implies inaccuracies at district level. Further problems with these measures are due to time lags and changes caused by revised data.

For Germany the main results can be summarized as follows. Studies using district level data show that in the first years following German reunification, disposable income and inner-regional income disparities in eastern Germany were low and have increased since then because of high unemployment rates on the one hand and well-paid jobs on the other hand (Colavecchio et al. 2005). Although the national poverty rate has increased, the differences between western and eastern Germany have declined because of public transfers to unemployed people that were three times higher in eastern Germany than in western Germany (Gatzweiler and Milbert 2003).

Nonetheless, income inequalities are still higher between western German regions than between eastern German regions. Also, substantial income disparities still exist between western and eastern Germany, because eastern German incomes have not yet reached the western German level. When taking regional price indices into account, Kosfeld et al. (2007) find out that disparities of the consumer price index are relatively small within eastern Germany and that the consumer price index with and without the housing rent index converges to a unique steady state. They also show that *"real income convergence across all German districts turns out to be stronger than nominal income divergence"* (Kosfeld et al. 2007: 24).

Similar studies at small-area level are available for example for Great Britain and Denmark. Studies for Great Britain show that regional income and productivity inequalities depend on the density of the population of working age in the same area (Rice et al. 2006) and within-region earning inequalities have increased in contrast to between-regions inequalities (Dickey 2007). In Denmark export growth

and price changes have influenced earned income, and changes in population and tax rates have had a significant effect on disposable income (Jensen-Butler and Madsen 2005).

Although some studies on small area level distinguish between “pre-government” and “post-government” income for western and eastern Germany (Becker and Hauser 2003, Schwarze 1996) there are no spatial analyses on a small-area level that examine the effects of different welfare programs. The aim of this paper is to take a more detailed look at the effects of different social policies on regional redistribution of income on a small-area level. In contrast to comparable studies that focus on the spatial distribution of welfare expenditures (Hamnett 2009, Williams 2005) this analysis includes the spatial distribution of expenditure and financing.

Following the study of Brenke (2006), who focused on primary and disposable income at state level, this study differentiates between income of employees (as pre-insurance income) and the expenditure and financing of unemployment and pension insurance at regional level (post-insurance income).

4 Regional redistributive effects

This section briefly discusses the potential effects of the two social insurances on the regional income distribution. Although reducing regional income inequalities is not the main aim of federal social insurance, equalising effects on regional income disparities are likely to be expected.

It is to be expected that the spatial distribution of pension payments generally depends on the age structure of the population and on the former regional wage level. Additionally, the legal approach to dealing with the employment biographies of inhabitants of the former German Democratic Republic (GDR) after reunification influences the spatial pattern of pension payments. As a result of a generous acceptance and acknowledgement of employment periods, along with nearly full employment in the former GDR and a large share of working women in contrast to the western states, up to now the average of state pensions is higher in the eastern part of Germany than in the western federal states. Hence, due to political and historical reasons higher transfers from the western to eastern regions are expected, enforced by high unemployment and lower wages in eastern Germany and thus lower contributions. Regions which have experienced structural change in the last decades, such as regions with an important mining industry in the past, and are now suffering from high unemployment, are expected to have lower contributions to social insurances but higher pension payments. On the other hand, agricultural regions in the south may have payments below and contributions above the national average.

The national unemployment insurance redistributes income from individuals with low unemployment risks to those with high risks. Across German regions the variance of the unemployment rate is very high. Whereas at the beginning of 2008 the

southern states of Bavaria and Baden-Wuerttemberg report low unemployment rates of 4.8 and 4.3 per cent, respectively, the north-eastern states of Mecklenburg-Western Pomerania and Saxony-Anhalt were confronted with much higher unemployment rates of 15.6 and 15.3 per cent. Additionally, due to political reasons regions in the eastern part of Germany receive more funds for active labour market policies than for benefit payments from unemployment insurance (Blien and Hirschenauer 2006). In 2003 expenditure on active labour market policies amounted to 20.9 billion Euros or 37 per cent of the total budget for unemployment insurance. To sum up, unemployment insurance may show a large redistributive effect across the regions and the federal pension insurance seems to have an observable but smaller effect, since the relationship between contributions and benefits is stronger for the latter.

5 Data and methodology

5.1 Data

The data used is obtained from different sources originating from the year 2003. The employment statistics of the Federal Employment Agency (*Bundesagentur für Arbeit*) contains information on all 29.4 million employees[2] that are subject to the compulsory social security scheme and their wages[3]. Wages above the upper earnings limit for social security contributions were estimated for each region.[4] The data also contains detailed information of the place of residence and work for every dependent employee at the smallest territorial unit for administrative purposes in the Federal Republic of Germany[5]. With these data it is possible to assess the contributions paid to the unemployment and pension insurance by the individuals of a region.

In order to estimate the redistributive effect of unemployment and pension insurance data are taken from national social security agencies. These data provide information on 1.8 million recipients of unemployment benefits and 18.3 million pensioners, as well as the average payments of these insurances on district level.

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[2] The employment statistics of the Federal Employment Agency do not include 1.7 million civil servants, soldiers and employees in military and civilian service. Although workers in marginal employment are recorded in these statistics they were omitted in this analysis because they often do marginal part-time work in addition to a regular job, so they are sometimes recorded twice.

[3] In Germany the upper earnings' limit for social security contributions was 61,200 Euros for western Germany and 51,000 Euros for eastern Germany in 2003. For higher wages no contributions have to be paid.

[4] A detailed description of the method used to estimate wages above the upper earnings limit for social security contributions that are not recorded can be found in Binder and Schwengler (2006).

[5] These more than 12,000 municipalities can be aggregated to 439 districts.

The analysis is based on the 439 NUTS-3 units[6] in Germany (326 in western Germany and 113 in eastern Germany); these are districts or towns with autonomous administration. Furthermore, western Germany is divided into three regional groups (north, central and south) following the study by Frick and Goebel (2008) because of significant regional differences within western Germany.[7]

5.2 Definition of income

In this study income is used as a measure for living standards assuming that individuals in different regions with the same income are equally well-off, while regional price levels or the quality of life are neglected[8].

Irrespective of whether the personal or the regional income distribution is analysed, the distribution of primary income is usually compared with the distribution of post-government income as a measure of the redistributive impact of tax and transfer policies.

Regional post-government income *Y* contains earnings from dependent employment (*ED*), of self-employment (*ES*) and of civil servants (*ECS*) and other incomes (*I*) reduced by contributions to unemployment insurance (*CU*), pension insurance (*CP*) and other contributions and direct personal income taxes (*T*) plus payments of unemployment insurance (*PU*), pensions (*PP*) and other social benefits (*B*) for each region *i* with *n*=439 districts as follows:

$$Y = \sum_{i=1}^{n} ED_i - (CU_i + CP_i) - T_i + (PU_i + PP_i) + ES_i + ECS_i + I_i + B_i \quad (1)$$

The German system of social insurance is very complex, so the study concentrates on the main parts of expenditure and financing, indicated by *CU*, *PU* and *CP*, *PP* respectively. The regional budget incidence of these two systems on income from dependent employment (*ED*) subject to the compulsory social security scheme can be estimated as follows:

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[6] NUTS is the abbreviation of Nomenclature of Statistical Territorial Units, as reported by Eurostat. It is a three-level hierarchical classification that subdivides each Member State into a whole number of NUTS 1 regions, NUTS 2 regions and NUTS 3 regions. In Germany NUTS 3 regions are similar to 439 districts ("*Kreise*"), NUTS-2 level represents 29 units ("*Regierungsbezirke*") and NUTS-1 level 16 German Federal States ("*Länder*"). The map in Fig. A 1 in the Appendix shows the 16 Federal States and the 439 districts in Germany.

[7] North = Schleswig-Holstein, Hamburg, Lower Saxony, Bremen; Central = North-Rhine Westfalia, Rhineland-Palatinate, Saarland; South = Hessen, Baden-Wuerttemberg, Bavaria; East = Berlin, Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, Thuringia. A map of the sixteen German states and the four groups is presented in Fig. A 1 in the Appendix.

[8] Although different price levels balance living conditions in German regions to a certain extent they do not change the ranking of regions with high and low wage income when regarding real income instead of nominal income (Kawka 2009). However, by using nominal income in this study regional inequality tends to be overestimated.

$$Y_{ED} = \sum_{i=1}^{n} ED_i - (CU_i + CP_i) + (PU_i + PP_i) \quad (2)$$

Based on individual data all income variables are aggregated on district level and related to employees or inhabitants. Differences in mean incomes per inhabitant express regional differences in the structure of the population as well as different income levels per employee or recipient.

5.3 Measures of inequality

In this paper regional inequality is defined as disparities in mean income between regions, irrespective how large the regions are. Thus, we ignore within-region income variance. We further assume that each region has the same weight in measuring inequality. This approach was chosen because the intention of the study is to point out the importance of pension and unemployment insurance for equalising living standards in all regions, expressed in income disparities. From a policy perspective, the living standard of individuals living in a region with few inhabitants is supposed to be as important as the living standard of individuals living in regions with a large population density. For this reason it is not possible to compare the results of this mean income measures with individual inequality measures.

Regional disparities of pre- and post-insurance income are analysed with some commonly used measures of income inequality. These are the Gini coefficient (*G*), the mean logarithmic deviation (I_0), Theil's measure (I_1), half the squared coefficient of variation (I_2), the Atkinson indices (*A(e)*) and their within- and between-group components (Atkinson 1970; Shorrocks 1980). The Gini coefficient is commonly used in empirical work for measuring inequality. While the Gini coefficient is most sensitive to differences around the mode of the distribution, the mean logarithmic deviation, Theil's measure and the "half the squared coefficient of variation"-measure are more sensitive to changes at the top of the distribution.

For analysis at the regional level it is helpful to have inequality measures that are decomposable. This means that the total inequality in a given population is the sum of the inequality within subgroups of the population (within-group component) and the inequality between subgroups (between-group component) (Shorrocks 1980).

Theil's measure (T) = I_1:

$$T = \frac{1}{n} \sum_{j=1}^{k} \sum_{i=1}^{n} \left(\frac{y_{ij}}{\mu} \right) \log \left(\frac{y_{ij}}{\mu} \right) \quad (3)$$

can be decomposed into inequalities within (T_W) and between (T_B) the *k* subgroups:

$$T_W = \sum_{j=1}^{k} \frac{n_j \mu_j}{n\mu} \frac{1}{n_j} \sum_{i=1}^{n_j} \frac{y_{ij}}{\mu} \log \frac{y_{ij}}{\mu} \tag{4}$$

as a weighted average of Theil's ratios within each subgroup weighted by the income shares of the subgroup, and:

$$T_B = \sum_{j=1}^{k} \frac{n_j}{n} \frac{\mu_j}{\mu} \log \frac{\mu_j}{\mu} \tag{5}$$

It is possible to decompose the mean logarithmic deviation (I_0), respectively the Generalized Entropy class of inequality indices *GE(0)*, and the half the squared coefficient of variation (I_2) in the same way.

Another common measure used for analysing income inequalities is the Atkinson index. The Atkinson index measures the social welfare function for the inequality aversion parameter *e* and - in contrast to the indices presented before - is more sensitive to changes at the bottom of the income distribution.

The Atkinson index *A(e)* is defined as 1 minus the ratio of the equally distributed equivalent level of income *Y* to the mean income μ in the population. This measure is 0 if the distribution is completely equal and it is 1 if it is completely unequal. (Atkinson 1970: 250). The Atkinson indices are decomposable too, not additively decomposable but multiplicatively however (Dayioğlu/Başlevent 2006: 893 f.):

$$A(e) = A_W + A_B - A_W \cdot A_B \tag{6}$$

With all these different measures a detailed inequality analysis is possible and biased results driven by a particular inequality measure can be prevented.

6 Results

6.1 Spatial distribution of wages

As Table 1 shows, about 80 per cent of the whole population live in western Germany, but the share of the overall gross income is higher there. Although eastern Germany's share of all employees is equal to its share of the population (21 per cent), employees only contribute 17 per cent to the total gross income. While 35 per cent of the total population live in the southern part of Germany, a higher percentage of income is generated there in prosperous metropolitan areas such as Munich, Frankfurt and Stuttgart. On the other hand there is hardly any difference between the shares of income and the percentage of employees and population in the northern and central parts of western Germany.

Table 1. Regional shares of income components

Regional group	Population	Earned income of employees	Employees
Eastern Germany	21%	17%	21%
Western Germany	79%	83%	79%
North	16%	15%	15%
Central	28%	28%	27%
South	35%	40%	37%
Total in million	**82.5**	**743,285**	**29.3**

Source: Employment statistics of the Federal Employment Agency 2003; authors' calculations.

By comparing mean wages per employee in western and eastern Germany in Table 2 it becomes obvious that income differences in wages per employee are stronger between western regions than between eastern regions. Moreover, income inequalities are stronger at the bottom of the distribution, shown by the variation of the Atkinson indices and they are dominated by between-group inequalities. Splitting the western regions into the northern, central and southern parts, two main results are visible: first of all the largest income inequalities can be found in the southern part of Germany with the highest income per capita. The Atkinson indices range from 2.88 to 11.15. Second, wages in the central part of western Germany are less unequally distributed than in eastern Germany (with a Gini coefficient of 4.1 in comparison to 4.3).

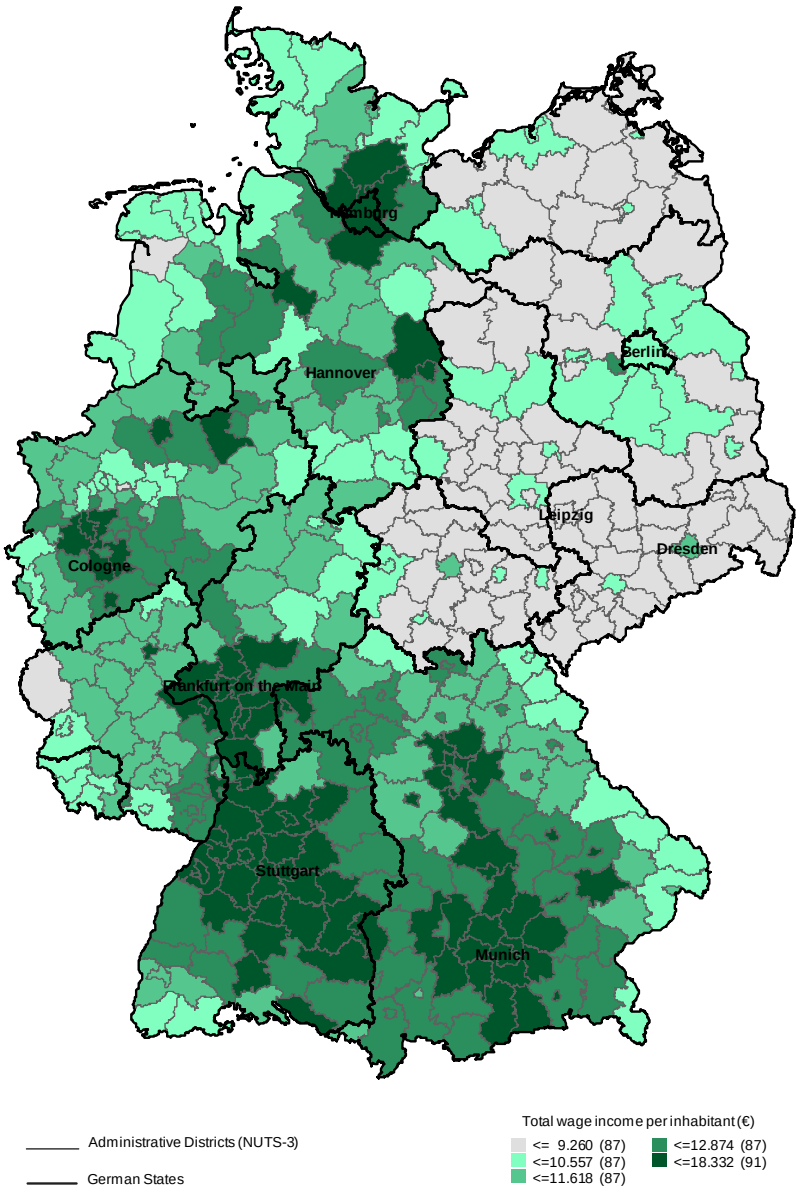
Table 2. Decompositions of wages per employee for western and eastern Germany

Regional group	Gini coefficient per cent	Theil's Indices			Atkinson Indices		
		1000 I_0	1000 I_1	1000 I_2	1000 $A_{0.5}$	1000 A_1	1000 A_2
Germany	8.9	13.06	12.76	12.63	6.43	12.97	26.31
Eastern Germany	4.3	2.95	2.96	2.98	1.48	2.94	5.85
Western Germany	5.5	4.91	4.98	5.09	2.47	4.90	9.62
North	5.3	4.42	4.49	4.59	2.23	4.41	8.66
Central	4.1	2.72	2.72	2.72	1.36	2.71	5.42
South	6.0	5.71	5.81	5.95	2.88	5.69	11.15
Within-group inequality		4.16	4.31	4.55	2.14	4.25	8.36
Between-group inequality		8.90	8.45	8.05	4.30	8.76	18.10

Source: Employment statistics of the Federal Employment Agency 2003; authors' calculations
I_0 = mean logarithmic deviation; I_1 = Theil's measure; I_2 = half the squared coefficient of variation; $A(e)$ = Atkinson indices with e = 0.5, 1 and 2

Fig. 2 illustrates the regional distribution of wages per inhabitant. There are significant wage income disparities in Germany with the lowest wages in eastern Germany and the highest wages in western Germany, especially in the southern part. In western Germany there is a wider range of wage incomes: lower wages dominate in rural areas and higher wages in urban, metropolitan areas around cities like Hamburg, Cologne, Frankfurt, Stuttgart or Munich. The surroundings of Berlin benefit from employment opportunities in the capital, so regional income is higher there – as it is in some of eastern Germany's prospering cities – than in the rest of eastern Germany.

Fig. 2. Regional distribution of wages per inhabitant



Source: Employment statistics of the Federal Employment Agency 2003; authors' calculations.

Our results are in line with the other studies identifying substantial income inequalities between western and eastern Germany as well as within western Germany.

6.2 Spatial distribution of expenditure and contributions

This section provides the results of the spatial distribution of expenditure and contributions. Table 3 shows the shares of payments and recipients for the four regional groups. Neither unemployment benefits nor public pensions are distributed in proportion to the population share across western and eastern Germany.

Table 3. Regional shares of social payments

Regional group	Population	Pension payments	Recipients of pension payments	Unemployment benefits	Recipients of unemployment benefits
Eastern Germany	21%	26%	25%	28%	31%
Western Germany	79%	74%	75%	72%	69%
North	16%	15%	16%	15%	15%
Central	28%	28%	27%	25%	25%
South	35%	31%	32%	32%	29%
Total in million	**82.5**	**190,048**	**18.3**	**29,048**	**1.7**

Source: Unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations.

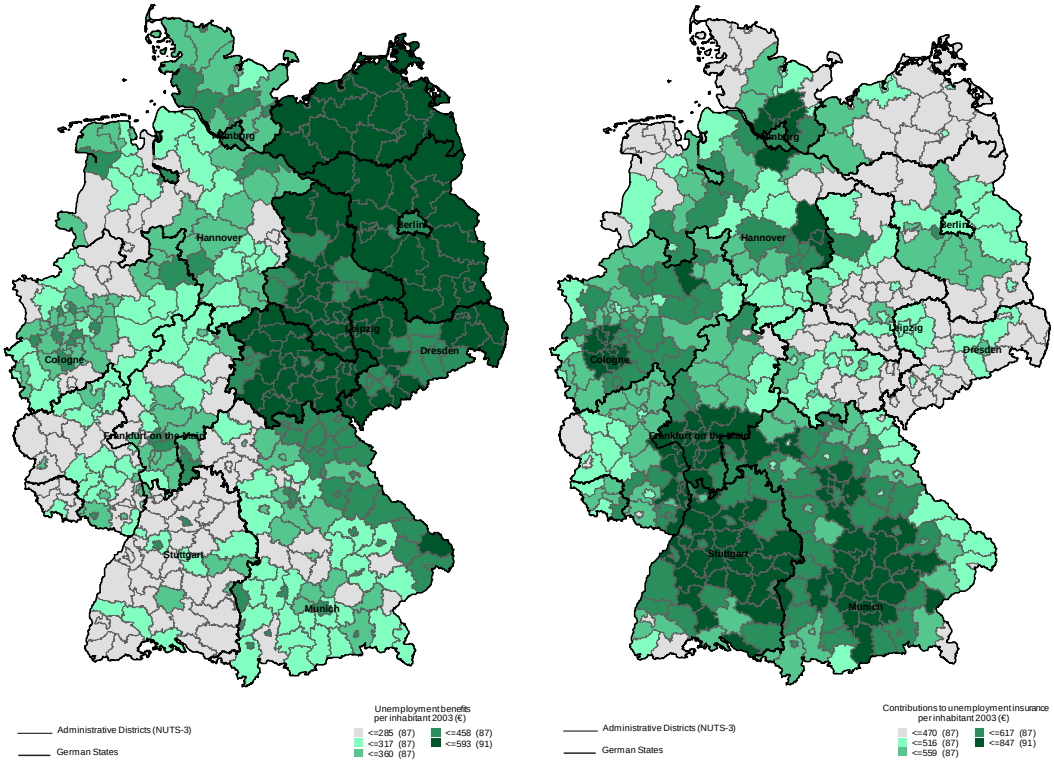
Differences are particularly high for unemployment insurance. Expenditure and financing of unemployment insurance depend on the economic performance of the regions. Following the regional economic disparities, the redistributive effect of unemployment insurance seems high. The values for eastern Germany indicate that entitlements to unemployment benefits are lower than the average of total entitlements. Driven by high unemployment rates, the share of recipients of unemployment benefits (31 per cent) is larger than the population share (21 per cent). For the southern part of western Germany the opposite relationship is true.

For the pension insurance the results also reveal differences between eastern and western Germany. The expenditure in eastern Germany is disproportionately high compared to the population share. A quarter of all retired people eligible for a state pension live in eastern Germany, while only 21 per cent of the overall population live there. The share of pension payments (26 per cent) is almost as high as the share of recipients. The values for eastern Germany indicate that entitlements to a state pension are near or above the average of total entitlements.

The map on the left-hand side in Fig. 1 shows the distribution of unemployment benefits per inhabitant for NUTS-3 units. At first glance the disparities between western and eastern Germany emerge clearly. The variance of benefits paid per inhabitant in eastern Germany seems to be small, while the picture for the western regions differs considerably. Regions with unemployment rates above the western German average in the north east of Bavaria, the Ruhr area, parts of Schleswig-Holstein and in northern Lower Saxony also benefit disproportionately highly from unemployment insurance. While the economic performance of metropolises often leads to higher income in neighbouring regions, mainly driven by commuting, the metropolises are often affected by high unemployment among their own residents.

This effect emerges clearly in the metropolitan areas of Bavaria and Baden-Wuerttemberg in the south.

Fig. 1. Regional distribution of unemployment benefits and contributions to unemployment insurance per inhabitant in 2003 (NUTS-3)



Source: Unemployment and employment statistics of the Federal Employment Agency 2003; authors' calculations.

The map on the right-hand side in Fig. 1 shows the regional distribution of contributions paid to unemployment insurance per inhabitant. The distribution follows the economic performance and labour market conditions of the regions and therefore reflects the opposite distribution of unemployment benefits. To conclude, the descriptive results provide strong evidence of a regional redistribution effect of unemployment insurance. Additionally Fig. A 2 in the Appendix gives an impression of the regional distribution of expenditure on active labour market policies and state pension payments. The spatial distribution of pension payments is quite similar to the distribution of unemployment benefits. High pension payments dominate in the eastern part of Germany, because of nearly full employment – particularly of women – before reunification and thus longer periods of employment.

Redistributional effects

This section focuses on the regional formal budget incidence of unemployment and pension insurance. To assess the redistributive effect of these two systems on the regional earned income a new income variable (C) was calculated. After deducting contributions to social insurance (B1) from wages from dependent employment (A) described in section 6.1, social insurance benefits and payments (B2) for each region have to be added (Table 4).[9]

Table 4. Wage income, payments from and contributions to pension and unemployment insurance (in million €)

A	**Wages earned by employees**	**743,285**
	Contributions to state pension insurance	-169,560
	Contributions to unemployment insurance	-47,146
B1	**= Contributions to social insurance**	**-216,706**
	State pension payments	190,048
	Unemployment benefits	29,048
	Expenditure on active labour market policies	21,874
B2	**= Social insurance benefits and payments**	**240,970**
C	**Income after pension and unemployment insurance**	**758,549**

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, national, statutory pension scheme 2003; authors' calculations.

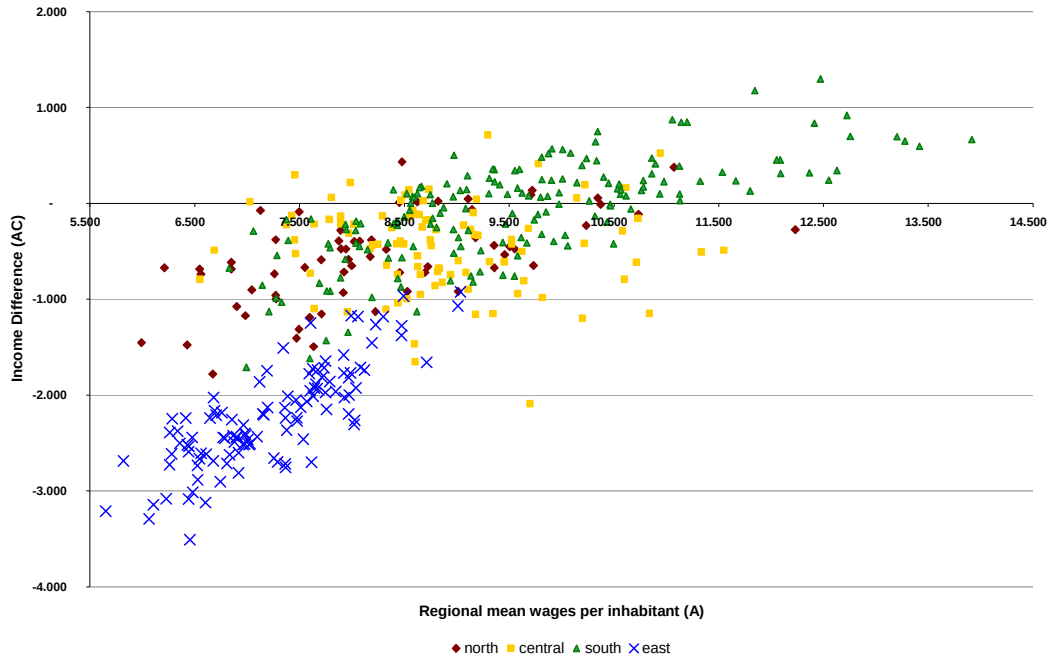
In total there should be no difference between the income before (A) and after social insurance (C) at the federal level. The difference in Table 4 is explained by parts of social insurance which are financed from taxes (not included in B1) and expenditure other than benefits (not included in B2) being disregarded. These two factors are minor parts of the total expenditure and financing, but the tax-financed elements especially of the pension insurance are larger than the disregarded expenditure such as administration costs. Due to the fact that there is no valid information about the regional tax incidence in Germany, the regional budget incidence for pension and unemployment insurance is underestimated. The results would not change if regional contributions to total national tax revenues would be taken into account.

Fig. 4 shows the difference between regional incomes A and C per inhabitant for all districts. The general pattern shows the expected positive correlation. Regions with higher wages per inhabitant show a higher and positive difference between the two income variables. While the variance of wages per inhabitant seems high for all regions, it is lower for the income differences (between A and C) within and between the three western regions. Particularly the picture for the northern and

[9] Note that the income variable measured is not equal to the disposable income because no capital income, taxes or other social payments besides social insurance such as housing benefits have been considered.

central regions looks similar. Most regions in the south have a positive income difference and high wages. For the three western regions the picture points to the north-south divide within western Germany, which is a well-established fact in the empirical literature on income distribution. Fig. 4 also shows that the eastern regions are predominantly distinct from the western regions; all of them have negative income differences and low wages per inhabitant. This means that the regional income per inhabitant is higher after the redistribution process of pension and unemployment insurance. With regard to economic disparities and the discussion about public transfers from western to eastern Germany, the result was as expected. However, there are some western regions in all three groups which are comparable to some eastern regions.

Fig. 2. Average difference between wage income (A) and income after social insurance (C) in € per inhabitant 2003 for 439 districts



Source: Employment and unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations.

Table 5 compares the Gini coefficients of regional wages per inhabitant (see section 6.1) and income after social insurance per inhabitant for the four regional groups. In all four groups the Gini index decreases significantly. The reduction is highest for eastern Germany (-55 per cent) and lowest for the southern part of western Germany (-22 per cent). The results confirm the findings for the distribution of wage income but at a lower level. Income inequalities are still stronger in the southern part of western Germany with a range from 3.42 to 13.33 and lowest in eastern Germany ranging from 0.49 to 1.97 (see Atkinson indices). Inequality within and between the groups is also lower for the new post-insurance income variable C, especially at the bottom of the income distribution.

Table 5. Decompositions of mean income per inhabitant for regional groups

Regional group	Wage income (A)	Income after social insurance (C)						
	Gini coefficient (per cent)		Theil's Indices			Atkinson Indices		
			1000 I_0	1000 I_1	1000 I_2	1000 $A_{0.5}$	1000 A_1	1000 A_2
Germany	9.7	5.6	5.14	5.18	5.26	2.58	5.13	10.18
Eastern Germany	5.6	2.5	0.98	0.98	0.97	0.49	0.98	1.97
Western Germany	8.5	6.4	6.58	6.63	6.74	3.30	6.56	12.97
North	8.5	6.5	6.66	6.75	6.88	3.35	6.63	13.06
Central	6.1	5.1	4.27	4.23	4.21	2.12	4.26	8.59
South	8.5	6.6	6.80	6.89	7.02	3.42	6.78	13.33

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations.

I_0 = mean logarithmic deviation; I_1 = Theil's measure; I_2 = half the squared coefficient of variation; *A(e)* = Atkinson indices with e = 0.5, 1 and 2

Table 6 and Table 7 show that inequality decreases as well within groups as between groups. The within-group inequality of wage income A decreases about 50 per cent and the between-group inequality nearly disappears, especial at the bottom of the distribution. Transfers from prospering regions in the south lead to a higher income level in the east. In eastern Germany the average income C increases by about 26.9 per cent compared to wage income A (from 7,387 to 9,372 Euro), while the average income C in the southern part of western Germany is slightly lower than the wage income A (10,060 in comparison to 10,109). In the northern and central part the average income C increases by 5.9 respectively 5.2 per cent. Within the regions the redistributive effect is smaller.

Table 6. Decompositions of wage income (A) for regional groups

	Theil's Indices			Atkinson Indices		
	1000 I_0	1000 I_1	1000 I_2	1000 $A_{0.5}$	1000 A_1	1000 A_2
Aggregate inequality	14.70	14.85	15.25	7.36	14.59	28.63
Within-group inequality	8.45	8.75	9.23	4.35	8.65	17.10
Between-group inequality	6.24	6.10	5.98	3.02	5.99	11.74

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations.

I_0 = mean logarithmic deviation; I_1 = Theil's measure; I_2 = half the squared coefficient of variation;

A(e) = Atkinson indices with e = 0.5, 1 and 2

Table 7. Decompositions of income after pension and unemployment insurance (C) for regional groups

	Theil's Indices			Atkinson Indices		
	1000 I_0	1000 I_1	1000 I_2	1000 $A_{0.5}$	1000 A_1	1000 A_2
Aggregate inequality	5.14	5.18	5.26	2.58	5.13	10.18
Within-group inequality	4.73	4.77	4.85	2.37	4.72	9.33
Between-group inequality	0.41	0.41	0.41	0.21	0.42	0.86

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations.

I_0 = mean logarithmic deviation; I_1 = Theil's measure; I_2 = half the squared coefficient of variation;

A(e) = Atkinson indices with e = 0.5, 1 and 2

7 Summary and conclusion

This paper examines the effects of the federal unemployment and pension insurance on regional income inequalities in Germany. In a first step the regional distribution of the wages of employees is analysed. Secondly, the redistribution is estimated by comparing regional income before and after pension and unemployment insurance.

For earned income from dependent employment, which is the most important source of regional income, the results illustrate the still large income differences between western and eastern Germany. In addition to the wage gap between the two parts of Germany, there are large labour market disparities. The decomposition analysis reveals further income disparities within western Germany. Especially in the prospering southern part of Germany more and higher wages are earned but there are also the highest regional income inequalities. These results are in line with previous studies on wage and income distribution in Germany. Although other studies have shown that income inequalities are lower in eastern Germany, the current analysis suggests that when differentiating between three regional groups in western Germany, wages are even less unequally distributed in central western Germany than in eastern Germany. Despite the considerable financial support to

enhance economic growth in eastern Germany, there are still large income disparities.

The redistributive effect of the welfare state at regional level is usually analysed for the entire social insurance and the tax and transfer systems. The focus of this analysis is the redistributive effect of unemployment and pension insurance. These two systems have a considerable weight in the German security system, not only because of their financial importance in relation to total social expenditure, but also because of their stabilising effect. The regional income after social insurance per inhabitant was calculated by adding unemployment benefits and pension payments and deducting contributions to social insurance from the wage income. The study estimated the regional budget incidence of these two social systems. The results confirm the hypotheses about the stabilising effects of expenditure and contributions on regional level. The effect was stronger for unemployment insurance, but the results also confirm regional patterns in the distribution of state pension payments. The findings illustrate that inequality was reduced substantially, with the largest reduction in eastern Germany and the lowest in the southern states. Another result is that within-group and between-group inequalities are lower for income after social insurance.

Like in other European countries, the German welfare state had and still has to face a growing financial burden, due to high unemployment rates. In 2004 and 2005 significant reforms in the welfare system were implemented which also affected parts of social insurance. The results of this analysis show that changing parameters of eligibility, claims and financing may directly influence spatial disparities of post-government income (see also Blos and Schwengler 2007). In this context further research based on more recent data will show, whether the stabilising function of social insurance has improved or not as a result of social policy reform process.

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blikationen/Querschnittsveroeffentlichungen/Jahrbuch,) (accessed 15 September 2009).

8 Appendix

Fig. A 1. German states, regional groups and districts

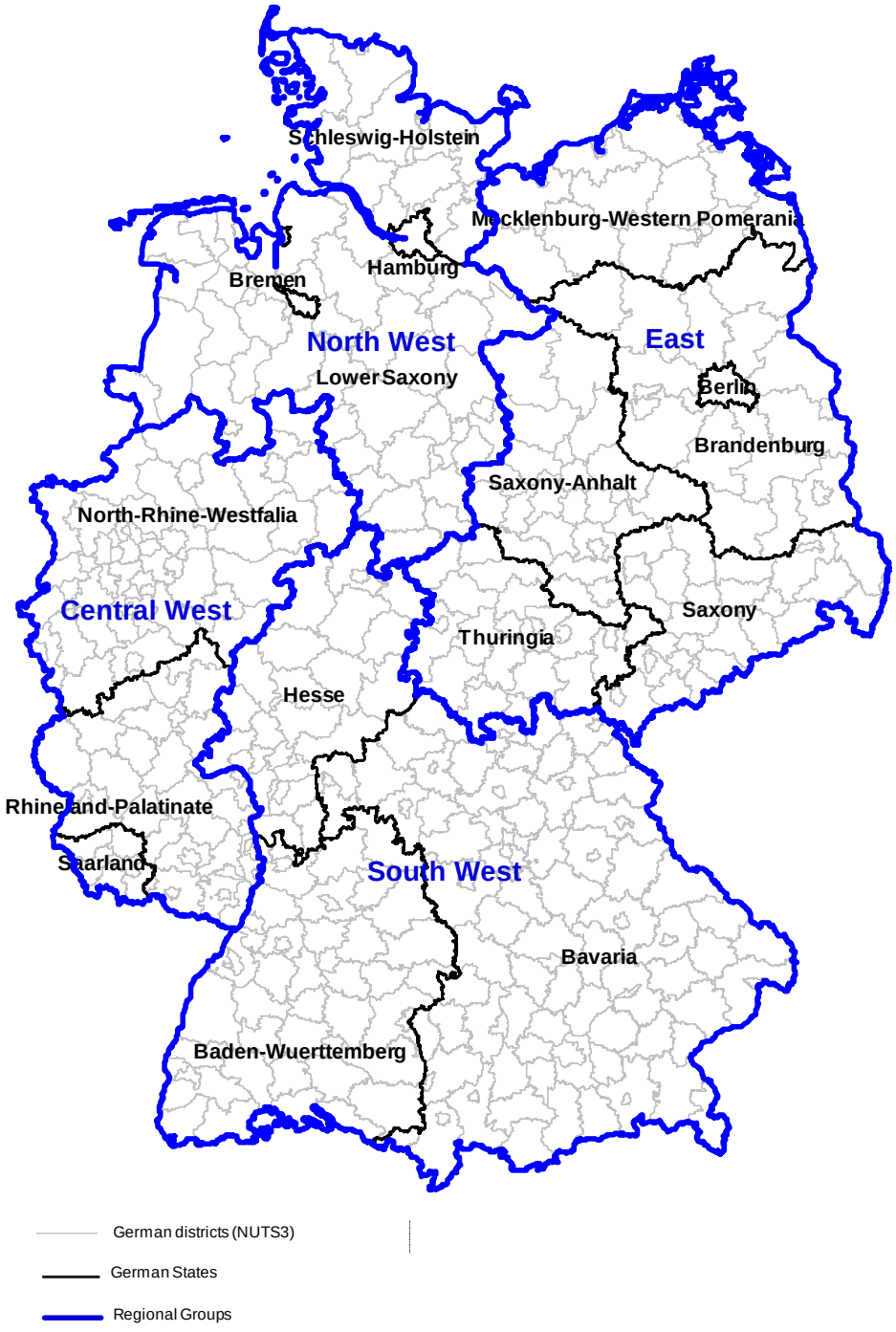
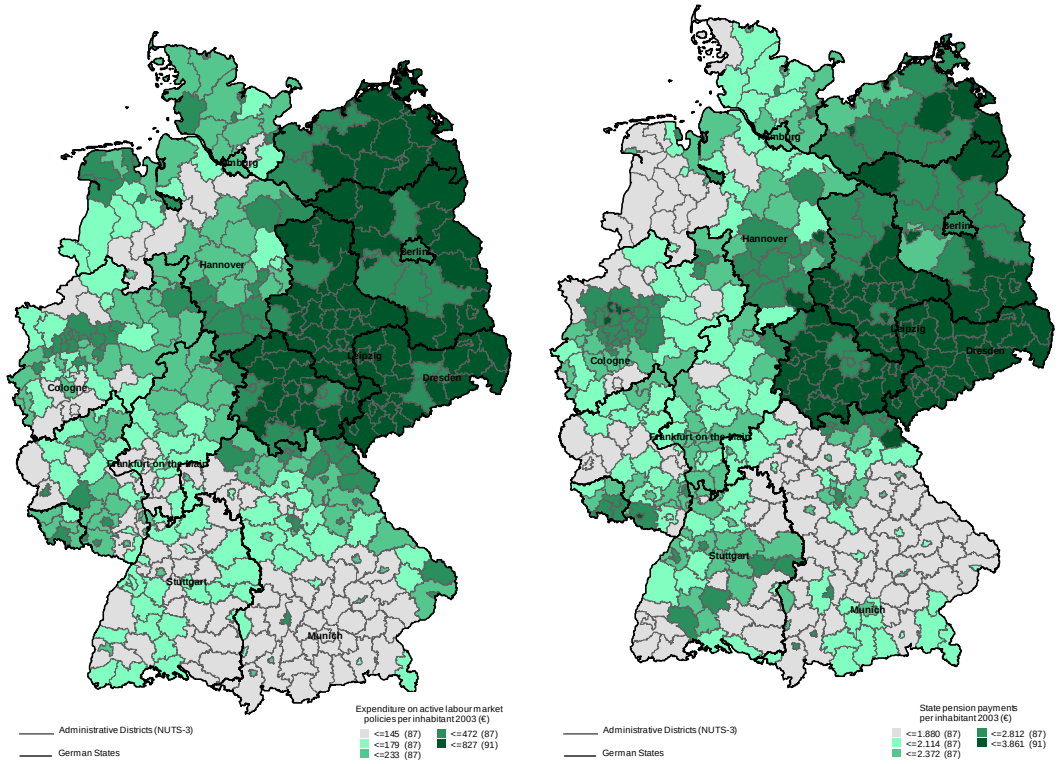


Fig. A 2. Regional distribution of expenditure on active labour market policies and state pension payments per inhabitant 2003 (NUTS-3)



Source: Unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations