

The impact of federal social policies on spatial income inequalities in Germany

Empirical evidence from social security data

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INDEX

1.	Introduction	1
2.	Empirical literature and theory.....	3
	2.1. Recent studies on spatial income inequalities	3
	2.2. Regional redistributive effects of social insurance.....	5
3.	Data and methodology	8
	3.1. Data	8
	3.2. Methodology.....	9
4.	Empirical results	10
	4.1. Income geography in Germany	10
	4.2. Spatial wage income distribution	12
	4.3. Distributional effects of social insurance.....	16
5.	Summary and conclusion.....	22
6.	Annex	24
7.	References.....	28

Abstract

More than one decade after German reunification there are still huge income disparities between western and eastern regions in Germany. The main purpose of the paper is to show how social transfer payments reduce these inter-regional disparities.

In a first step we examine inequalities in the distribution of gross income from dependent employment and self-employment at the small-area level of 439 NUTS-3 units (NUTS = Nomenclature of Statistical Territorial Units). The data used are from the employment statistics of the Federal Employment Agency and the national income tax statistics of the year 2003. Our distributional analysis quantifies regional wage inequalities driven by economic disparities and different patterns of employment. A decomposition analysis reveals that large wage differentials exist not only between eastern and western Germany but also within western regions.

Furthermore we estimate the income effects of the German unemployment and pension insurance using different sources of social security data. The data allow us to analyse revenues and expenditure also at regional level. The results indicate large regional redistributive effects across areas: the share of social benefits and payments as a percentage of total net income ranges from 11 per cent to 41 per cent.

Like other European states, Germany has to face several problems concerning its welfare system. Recent reforms of the welfare system in 2004 and 2005 also affected some core principles of social security. Our results show that changing parameters of eligibility, claims and financing influence the spatial income distribution. Hence further research on this topic is recommended when data for 2005 and later years are available.

JEL Codes: D30, D63, H55, R12

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1. Introduction

The redistributive effect of the federal tax and transfer system has been well analysed in the literature dealing with the personal income distribution at a microeconomic level. Actually, changes in nearly all fields of public policies have direct or indirect effects on the spatial distribution of income or resources, since the affected population or groups are not distributed equally across regions. The pre- and post-government distribution of personal income is directly linked to the spatial distribution of income and the regional variation of economic, social and political factors. However, the spatial picture of welfare and income distribution points out political and economic implications.

In Germany equalising cross-regional differences in living standards is an important policy goal which is anchored in the constitution. Particularly after 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 in former East Germany and to stabilise market income. However, disparities in labour productivity and unemployment still remain high.

Several federal policy systems and instruments deal with regional economic and financial equalisation. For example from 1990 to 2007 the German "Joint Task for Improving the Regional Economic Structure" provided a total of 34,164 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. Despite these substantial government grants, pre-government income disparities still exist between Germany's western and eastern regions. In 2003 the average wages of dependent employees in eastern Germany amounted to 72.8 per cent of average western German wages (Statistisches Bundesamt [Federal Statistical Office] 2006: 116).

Furthermore, the German welfare state influences the regional distribution of post-government income to a great extent. Social policies in Germany are mainly constituted at federal and not at regional level like the Federal States or *Länder*. Analyses of the benefits of federal budgets with regard to the possibility of sharing the risks of regional income shocks tell us about the regional redistributive and stabilising effect of these systems on regional income. Because economic disparities between the German regions have been persistent over the last decades, we assume not only that shocks in the disposable income of the regions are diminished by the federal tax and transfer system but also that permanent income is affected. Thus the welfare state provides indirect regional subsidies from prospering regions to economically weak regions, which is essential for considering the transfers from western Germany to eastern Germany. Germany's federal social security system, financed mainly by

contributions, plays a decisive role in this process of indirect regional income redistribution. Firstly, the social security 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. On the other hand 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 more than 80 per cent of all federal expenditure on social benefits in the year 2005. 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 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.

We analyse how, due to the large regional economic disparities, payments from the federal social insurance reduce inter-regional income differences. With regard to the total income it becomes visible 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. Our analysis makes use of data from different sources and examines the income distribution of the year 2003. It is based on the 439 administrative districts (NUTS-3) in Germany. First of all we analyse the distribution of the pre-government earned income of employees and the self-employed and show how the gross income is regionally distributed in Germany. Next we look at the regional budget incidence of unemployment and pension insurance and compare our findings with the regional distribution of post-government income. For our purposes we analyse only the income distribution after German unemployment and pension insurance (i.e. after contributions to unemployment and pension insurance have been deducted and payments and benefits from the two insurance systems have been added) and show the effect that these two systems have on reducing income differences. We use a decomposition analysis based on commonly decomposable inequality indices such as the Theil Index. Due to the economic differences and the political relevance we decompose total inequality into eastern and western Germany. Because we are also interested in the regional income distribution within the western regions, and previous analyses have shown that regional transfers from the social security system are mainly financed by Germany's southern regions, we additionally formed three regional groups for western Germany.

The paper is organised as follows. In the next section we discuss the theoretical background for our analysis and review the empirical research of other studies on this topic. In section 3 we describe the data and methodology used. The empirical results of our analysis are presented in section 4. We first present inequality measures for the regional earned income

and then repeat the results for regional income after pension and unemployment insurance. Finally, section 5 concludes.

2. Empirical literature and theory

2.1. Recent studies on spatial income inequalities

In recent years several studies have been conducted on income distributions and wage inequalities in Germany. Most of these studies comparing western and eastern Germany are 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). Studies focussing on small areas like district level use 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).

Although Becker and Hauser (2003) and Schwarze (1996) distinguish between “pre-government” and “post-government” income for western and eastern Germany in their studies there are still no spatial analyses at small-area level that split the gross income into its different components. Existing spatial analyses focus solely on gross measures at district level. 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 figures in the process of time. The intention of our paper is to take a more detailed look at the different components that make up the total income for all 439 NUTS-3 regions in Germany. Therefore we focus on the effects that social transfer payments have on income differences at district level.

Similar studies at small-area level are available for Great Britain and Denmark: Rice et al. (2006) analysed the regional income and productivity inequalities due to the quality of jobs for NUTS-3 regions in Great Britain and found that productivity depends to a large extent on the density of the working-age population in the same area. Another recent study focuses on the within-region earnings inequalities that have increased in contrast to the inequalities between regions in Great Britain (Dickey 2007). Jensen-Butler and Madsen (2005) examined the changes in regional income distribution in Denmark from 1980 to 1998 using a decomposition method. They were able to show that changes in earned income were influenced by export growth and price changes whereas changes in population and tax rates had a significant effect on disposable income.

For Germany Colavecchio et al. (2005) examined GDP per capita for all 439 districts from 1992 to 2001. Their main result was that the cross-regional income disparity grew during this

period of time (Colavecchio et al. 2005: 8). Although in 2001 the poorest districts were still in eastern Germany, in some western German districts GDP decreased significantly from 1992 to 2001. For example, in 2001 some regions in the northern and south-western parts of Germany counted among the poorest regions as well.

Frick and Goebel (2008) analysed the income distribution by Gini decomposition for eastern and western Germany using data from the German Socio-Economic Panel Study (SOEP) from 1992 to 2003. They differentiated between pre-government and post-government income and found that the distribution of eastern German incomes had increased from a low level of inequality in the early 1990s to a high level in 2003. The between-inequality of individuals' pre-government income was lower in eastern Germany than in western Germany after reunification but has risen since then and is still rising because of high unemployment rates on the one hand and well-paid jobs on the other hand. In contrast to this result, individuals' post-government income also increased in eastern Germany until 1995, but inequality remained lower than in western Germany mainly because of public transfers to unemployed people.

Kosfeld et al. (2007) analysed disparities in prices and income across German NUTS-3 regions between 1995 and 2004. They estimated separate regional price indices, a consumer price index (CPI) and a housing rent index (HRI). Their results show that CPI price disparities are relatively small within eastern Germany. For western and eastern Germany the CPI with and without housing converges to the unique steady state (β -convergence), whereas in western Germany the HRI disparities have increased (characterized by σ -divergence) and in eastern Germany they have decreased (characterized by σ -convergence). Moreover, the gap in housing rents widened from 1995 to 2004 across German regions. They also found that "*real income convergence across all German districts turns out to be stronger than nominal income divergence*" (Kosfeld et al. 2007: 24).

Gatzweiler and Milbert (2003) examined the different income components at district level. They used the number of long-term unemployed people as an indicator for unemployment benefits and purchasing power as an indicator for total net income. They pointed out that there is a considerable wage gap between western and eastern Germany and between core and peripheral regions. But more regional disparities exist when comparing unemployment benefits. They dominate in eastern Germany and in structurally weak areas in western Germany with sunset industry. Transfers were three times higher in eastern Germany than in western Germany. Most social assistance recipients can be found in agglomerations in the northern and western part of the former West German states. (Gatzweiler and Milbert 2003: 129ff).

The main results of these studies can be summarised as follows: in the first years following reunification, disposable income and the inner-regional income disparities in eastern Germany were low and have increased since then. Nevertheless substantial income disparities still exist

between western and eastern Germany because eastern German incomes have not yet reached the western German level. These regional inequalities become even larger when regional price indices are taken into account. Although the poverty rate has increased, the differences between western and eastern Germany have declined and income inequalities are still higher between western German regions than between eastern German regions.

The research cited is a valuable source of information, but in contrast to all these studies we focus here on the different components of income in one year instead of analysing the development of the income distribution. Following the study of Brenke (2006), who focused on primary income and disposable income at state level, we differentiate between income components from employees and the self-employed and the expenditure and financing of unemployment and pension insurance at regional level. Before we proceed with our empirical analysis, we discuss the expected redistributive effects of these two elements of social insurance in the next section.

2.2. Regional redistributive effects of social insurance

Studies analysing the redistributive effects of public policies often focus on aspects of personal income distribution. From the microeconomic perspective Becker (2003) distinguishes three dimensions of interpersonal redistribution: firstly, a system of private insurance with equivalence of premium and insured risk. Secondly, the state tax and transfer system, which includes no equivalence for paid taxes and contributions and finally a system of social insurance, which combines both elements in Germany: while recipients have to pay contributions to be eligible for payments, their entitlement is not determined by actuarial means only, but also by social criteria. Our purpose is to analyse how the redistributive effect of social security is also reflected in the regional redistribution of income.

The spatial dimension of central public policies is mainly discussed in the context of fiscal equalisation schemes of economic and monetary unions. The federal budget creates an interregional insurance against regional asymmetric shocks when regional incomes are not perfectly correlated. Hence, in a fiscal federation the fiscal system automatically provides transfers from prospering regions to non-prospering regions, which stabilize a region's permanent income. Fatás (1998) distinguishes between the effect on the periodic disposable income of a region (stabilisation) and the effect on a region's permanent income (insurance). Using data of the European countries he estimates the risk-sharing potential of a Europe-wide fiscal federation. Assuming an amount of disposable income stabilisation of 30 per cent as a result of the given tax structure, he estimates an amount of interregional insurance of approximately 10 per cent. Whereas stabilisation is defined as the reduction of volatility of regional disposable income, insurance is defined as the reduction of volatility of regional permanent income. Additionally he estimates the insurance benefits that European regions can obtain from the national fiscal system. Under the same assumption about disposable income

stabilisation, his results for the western German states indicate a potential of national insurance of approximately 9 per cent. Similar to the personal income distribution, not only the tax-transfer system of a federations' central government is important for regional income and consumption smoothing, but also a federal social security system has a redistributive effect on the spatial income distribution. Based on Fatás' (1998) model of a federation with two regions, Kurz (2002) expands the theoretical analysis of the insurance and stabilisation potential of a fiscal federation to include a federal unemployment insurance. If economic shocks are directly expressed in unemployment, a federal system of unemployment insurance provides a regional stabilisation system, she concludes. Furthermore, if regional economic asymmetries exist constantly, permanent income transfers result from regions with below-average unemployment to regions with unemployment that is higher than the national average.

The mentioned studies focus on the benefits associated with creating a fiscal federation. It allows the regions to share macroeconomic risks. In our analysis we look explicitly at the consequences that interregional transfers, produced by federal social insurance, have on the spatial income distribution. Irrespective of whether the personal or the regional income distribution is analysed, the distribution of primary income is usually compared with the distribution of net income as a measure of the redistributive impact of tax and transfer policies. The data we use allows us to focus on two elements of social insurance in Germany: pension insurance and unemployment insurance. These are two dominant parts of the overall social system in Germany. In 2005 expenditure on social payments and services amounted to 241 billion Euros for pension insurance and to 53 billion Euros for unemployment insurance. Together they constituted 42 per cent of the total budget for social expenditure in 2005. We choose these two systems not only because of their weight in the federal budget, but also because they mainly provide income payments, which are the subject of our distribution analysis, and not social services.

First of all we look at the economic, social and political determinants of the budget of pension and unemployment insurance. We consider only interpersonal redistributive effects in a given time period and disregard intertemporal redistributive effects in the long run. Because the German system of social insurance is very complex and includes several financial relations, we only mention the main parts of expenditure and financing. The results help us to derive the determinants of the distribution of expenditure and financing across regions.

Both pension insurance and unemployment insurance are financed mainly by obligatory contributions from employers and employees. The contributions are calculated as a percentage of the gross wages up to an income threshold, individual risks are not considered. Entitlement also depends on individuals' earned income and, especially in the case of pension insurance, on the duration of employment. At this point we have to mention that in 2003 almost a quarter of the pension insurance budget was financed by taxes, justified by social

elements of the pension system. However, the way in which social insurance is financed, results in income transfers from insured individuals with low risks to individuals with high risks. Thus we concentrate on the regional distribution of risks when we focus on the distribution of expenditure. For pension insurance we do not have any references for a meaningful regional variance in mortality risks but we can add some other political and social explanations for the spatial distribution of state pension payments. Social elements of the pension insurance are, for example, the acknowledgement of a contribution period for parenting, and early retirement pensions. An important social or political element is the legal approach to dealing with the employment biographies of inhabitants of the former German Democratic Republic (GDR) after reunification. 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 share of working women who lived in West Germany, up to now the average of state pensions is still higher in the eastern part of Germany than in the western federal states. Finally we can mention the intergenerational redistribution within the pension insurance. This is a result of demographic, economic and social trends.

What conclusions can now be drawn from the elements listed above for the impact of federal pension insurance on the regional income distribution in a given period of time? Although the equivalence of contributions and entitlements is still high in the pension insurance, we expect some trends in the regional distribution. For political and historical reasons we assume higher net income transfers from the western regions to regions in eastern Germany, enforced by high unemployment and lower wages in eastern Germany and thus lower contributions. Due to the fact that we can only observe the year 2003 in our empirical analysis, we also assume a spatial picture of distribution within the western regions. Regions which have experienced structural change in the last decades, such as regions with an important mining industry in the past, such as the Ruhr area, and are now suffering from high unemployment, could also have a positive balance of regional contributions and regional pension payments. On the other hand, prospering regions in the south which used to have an important agricultural sector may have payments below and contributions above the national average.

Through the unemployment insurance system, income is redistributed between individuals with high unemployment risks and those with low risks. Groups with above-average unemployment risks are the low-skilled, older employees and women. As was also pointed out in the analysis by Kurz (2002), the spatial distribution and correlation of economic risks and employment opportunities have a great effect on income payments across regions resulting from the federal unemployment insurance. Across German regions the variance of the unemployment rate as an expression of employment opportunities 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 are confronted with unemployment rates of 15.6 and 15.3 per cent. Additionally, unemployment insurance also has some social elements in its constitution. What is important for the stabilising effect on regional income is the mechanism by which the expenditure on active labour market policies is distributed across regions. In 2003 the expenditure on these policies amounted to 20.9 billion Euros or 37 per cent of the total budget for unemployment insurance. The formula allocation of this expenditure results in eastern regions receiving more funds for active labour market policies than for benefit payments from unemployment insurance (Blien and Hirschenauer 2006).

To sum up, we expect unemployment insurance to have a large redistributive and stabilising effect across the regions and the federal pension insurance to have an observable but smaller effect, since the relationship between contributions and benefits is stronger there.

3. Data and methodology

3.1. Data

Our analysis is based on the 439 NUTS-3 units in Germany; these are districts or towns with autonomous administration. Most of the data we use comes from different sources originating from the year 2003. On the one hand the employment statistics of the Federal Employment Agency contains information about all employees and their wages that are subject to the compulsory social security scheme at small-area level. This amounts to about 83 per cent of all employees in Germany¹. Wages above the upper earnings limit for social security contributions, which are not recorded in this database, were estimated for each region².

The wage incomes of self-employed individuals, which are also not recorded in these statistics, were obtained from the national income tax statistics. To determine their regional income we use only positive incomes of the recently available national income tax statistics of the year 2001 collected by the German Federal Statistical Office. Due to long assessment procedures and the publication of tax data every three years, more up-to-date statistics from this data source are presently not available. The share of self-employed people as a percentage of all working people that are liable to tax was around 11 per cent in 2001 and their incomes made up 16.5 per cent of all the positive incomes of dependent employees and the self-employed.

¹ The employment statistics of the Federal Employment Agency do not include civil servants, soldiers and employees in military and civilian service. Although marginal part-time workers are recorded in these statistics we omitted them because they often do marginal part-time work in addition to a regular job, so they are sometimes recorded twice.

² 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).

To assess the redistributive effect of the unemployment insurance and pension system our analysis uses data provided by the national social security agencies. These data provide information about the average payments of unemployment benefits and pensions for all 439 NUTS-3 units. Disposable income and earned income both depend on payments from the social security system. Due to high unemployment rates especially in eastern Germany, these payments are of great importance and amount to 60 per cent of the last gross salary before unemployment. The data allows us to assess the contributions paid into the unemployment and pension insurance by the individuals of a region. Thus we are able to estimate the regional budget incidence of these two systems.

3.2. Methodology

For analysing the regional disparities we use 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 and their within- and between-group components.

The Gini coefficient is commonly used in empirical work for measuring inequality. It represents the area between the Lorenz curve and the line of complete equality and is defined as:

$$G(Y) = \frac{2}{n^2 \mu} \sum_i \left(i - \frac{n+1}{2} \right) Y_i \quad (1)$$

If the Gini coefficient is zero, the distribution is completely equal and as the Gini coefficient rises the distribution becomes more and more unequal. 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 are more sensitive to changes at the top of the distribution. These measures can be written as follows:

Mean logarithmic deviation:

$$I_0 = \frac{1}{n} \sum_{i=1}^n \log \left(\frac{\mu}{y_i} \right) \quad (2)$$

Theil's measure:

$$I_1 = \sum_{i=1}^n \left(\frac{y_i}{\mu} \right) \log \left(\frac{y_i}{\mu} \right) \quad (3)$$

Half the squared coefficient of variation:

$$I_2 = \frac{1}{n} \sum_{i=1}^n \frac{[(y_i/\mu)^2 - 1]}{2} \quad (4)$$

where y_i is the income and μ is the mean income of the population of n individuals.

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 lower end of the income distribution.

The Atkinson index is defined as:

$$A(e) = 1 - \frac{y_{EDE}}{\mu} \quad (5)$$

where $A(e) = 1$ minus the ratio of the equally distributed equivalent level of income to the mean of the actual distribution, and EDE = equally distributed equivalent level of income (y_{EDE}) (Atkinson 1970: 250).

With these measures a detailed inequality analysis is possible and biased results driven by a particular inequality measure can be prevented. For analysis at 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 the subgroups of the population (within-group component) and the inequality between the subgroups (between-group component) (Shorrocks 1980).

4. Empirical results

4.1. Income geography in Germany

Before analysing the income distribution for earned income and transfers in Germany in more detail we take a look at some summarizing statistics. Table 1 shows the different income components for western Germany, eastern Germany and Germany in total. As can be seen in Table 1 earned income is still unequally distributed between western and eastern Germany. In western Germany the highest wage incomes are earned by employees and self-employed people. In both parts of Germany the wages of the self-employed are much higher than wages per employee, but in western Germany the difference is 1.5 times higher and in eastern Germany 1.3 times higher. The range of mean wages earned by the self-employed at regional level is also larger than that of mean wages earned by employees. The maximum wage per

employee is more than twice the minimum wage, and the maximum wage per self-employed person is more than three times the minimum wage.

As a consequence of higher wages in western Germany, unemployment benefit and unemployment assistance payments per recipient are higher. The amount of benefit paid depends on the last earned income before unemployment. On the other hand, pension payments per recipient are higher in eastern Germany as a result of nearly full employment before reunification and thus longer periods of employment and contribution. Hence in 2003 women in eastern Germany received an average pension of 850 Euros compared to 690 Euros for women in western Germany.³ When we focus on transfers per inhabitant the result changes. The sum of these public transfers per inhabitant in eastern Germany is 1.5 times higher than in western Germany, because of the still high labour market disparities between the two parts of Germany.

Table 1: Regional income characteristics in 2003 in Euros⁴

	Germany	Western Germany	Eastern Germany	Minimum	Maximum	Standard deviation
Mean wage per employee ⁵	25,405	26,730	19,942	15,695	35,488	3,832
Mean wage per self-employed 2001	37,905	40,413	25,981	20,481	69,628	9,375
Mean wage income per gainfully employed person (employees, self-employed and civil servants)	27,321	28,910	21,212	16,961	40,405	4,251
Mean wage income per inhabitant	11,662	12,318	9,118	6,946	18,332	2,066
Unemployment benefit per recipient	16,407	17,050	14,950	13,935	22,458	1,597
Unemployment assistance per recipient (financed by taxes)	8,220	8,763	7,618	6,880	10,046	635
State pension payments per recipient	10,378	10,168	11,033	6,298	29,761	1,546
Public social transfers per inhabitant	3,191	2,875	4,418	1,862	5,933	911
Total income per inhabitant	14,854	15,193	13,536	11,083	21,283	1,575

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001, statutory pension scheme 2003; authors' calculations.

³ See data of the statutory pension scheme.

⁴ Differences between the sum of the mean wage per inhabitant plus the public transfers per inhabitant and the total income per inhabitant are due to rounding.

⁵ Including the estimate for wages above the upper earnings limit for social security contributions.

4.2. Spatial wage income distribution

Our data confirm the results of other studies according to which in Germany there are income inequalities between western and eastern Germany as well as between western German regions, as is illustrated in Table 2. For a more detailed look at the income situation in western Germany we split the western regions into north, central and south⁶ following the study by Frick and Goebel (2008). Due to the different sizes and functions of the underlying districts (urban vs. rural) we use the size of the population and the numbers of employees and self-employed as a suitable indicator for comparing measures of income. As Table 2 shows, 80 per cent of the whole population lives in western Germany, but the share of the overall gross income is much higher in western Germany (83 per cent for employees and 88 per cent for the self-employed) than in eastern Germany. Although eastern Germany's share of all employees in Germany is slightly higher than its share of the population (21 per cent vs. 20 per cent), eastern German employees only contribute 17 per cent to the total gross income. The share of self-employed people is smaller in eastern Germany than in the total population but it must be taken into account that there were no entrepreneurs or self-employed people in eastern Germany before reunification. Secondly, the share of self-employed people in eastern Germany is the same as that in the northern part of western Germany.

As can be seen in Table 2, 35 per cent of the total population lives in the southern part of Germany but more earned income is generated there (by 40 per cent of all employees and 42 per cent of all self-employed in the country as a whole) in prosperous metropolitan areas such as Munich, Frankfurt and Stuttgart. On the other hand there is hardly any difference between the shares of income, employees, self-employed and population in the northern and central parts of western Germany.

⁶ North = Schleswig-Holstein, Hamburg, Lower Saxony, Bremen; Central = North-Rhine Westfalia, Rhineland-Palatinate, Saarland; South = Hesse, 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 Figure A 1 in the Annex.

Table 2: Regional shares of income components

Regional group	Population	Earned income of employees	Employees	Income of self-employed people	Self-employed
Eastern Germany	20%	17%	21%	12%	17%
Northern western Germany	16%	15%	15%	17%	17%
Central western Germany	28%	28%	27%	29%	27%
Southern western Germany	35%	40%	36%	42%	39%

Source: Employment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001; authors' calculations.

Wages per employee

In a first step we look at the wages of all employees including the estimated wages above the upper earnings limit for social security contributions. By comparing mean wages per employee in western and eastern Germany it is obvious that income differences in wages per employee are stronger between western German regions than between eastern German regions. Moreover, income inequalities are stronger at the bottom of the distribution and they are dominated by between-group inequalities.

If we split 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. Second, wages in the central part of western Germany are less unequally distributed than in eastern Germany, presumably because of low wages there.⁷

Wages per self-employed person

Wages earned by the self-employed are distributed more unequally in Germany than the wages of employees. The wages of the self-employed differ more between regions in western Germany, which is proven by a Gini coefficient that is twice as high in western Germany as in eastern Germany. The distribution of the wages of the self-employed is more sensitive among the lower wages as well. In contrast to the results for wages per employee, where the aggregate inequality was dominated by the between-group inequality, the aggregate inequality for the self-employed is determined almost equally by the within-group and the between-group inequality.

⁷ The detailed results are presented in Tables A1 and A2 in the Annex.

When comparing the different regional groups, the order of the Gini inequality index changes for the wages of self-employed people compared to the wages of employees. The highest income inequalities of the self-employed exist between districts in southern Germany, as was the case for employees. But the second unequally distributed group is central western Germany, which was the less unequally distributed regional group for wages per employee.⁸

These results agree with those of Becker and Hauser (2003), who analysed the income distribution of the self-employed in western and eastern Germany using a Household Income Survey for Germany from 1969 to 1998. They were able to show that there has been an increase in income differences especially at the bottom of the distribution of “pre-government income”, because more and more people have little or no income – whereas there has been no substantial change in the middle of the income distribution. In Germany inequalities in earned wages are dominated by income from self-employment as it is in the UK, as Jenkins found on the basis of the Family Expenditure Survey (FES) for 1971, 1976, 1981 and 1986 (Jenkins 1995).

Wages per inhabitant

In order to compare the regional distribution of earned income and transfers we relate both to inhabitants. The mean wages per inhabitant include the sum of all wages earned by employees, self-employed people and civil servants. Regarding the total earned income distribution in Table 3, income inequalities are stronger in western Germany, especially at the bottom of the distribution. Also, there is only a slight domination of between-group inequalities.

Table 3: Decompositions of mean wages per inhabitant for western and eastern Germany in 2003

Region	Gini coefficient per cent	1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0,5}	1000 A ₁	1000 A ₂
Germany	10.4	17.26	17.07	17.18	8.55	17.11	34.23
Eastern Germany	5.9	5.42	5.47	5.56	2.72	5.40	10.65
Western Germany	7.5	8.88	9.04	9.28	4.47	8.84	17.32
Within-group inequality		7.99	8.32	8.85	4.12	8.15	15.98
Between-group inequality		9.27	8.75	8.29	4.45	9.03	18.55

Source: Employment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001; authors' calculations.

⁸ The detailed results are presented in Tables A3 and A4 in the Annex.

When comparing the different regional groups in Germany there seems to be no difference between the inequality in the northern part of western Germany and that in central western Germany regarding the total mean per inhabitant. As seen before, income inequalities are stronger at the bottom of the distribution throughout all groups. Furthermore, the largest earned income inequalities can be identified among regions in the southern part of western Germany while between-group inequality is stronger than the within-group inequality, especially at the bottom of the distribution, as is shown in Table 4.

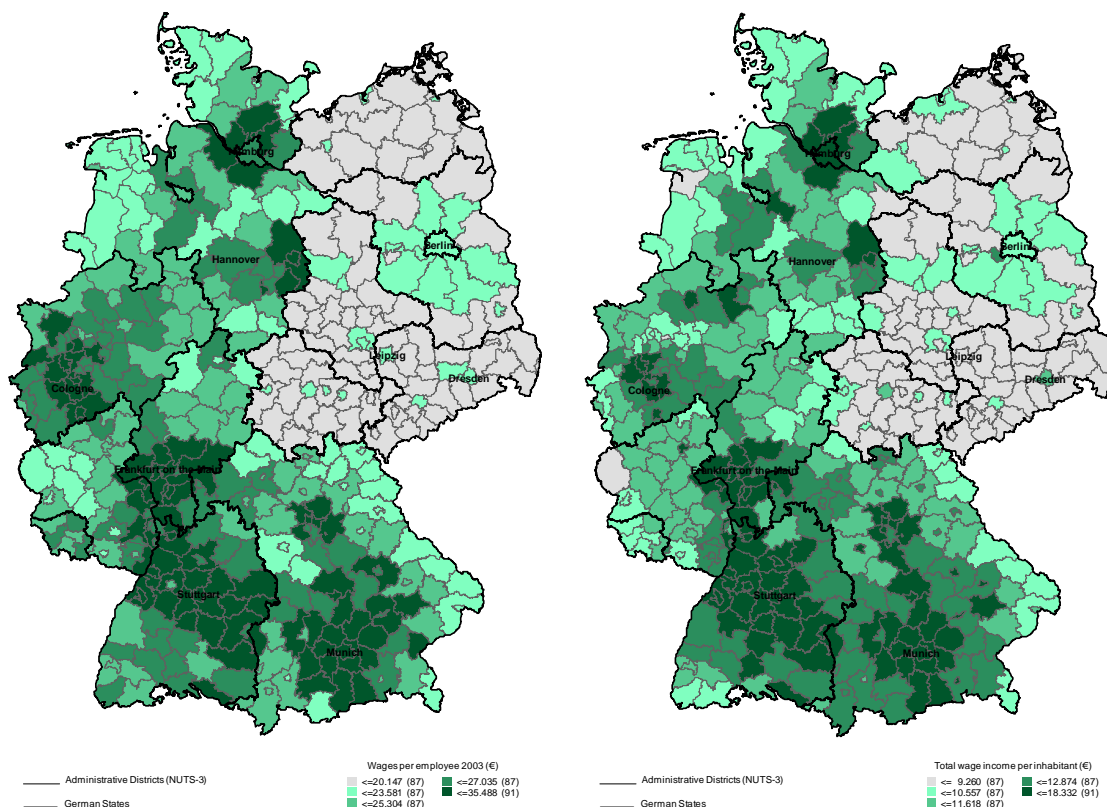
Table 4; Decompositions of mean wages per inhabitant for regional groups

Regional group	Gini coefficient per cent	1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0,5}	1000 A ₁	1000 A ₂
Eastern Germany	5.9	5.42	5.47	5.56	2.72	5.40	10.65
Northern western Germany	6.1	5.94	5.96	6.02	2.97	5.92	11.75
Central western Germany	6.1	5.91	5.97	6.06	2.96	5.89	11.62
Southern western Germany	7.3	8.65	8.77	8.98	4.34	8.61	16.91
Within-group inequality		6.82	7.07	7.51	3.51	6.96	13.71
Between-group inequality		10.44	10.00	9.64	5.06	10.22	20.81

Source: Employment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001; authors' calculations.

To visualise the income distribution in Germany at regional level, Figure 1 shows the wages per employee on the left-hand side and the total wage income per inhabitant on the right-hand side. As can be seen very clearly on the left map the lowest wages are earned in eastern Germany and the highest are earned in western Germany, especially in the southern part. In western Germany there is a wider range of wages: 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 – and in some of eastern Germany's prospering cities – than in the rest of eastern Germany. The map on the right illustrates the overall income situation in all regions including the wages of employees, self-employed people and civil servants – but now based on inhabitants. This map is very similar to the one on the left, with low wages in eastern Germany and higher wages in western regions, though the latter vary more considerably.

Figure 1: Regional distribution of wages per employee and total wage income per inhabitant



Source: Employment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001; authors' calculations.

4.3. Distributional effects of social insurance

Spatial distribution of expenditure and contributions

As argued in section 2.2, we expect an asymmetric spatial distribution both of contributions to unemployment and pension insurance and of pension payments and unemployment benefits. Table 5 shows the shares of payments and benefits received from these two systems of social insurance for our four regional groups.

Table 5: Regional shares of social payments

Regional group	Population	Pension payments	Recipients of pension payments	Unemployment benefits	Recipients of unemployment benefits
Eastern Germany	20%	26%	25%	28%	31%
Northern western Germany	16%	15%	16%	15%	15%
Central western Germany	28%	28%	27%	25%	25%
Southern western Germany	35%	31%	32%	32%	29%

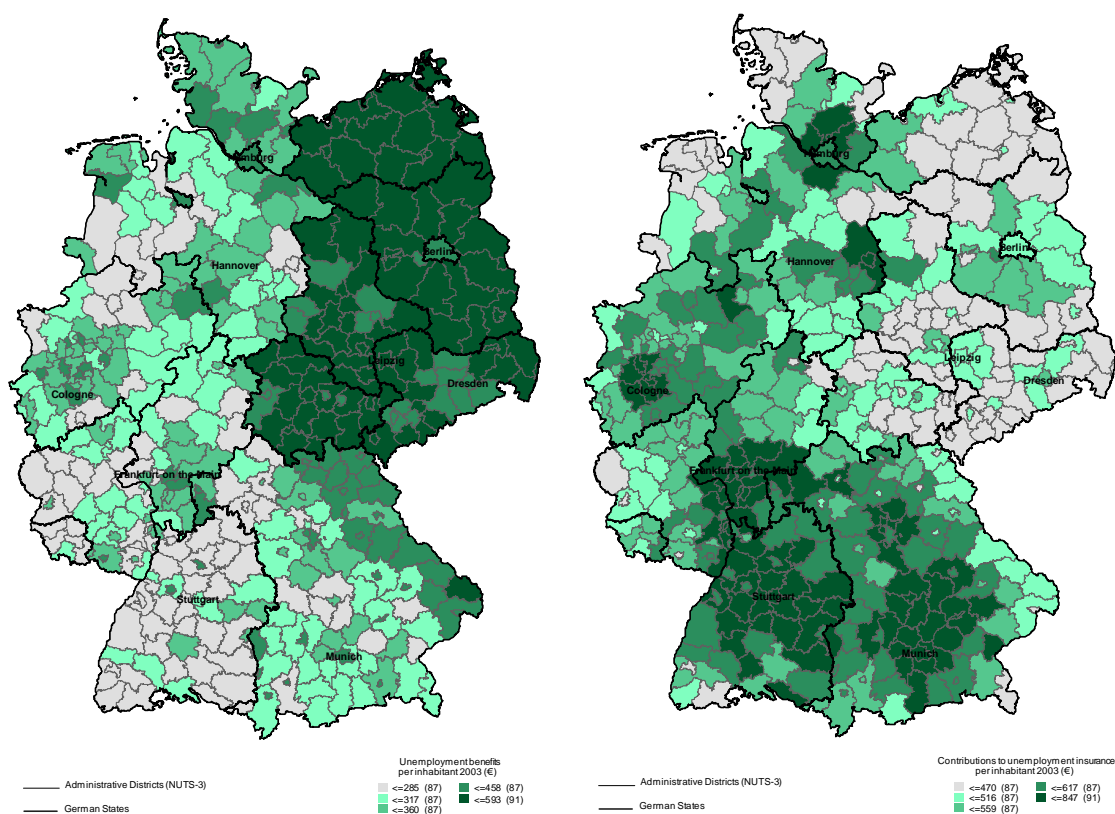
Source: Unemployment statistics of the Federal Employment Agency 2003, statutory pension scheme 2003; authors' calculations.

Neither entitlements to unemployment benefit nor to a state pension are distributed in proportion to the population share across the four regional groups. Differences are particularly high for unemployment insurance. As argued before, the expenditure and financing of unemployment insurance are connected to the economic performance of the regions. Following the regional economic disparities, the redistributive effect of unemployment insurance seems high. For pension insurance the results also confirm our considerations about differences between eastern and western Germany. The expenditure in eastern Germany is disproportionately high compared to the population share. 25 per cent of retired people eligible for a state pension live in eastern Germany, while only 20 per cent of the overall population live there. Almost the same share of total benefits is passed into the eastern regions. Driven by high unemployment rates, the share of recipients of unemployment benefits (31 per cent) is also larger than the population share. Here, however, the share of the total expenditure (28 per cent) is lower. The values for eastern Germany indicate that entitlements to a state pension are near or above the average of total entitlements and, as a consequence of lower wages in the eastern regions, entitlements to unemployment benefits are lower than the average of total entitlements. For the southern part of western Germany we find the opposite relationship.

Figure 2 shows the distribution of unemployment benefits per inhabitant for NUTS-3 units on the left-hand map. 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. Regions with unemployment rates above the average for western Germany 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.

Figure 2: 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.

Before proceeding with the spatial distribution of contributions to social insurance we have to make some assumptions about their incidence. We assume that the burden of employers' contributions is passed entirely onto the employees and therefore that both the employee and the employer contributions are actually paid by the employee. The right-hand map in Figure 2 shows the regional distribution of contributions paid into 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, our descriptive results provide strong evidence of the regional redistribution effect of unemployment insurance. Additionally Figure A 2 in the Annex gives an impression of the regional distribution of expenditure on active labour market policies and state pension payments.

Redistributional effects

In this section we look at the budget incidence of unemployment and pension insurance. To assess the redistributive effect of these two systems on the regional earned income we construct a new income variable. We use the primary income described in section 4.2, add social insurance benefits and deduct contributions to social insurance for each region (Table 6).⁹

Table 6: Primary income, transfers and contributions to pension and unemployment insurance (in € m.)

	Wages earned by employees	734.285
	Income earned by the self-employed	155.743
	Earnings of civil servants	63.488
A	= Primary income	953.516
	State pension payments	190.048
	Unemployment benefits	29.048
	Expenditure on active labour market policies	21.874
B1	= Social insurance benefits and payments	240.970
	Contributions to state pension insurance	-169.560
	Contributions to unemployment insurance	-47.146
B2	= Contributions to social insurance	-216.724
C	Income after pension and unemployment insurance	1,002.008

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001, statutory pension scheme 2003; authors' calculations.

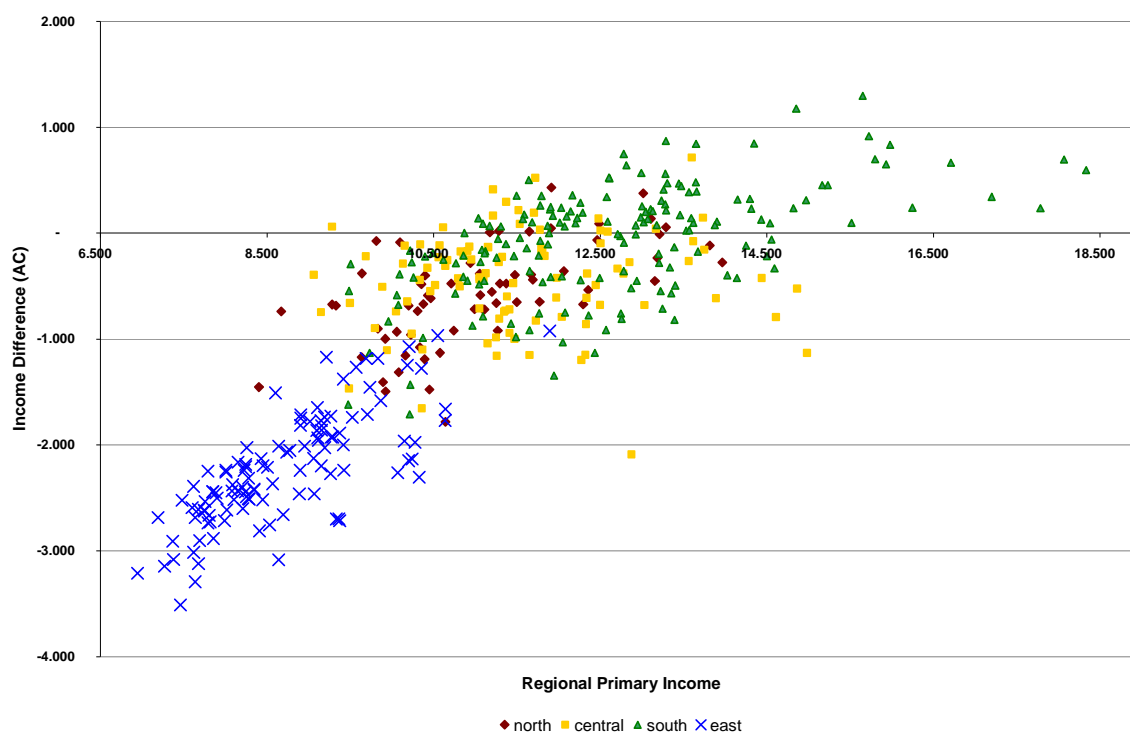
In total there should be no difference between the income before (A) and after social insurance (C) at federal level. The difference in table 6 is explained by parts of social insurance which are financed from taxes (not included in B1) and expenditure other than benefits (not included in B2) being disregarded. 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, we underestimate the regional budget incidence for the pension and unemployment insurance. We assume that taking into account the regional contributions to total national tax revenues would not change our results.

Although there should be no effect of social insurance at federal level because of the balanced budget, there is an effect at regional level. Figure 3 shows the difference between regional incomes A and C per inhabitant for the 439 administrative units. The general structure follows the expected correlation. Regions with higher primary income per inhabitant show a higher

⁹ Note that the income variable measured is not equal to the disposable income because we do not consider capital income, taxes or other social payments besides social insurance such as housing benefits.

and positive difference between our two income variables. While the variance of primary income per inhabitant seems wide 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 central regions looks similar. Most regions in the south have a positive income difference and a high primary income. 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. Figure 3 also shows that the eastern regions are predominantly distinct from the western regions; all of them have negative income differences and low primary incomes. This means that the regional income per inhabitant is higher after the redistribution process of pension and unemployment insurance. With regard to the economic disparities and the discussion about the 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.

Figure 3: Average difference between regional primary income (A) and income after social insurance (C) in € per inhabitant 2003



Source: Employment and unemployment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001, statutory pension scheme 2003; authors' calculations.

Table 7 compares the Gini coefficients of regional primary income per inhabitant (see section 4.2) and income after social insurance per inhabitant for our four regional groups. For all four groups we find a noticeable reduction of the Gini index. The reduction is highest for eastern Germany and lowest for the southern part of western Germany. The results confirm our

findings for the distribution of primary income but at a lower level. Income inequalities are still stronger in the southern part of western Germany and lowest in eastern Germany.

Table 7: Decompositions of mean income per inhabitant for regional groups

Regional group	Primary income (A)		Income after social insurance (C)					
	Gini coefficient (per cent)		1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0.5}	1000 A ₁	1000 A ₂
Germany	10.4	6.2	5.99	6.15	6.37	3.03	5.97	11.61
Eastern Germany	5.9	3.1	1.57	1.59	1.62	0.79	1.57	3.08
Northern western	6.1	4.7	3.64	3.64	3.65	1.82	3.63	7.26
Central western Germany	6.1	5.0	4.06	4.10	4.16	2.04	4.06	8.03
Southern western	7.3	6.3	6.38	6.49	6.65	3.21	6.36	12.46

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001, statutory pension scheme 2003; authors' calculations.

Inequality within and between the groups is also lower for our new income variable, especially at the bottom of the income distribution. Table 8 shows that the reduction of inequality is mainly driven by the reduction of between-group inequality. In contrast to the results for the primary income, the within-group inequality is now greater than the between-group inequality. Transfers from the prospering regions in the south lead to a higher income level in the east. The average income C increases by about 22 per cent compared to primary income in the east, while the average income C of the southern part of western Germany decreases slightly by about 1 per cent. Within the regions the redistributive effect is smaller. The result for the indirect regional transfer system is in line with the regional structure of direct financial support, suggesting that the financing of payments is regionally concentrated in Germany's prospering southern regions.

Table 8: Decompositions of income after pension and unemployment insurance (C) (Groups: eastern Germany, northern western Germany, central western Germany, southern western Germany)

Regional groups	1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0.5}	1000 A ₁	1000 A ₂
Aggregate inequality	5.99	6.15	6.37	3.03	5.97	11.61
Within-group inequality	4.23	4.41	4.62	2.19	4.34	8.53
Between-group inequality	1.76	1.74	1.73	0.85	1.64	3.10

Source: Employment and unemployment statistics of the Federal Employment Agency 2003, national income tax statistics of the Federal Statistical Office 2001, statutory pension scheme 2003; authors' calculations.

5. Summary and conclusion

In this paper we have examined the effects of the federal unemployment and pension insurance on regional income inequalities in Germany. In a first step we analysed the regional distribution of the wages of employees and the self-employed. Furthermore we estimated the redistribution by comparing regional income before and after activities of the federal social insurance.

For earned income, which is the most important regional income source, our 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 the highest regional income inequalities also exist there. Furthermore, income earned by the self-employed is more unequally distributed than wages earned by employees. 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, we found that when differentiating between three regional groups in western Germany wages are even less unequally distributed in central western Germany than in eastern Germany. Another remarkable result is that the inequality of wages is dominated by between-group inequality. With regard to the considerable financial support to enhance economic growth in eastern Germany and the still large income disparities, the question about the efficiency of these transfers arises.

The redistributive effect of the welfare state at regional level is usually analysed for the entire social insurance and the tax and transfer systems. In our analysis we wanted to look at the redistributive effect of unemployment and pension insurance. We selected these two systems not only because of their financial importance in relation to total social expenditure, but also because of their stabilising effect. In a further step we estimated the regional budget incidence of these two social systems. The results confirm our hypotheses about the regional stabilising effects of expenditure and contributions. The effect was stronger for unemployment insurance, but we still find regional patterns in the distribution of state pension payments. After adding unemployment benefits and pension payments and deducting contributions to social insurance from the primary income we obtain the regional income after social insurance per inhabitant. We were able to illustrate that inequality was reduced substantially, with the largest reduction in eastern Germany and the lowest in the southern part of western Germany. Another result is that within-group and between-group inequalities are lower for income after social insurance.

Due to high unemployment rates the welfare state has come under pressure in Germany during recent years, as it has in other European states. In 2004 and 2005 significant reforms in the welfare system were implemented which also affected parts of social insurance.

Our results show that changing parameters of eligibility, claims and financing will directly influence the spatial income distribution. On the other hand, despite the recent upturn in the economy, economic differences between the regions, especially between eastern and western Germany, will remain. In this context further research based on data for 2005 and later years will show whether the stabilising function of social insurance has improved or not.

6. Annex

Figure A 1: German states and regional groups

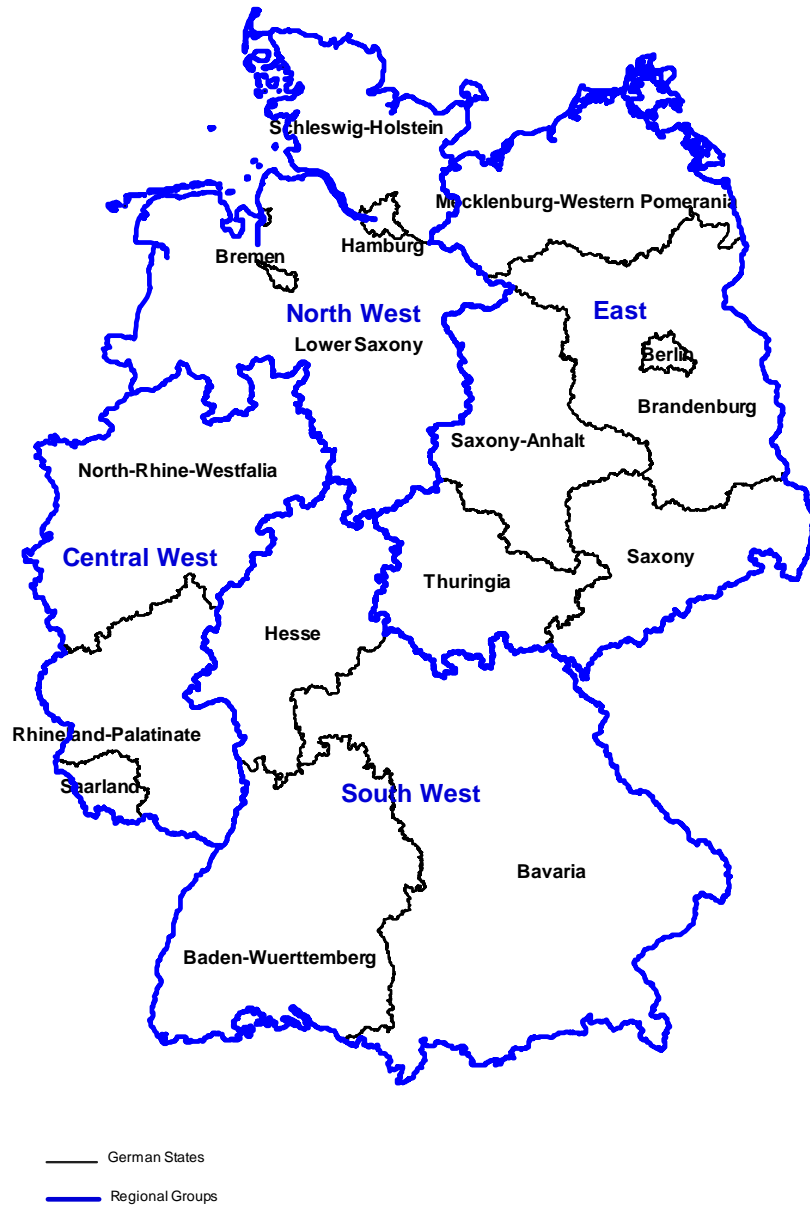


Table A 1: Decompositions of wages per employee for western and eastern Germany

Region	Gini coefficient per cent	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
Within-group inequality		4.40	4.57	4.83	2.27	4.50	8.86
Between-group inequality		8.65	8.19	7.78	4.18	8.51	17.61

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

Table A 2: Decompositions of wages per employee for regional groups

Regional group	Gini coefficient per cent	1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0,5}	1000 A ₁	1000 A ₂
Eastern Germany	4.3	2.95	2.96	2.98	1.48	2.94	5.85
Northern western Germany	5.3	4.42	4.49	4.59	2.23	4.41	8.66
Central western Germany	4.1	2.72	2.72	2.72	1.36	2.71	5.42
Southern western Germany	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

Table A 3: Decompositions of wages per self-employed person for western and eastern Germany

Region	Gini coefficient per cent	1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0,5}	1000 A ₁	1000 A ₂
Germany	14.82	34.16	34.04	34.94	16.92	33.59	65.78
Eastern Germany	5.31	4.57	4.66	4.78	2.31	4.56	8.93
Western Germany	11.58	18.99	19.37	20.12	9.54	18.81	36.50
Within-group inequality		15.28	16.73	18.85	8.25	16.26	31.56
Between-group inequality		18.89	17.31	16.02	8.75	17.62	35.34

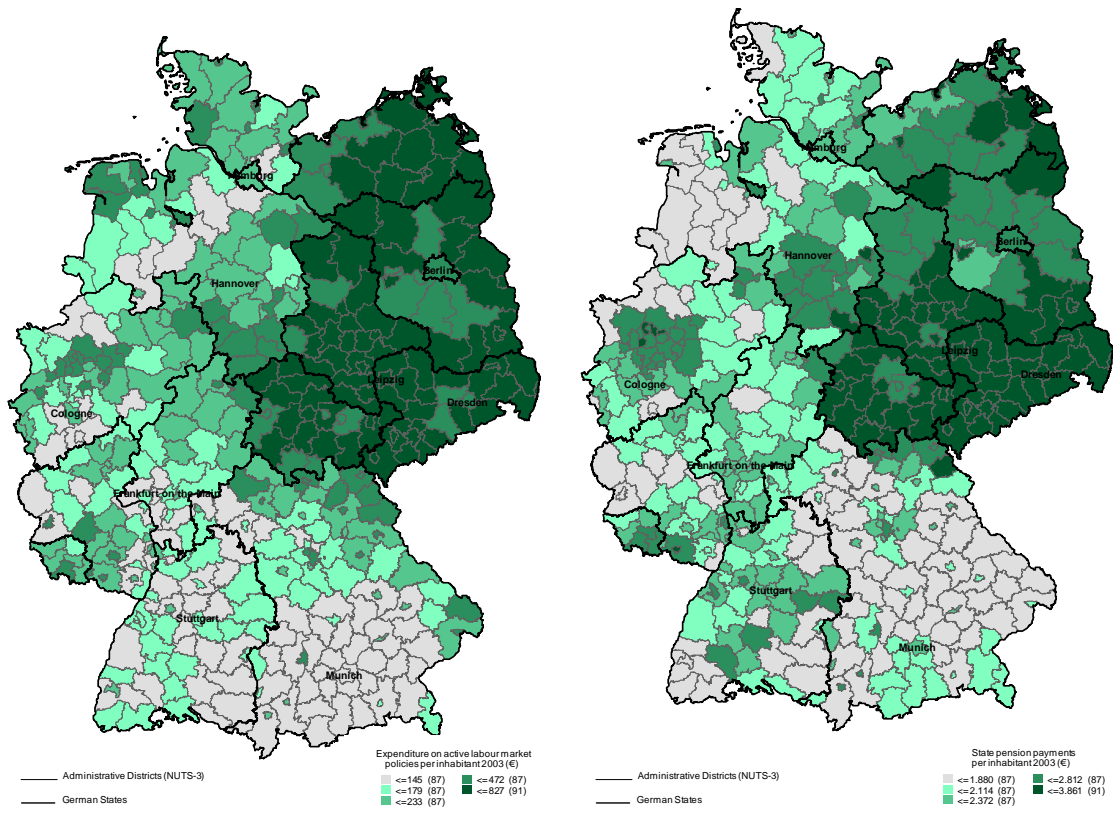
Source: National income tax statistics of the Federal Statistical Office 2001; authors' calculations

Table A 4: Decompositions of wages per self-employed person for regional groups

Regional group	Gini coefficient per cent	1000 I ₀	1000 I ₁	1000 I ₂	1000 A _{0,5}	1000 A ₁	1000 A ₂
Eastern Germany	5.31	4.57	4.66	4.78	2.31	4.56	8.93
Northern western Germany	9.54	14.47	14.29	14.30	7.16	14.37	28.88
Central western Germany	10.16	15.82	15.91	16.18	7.90	15.69	30.84
Southern western Germany	11.79	21.61	22.19	23.23	10.89	21.38	41.09
Within-group inequality		14.92	16.34	18.41	8.07	15.93	31.01
Between-group inequality		19.25	17.70	16.45	8.92	17.94	35.89

Source: National income tax statistics of the Federal Statistical Office 2001; authors' calculations

Figure 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

7. References

- Atkinson, A. B. (1970). On the Measurement of Inequality. *Journal of Economic Theory* 2, 244-263.
- Bach, S., Corneo, G. and Steiner, V. (2007). No Rise in Income Inequality? A Reappraisal of the German Income Distribution 1992 - 2001. *DIW Discussion Paper* March 2007.
- Becker, I. (2003). Income Redistribution: Tax-Financed Versus Contribution-Financed Components. In *Reporting on Income Distribution and Poverty. Perspectives from a German and a European Point of View.*(Ed., Hauser, R. B., Irene). Berlin: Springer, 29-54.
- Becker, I. and Hauser, R. (2003). *Anatomie der Einkommensverteilung*. Berlin: edition sigma.
- Biewen, M. (2005). The Covariance Structure of East and West German Incomes and its Implications for the Persistence of Poverty and Inequality. *German Economic Review* 6, 445-469.
- Binder, J. and Schwengler, B. (2006). Korrekturverfahren zur Berechnung über der Beitragsbemessungsgrenze. *IAB Discussion Paper* 4, 28.
- Blien, U. and Hirschenauer, F. (2006). Formula allocation: The regional allocation of budgetary funds for measures of active labour market policy in Germany. *Economics Bulletin* 18, 1-10.
- BMVBS (Bundesministerium für Verkehr, Bau und Stadtentwicklung (2007): Jahresbericht der Bundesregierung zum Stand der Deutschen Einheit 2007, 159.
- Brakman, S., Garretsen, H. and Schramm, M. (2004). The spatial distribution of wages - estimating the Helpman-Hanson Model for Germany. *Journal of Regional Science* 44, 437-466.
- Brenke, K. (2006). Zunehmende regionale Einkommensunterschiede in Deutschland, aber starke Ausgleichswirkungen durch Pendlereinkommen und Sozialtransfers. *DIW-Wochenbericht* 73, 141-150.
- Colavecchio, R., Curran, D. and Funke, M. (2005). Drifting Together or Falling Apart? The Empirics of Regional Economic Growth in Post-Unification Germany. *CESIFO Working Paper*, 24.
- Dickey, H. (2007). Regional Earnings Inequality in Great Britain: Evidence from Quantile Regressions. *Journal of Regional Science* 47, 775-806.
- Fatás, A. (1998). Does EMU need a fiscal federation? *Economic Policy* 13, 165-203.
- Frick, J. R. and Goebel, J. (2008). Regional Income Stratification in Unified Germany Using a Gini Decomposition Approach. *Regional Studies* 42.4, 555-577.
- Gatzweiler, H.-P. and Milbert, A. (2003). Regionale Einkommensunterschiede in Deutschland. *Informationen zur Raumentwicklung*, 125-145.
- Gernandt, J. and Pfeiffer, F. (2007). Rising Wage Inequality in Germany. *SOEPpapers on Multidisciplinary Panel Data Research* 14, 23.
- Jenkins, S. P. (1995). Accounting for Inequality Trends: Decomposition Analyses for the UK, 1971-86. *Economica* 62, 29-63.

- Jensen-Butler, C. and Madsen, B. (2005). Decomposition analysis: an extended theoretical foundation and its application to the study of regional income growth in Denmark. *Environment and Planning A* 37, 2189-2208.
- Kosfeld, R., Eckey, H.-F. and Lauridsen, J. (2007). Disparities in Prices and Income Across German NUTS 3 Regions. *Volkswirtschaftliche Diskussionsbeiträge der Universität Kassel*, 33.
- Kurz, C. (2002). *Regionale Arbeitslosigkeit, Risikoausgleich und staatliche Transfersysteme: Theoretische Überlegungen und empirische Evidenz*. Aachen: Shaker Verlag.
- OECD (2007). *Revenue Statistics 1965-2006*.
- Rice, P., Venables, A. J. and Patacchini, E. (2006). Spatial determinants of productivity: Analysis for the regions of Great Britain. *Regional Science and Urban Economics* 36, 727-752.
- Schwarze, J. (1996). How income inequality changed in Germany following reunification: An empirical analysis using decomposable inequality measures. *Review of Income and Wealth* 42, 1-11.
- Shorrocks, A. F. (1980). The Class of Additively Decomposable Inequality Measures. *Econometrica* 48, 613-625.
- Statistisches Bundesamt (2006). *Datenreport 2006. Zahlen und Fakten über die Bundesrepublik Deutschland*. Bonn.