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# Explaining Rising Income Inequality in Germany, 1991-2010

Kai Daniel Schmid and Ulrike Stein

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# Explaining Rising Income Inequality in Germany, 1991-2010

Kai Daniel Schmid<sup>1</sup> and Ulrike Stein<sup>2</sup>

September, 2013

## *Abstract:*

In Germany, inequality of net equivalized income increased noticeably in the first half of the new millennium. We aim to identify the main drivers of this rise in income inequality since the early 1990s. We provide a broad overview of the circumstances under which inequality evolved, i.e. which changes in the German economy are most likely to provide an explanation for changes in income concentration. To explain the development of the distribution of net equivalized income we analyze changes in the distribution of market income as well as shifts in the effectiveness of public redistribution mechanisms. We find that cyclical and structural changes in the labor market, the increasing relevance of capital income as well as the decreasing effectiveness of the public mechanisms of income redistribution are the main explanatory factors for the development of income inequality. In addition to this, we discuss several issues that are of high relevance for the distribution of economic resources but are not directly covered in the analysis of net equivalized income. Most significantly, the design of the tax and social security contributions burden as well as the rising relevance of value-added taxes have exhibited negative redistributive effects for low income households.

*Keywords:* Income Inequality, Redistribution, SOEP

*JEL-code:* D31, I30, J30

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# *1 Motivation*

Since the 1980s many industrialized economies have experienced increasing income inequality (see, e.g., OECD 2008 and OECD 2011). While the increase in income concentration as such has been an obvious trend, the actual extent and timing have varied between countries. This rise in income inequality has also been observed for the German economy.<sup>3</sup> Inequality increased noticeably in the aftermath of German reunification as well as at the beginning of the new millennium (see Biewen and Juashz 2011, Fuchs-Schündeln et al. 2009 and IAW 2011).

The distribution of economic resources in general and income inequality in particular are central topics of political economy and reflect major aspects of social justice. Therefore, the explanation of changes in income distribution is a crucial issue for economic policy. Increasing income inequality poses a potential threat not only to social coherence and the acceptability of market-based economic policies. It also potentially causes destabilizing economic mechanisms, as decreasing income shares at the lower end of the income distribution may lead to rising indebtedness and age-related poverty in the long run. Such consequences not only reduce the social welfare of a country but may also necessitate costly intervention policies in the future, i.e. stabilizing income distribution in the medium to long run.

To explain the driving forces of increasing income inequality in developed countries, economic literature has come up with a number of potential mechanisms with a strong focus on trends in the distribution of labor income (see, for example Biewen and Juashz 2011 as well as Fitzenberger 2012). More generally, changes in inequality of net equivalized income, which constitutes the secondary distribution of income and is the standard income measure underlying analyses of poverty, can be explained by analyzing two major complexes: First, shifts in the distribution of market income, which constitutes the primary distribution of income and is driven primarily by changes in the distribution of individual labor income. And, second, the design and effectiveness of the economy's tax and public transfer system.

The goal of this study is to shed light on the main explanatory factors for the rise in income inequality in Germany since the early 1990s. In other words, we seek to better understand the changes in the distribution of net equivalized income. To this end, our analysis not only documents different facets of the evolution of income inequality but provides a broad overview of the circumstances under which inequality evolved, i.e. which changes in the economy are most likely to provide an explanation for changes in the concentration of income. We take into account information available for the reunified German economy, and focus on the period from 1991 to 2010.

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<sup>3</sup> For a detailed description of the development with regard to the distribution of net equivalized income see *section 3* of this study.

The remainder of this study is structured as follows: *Section 2* introduces the data and our analytical perspective underlying the analysis. *Section 3* documents the timing and the extent of the increases in inequality of net equivalized income in Germany from 1991 to 2010. In *sections 4* and *5* we assess the explanatory factors for changes in the distribution of net equivalized income. We proceed in two steps: First, *section 4* examines the development of the concentration of market equivalized income and its major driving forces. Second, in *section 5* we analyze the impact of the tax and public transfer system on the distribution of net equivalized income, in other words, here, we consider the transposition of the primary distribution of income into the secondary distribution of income. *Section 6* relates our findings to a number of special inequality issues including the development of poverty and the effectiveness of public transfers and taxes across income distribution. Finally, *section 7* summarizes our results and concludes.

## 2 *Data and Methodology*

This section describes the data underlying our analysis (*subsection 2.1*), explains the concept of equivalized income (*subsection 2.2*), introduces the applied measures of income inequality (*subsection 2.3*) and explains our analytical perspective (*subsection 2.4*).

### 2.1 *Data*

The evaluation of income distribution in this study is based on data from the German Socio-Economic Panel (SOEP) provided by the German Institute for Economic Research (DIW Berlin). The SOEP is a representative longitudinal study of private households conducted via fieldwork by TNS Infratest Sozialforschung, providing information on German households and its members. The first wave of the SOEP was conducted in 1984, starting with households in West Germany. Due to reunification, the sample was increased to include households in East Germany in 1990. The questionnaire is repeated annually with the same households (see Wagner et al. 2007). In the latest available wave (no. 28) for the year 2011, more than 12,000 households with more than 21,000 persons were interviewed (see Bohlender et al. 2012).

The SOEP provides information on different income sources, some on the personal level, others on the household level. From these, household market income and household net income can be computed. Household market income comprises labor earnings (wages, salaries and income from self-employment), asset income and income from occupational and private pensions. Following international standards, a value for imputed rent is also considered to take into account the opportunity costs for owner-occupied housing (see Fräβdorf et al. 2008 and Frick and Krell 2009). Adding public and private transfers and social security pensions to, and subtracting income and social security taxes from household market income yields household net income. In the following analysis the period starting with German reunification in 1991 up to 2010 is considered. Given that much information on



income in the sample is collected retrospectively, that is, it refers to the previous calendar year, more up-to-date information on household income is not available. All incomes presented in this study are real incomes. To calculate real income, nominal income is deflated by the CPI (consumer price index) with the base year being 2010. Throughout the analysis, cross section sampling weights are used in order to extrapolate the sample to the population.

In addition to the income information from the SOEP we use several other data sources. These comprise the German Mikrozensus and the National Account Statistics of the German Federal Statistical Office as well as data prepared and provided by the German Council of Economic Experts (GCEE), and data from the Federal Employment Agency (FEA).

## *2.2 The Concept of Equivalized Income*

Following national and international standards, we use the concept of equalized income. This concept allows for the comparability of incomes because household income is transferred into personal incomes by considering the benefits of persons living together in one household (economies of scale in housekeeping) and the fact that household members have different needs depending on their age. The concept is based on the assumption that all household members have the same access to and share in household income, and benefit equally from it. This also implies that every household member (no matter whether adult or child) gets assigned the same equivalence income. Technically, equivalized income is derived from household income by dividing the latter by an equivalence scale. Following general practice, we apply the modified OCED-equivalence scale for the transformation. This scale assigns a value of 1 to the first adult in the household, a value of 0.5 to further household members aged at least 14 years and a value of 0.3 for any younger child.

## *2.3 Inequality Measures*

There is a variety of different indices to measure inequality.<sup>4</sup> The most common one is the Gini coefficient which takes values between 0 and 1. A Gini coefficient of 0 represents a perfectly equal society in which everybody has the same income. A value of 1 represents perfect inequality with one person having all of the income. One drawback of the Gini coefficient is that it is particularly sensitive to inequality changes in the middle of the income distribution. Another weakness is that it can have the same numerical value for different distributions.

To overcome these drawbacks, we also consider other inequality measures, for instance the mean logarithmic deviation (MLD), the Theil index and the relative mean deviation (RMD). While the Gini coefficient and the RMD are both mean-normalized measures taking values between 0 and 1, for the other indices there is no such upper limit. The MLD and the Theil index are both special cases of the

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<sup>4</sup> In our analysis we apply standard measures to assess the evolution of income inequality, see, for example Bach et al. (2009), Cowell (2008) and IAW (2011).

class of general entropy indices and are sensitive to income changes at the bottom of the income distribution. The MLD is even more sensitive to these changes than the Theil index. One advantage of these indices is that they can be decomposed, allowing to distinguish between inequality resulting from inequality within subgroups and inequality among subgroups.

In addition to these measures, there are other inequality indicators such as decile ratios. These illustrate the income gap of different individuals in the income distribution. For instance, the decile ratio P90/P10 indicates by how much the income of the person earning 90 percent of the highest income exceeds the income of the person earning 10 percent of the highest income. Analogously, the decile ratio P90/P50 expresses by how much the income of the person at the upper bound value of the ninth decile exceeds the median income. In our analysis we use the P50/P10, the P90/P10 and the P90/P50 decile ratios.

One major drawback of the aggregated inequality indicators described above is that changes in the income distribution lead to changes in the values of these measures, but one cannot clearly assess the magnitude and/or the area of occurrence within the income distribution (lower, middle or upper part) of a relative income shock. Such a differentiation, however, is important for understanding the development and the causes of income inequality. Especially in the the analysis of income poverty risk, the economic well-being of households or persons in the lower part of the income distribution is relevant. To get a more precise picture of relative income changes across the whole income distribution, we therefore compare different aggregated inequality measures and consider the development of income shares of different groups within the income distribution.

#### *2.4 Analytical Concept of the Study*

As mentioned above, the discussion of income inequality primarily refers to the distribution of net equivalized income. Understanding changes in the distribution of net equivalized income requires considering two dimensions: First, changes in the distribution of market income and second, changes in the redistribution of market income via taxes and public transfers. These two dimensions specify the basic structure of our analysis. *Table 2.1* summarizes this perspective.

The central column illustrates that changes in the distribution of market income are primarily driven by changes in the distribution of labor and capital income. While differences in households' labor incomes are due to the levels of occupational activities within the households and the respective compensations, which themselves are determined by the qualification and experience of workers as well as by the branch-specific pay, capital income primarily results from the level of household wealth. Changes in the distribution of market equivalized income are therefore determined by changes in the level of job occupation in the household and, to a lesser extent, also by changes in household capital income.

Table 2.1 *Determinants of Income Inequality and Explanatory Factors of Changes in the Income Distribution*

	<b>Market Equivalized Income</b>	<b>Net Equivalized Income</b>
<b>Definition</b>	<b>Market income =</b> labor income + asset income + private and occupational pensions + imputed rent	<b>Net income =</b> market income + public and private transfers + public pensions - income taxes - social security contributions
<b>Inequality level</b>	Households differ with respect to household structure (number of persons, age) and with respect to the level of ...  <b>Labor Income, depending on:</b> <ul style="list-style-type: none"> <li>• amount of job occupations in the household</li> <li>• job-/branch-/region-/qualification-specific pay</li> </ul> <b>Capital Income, depending on:</b> <ul style="list-style-type: none"> <li>• level of wealth stock</li> <li>• (past) income and saving behavior</li> </ul>	<ul style="list-style-type: none"> <li>• the level of inequality in net income results from the modification of market income inequality through taxes and transfers</li> </ul>
<b>Inequality changes</b>	<ul style="list-style-type: none"> <li>• particularly explainable by changes in the amount of job occupation within the household and changes in pay</li> </ul>	<ul style="list-style-type: none"> <li>• changes in the distribution of market income</li> <li>• effectiveness of redistribution</li> </ul>

The level of net equivalized income results from the level of market income and is modified by taxes and transfer payments as has been described in *section 2.1*. The righthand column in *table 2.1* shows that changes in the distribution of net equivalized income stem from developments in the driving forces of market income and from the effectiveness of redistributive mechanisms.

### 3 *Inequality of Net Equivalized Income*

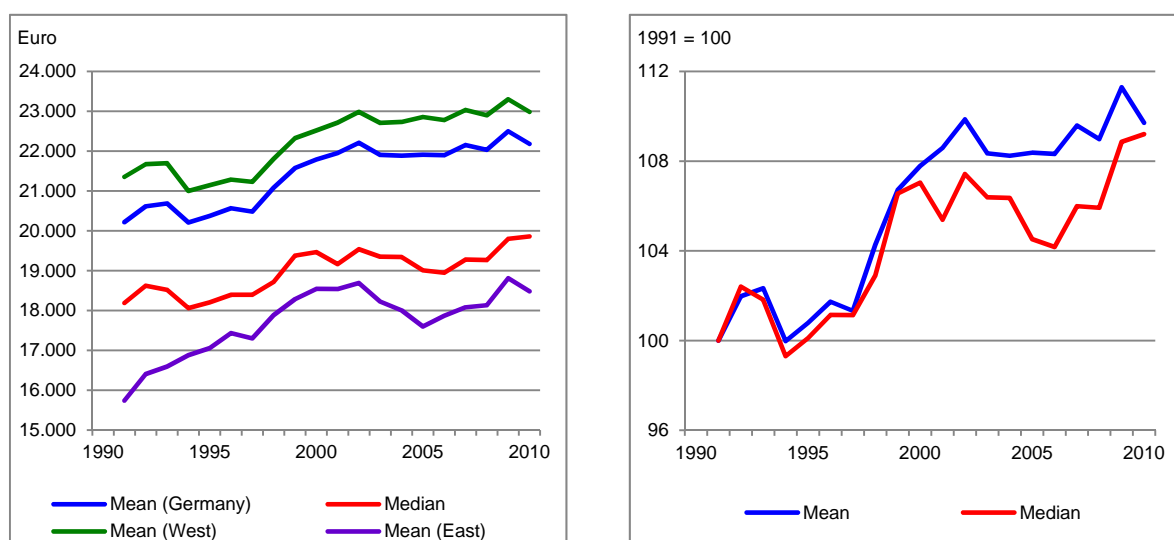
This section examines the development of the distribution of net equivalized income. First, we illustrate the evolution of average net income (*subsection 3.1*). Second, we address changes in the income concentration based on aggregate inequality measures (*subsection 3.2*). *Subsection 3.2.1* focusses on aggregated concentration measures. Decile ratios and income shares are analyzed in *subsections 3.2.2* and *3.2.3*.

#### 3.1 *Development of Real Net Equivalized Income*

In *figure 3.1*, the development of mean net equivalized income is plotted. Three different phases can be distinguished. In the first one, from German reunification until 1997, and in the third phase, between 2002 and 2010, average incomes stagnated. Only in the period between 1997 and 2002 we see a rise in annual average net equivalized income. While the development of mean income in West Germany resembled the all-German development, average income in East Germany showed a

different pattern. After reunification until 2002, net equivalized income rose significantly. Subsequently average income followed a U-shape development with the lowest value recorded in 2005. There is a remarkably persistent difference in the levels of mean incomes between East and West Germany. Average net equivalized income in East Germany is only about 80 percent of mean income in West Germany, and we do not observe any convergence.

Figure 3.1 Mean and Median Real Net Equivalized Income, 1991-2010



Note: This figure illustrates the development of mean and median net equivalized income in Germany from 1991-2010. The left panel shows the development of average income. The right panel contrasts the relative development of mean and median income as an index (1991=100). Average income is calculated in 2010 prices.

Source: SOEPmonitor, DIW and own calculations.

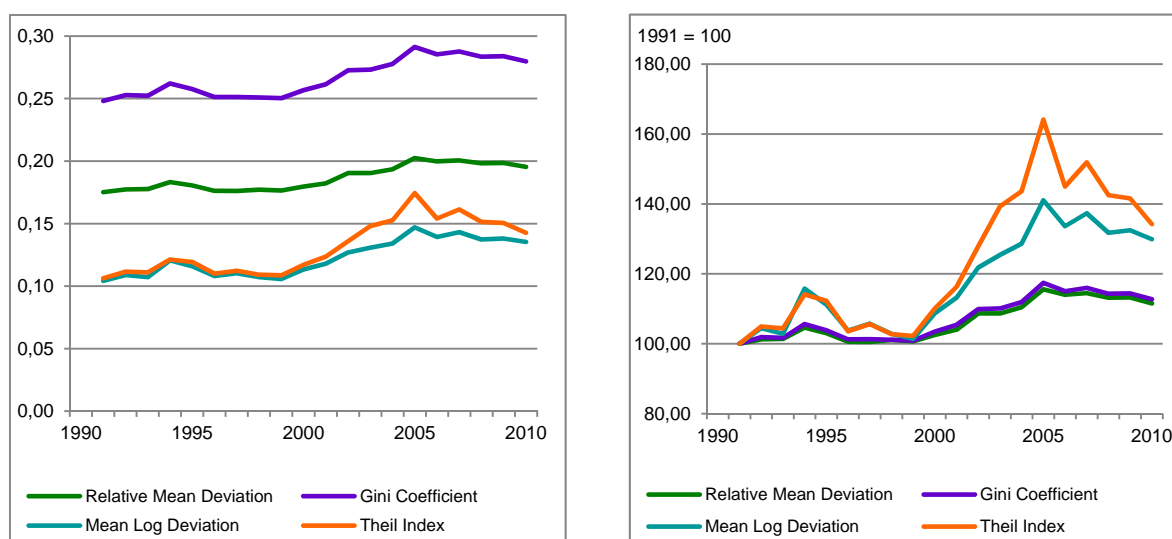
Given that the distribution of income data is usually skewed to the right, median income rather than mean income represents the income situation more accurately. Median net equivalized income is represented by the red line in *figure 3.1*. It can be seen that the level of median income is much lower than mean income. This mirrors the fact that German income data is strongly skewed with many incomes concentrated at the bottom of the income distribution. The comparison of the two incomes reveals that while between 1991 and 1999 mean and median net equivalized income run parallel, from 2000 onwards the development of each has decoupled. Whereas mean income kept rising until 2002 and stagnated thereafter, median income stagnated until 2002 followed by a drop until 2006. During the crisis both measures increased. According to the relative evolution of mean and median income over the last decade, income inequality has increased until 2006 and decreased slightly thereafter with a significant drop in 2010. To get a better overview of income inequality, a number of concentration measures are analyzed in the next section.

## 3.2 Development of Net Equivalized Income Concentration

### 3.2.1 Aggregated Inequality Indicators

In the following, we consider the different inequality measures introduced in *subsection 2.3*. The developments of the aggregated indices are illustrated in *figure 3.2*. All these measures support the overall picture observed from comparing mean to median income: Income inequality is much higher in 2010 than in 1991. After inequality of net equivalized income remained fairly stable over the 1990s, it increased significantly thereafter. Most of the increase in inequality took place in the period between 2000 and 2005 (see *table 3.1*). After that, inequality has not increased further. There even seems to have been a small decrease in income inequality from 2005 onwards. Although inequality has not risen further since 2006, a decline in income inequality, as suggested by the evolution of some of the measures presented in *figure 3.2*, is not clear. Specifically, Wagner (2012) points out that given the high data uncertainty in such household surveys, the development in recent years cannot be classified as a statistically significant decrease. Moreover, IAB (2013) also emphasizes that in survey data particularly small and high incomes are usually underrepresented and therefore small changes of inequality measures might not be representative.

*Figure 3.2* Aggregated Concentration Indices of Net Equivalized Income, 1991-2010



*Note:* This figure illustrates various aggregated concentration measures for net equivalized income in Germany from 1991-2010. On the left, the absolute development of the indices is plotted, while on the right a relative representation is shown.

*Source:* SOEP, own calculations.

As mentioned above, the various indicators presented in *figure 3.2* differ because they react differently to income changes in different parts of the distribution. Some are more sensitive to changes at the bottom of the income distribution, others react stronger to changes at the middle or the top of the distribution. According to the Gini coefficient, inequality in Germany increased by 13.4 percent in the

period from 2000 to 2005 and it seems that it fell slightly (about 2 percent) until 2010.<sup>5</sup> From 1991 to 2010 the Gini coefficient rose by 12.7 percent. The changes of the RMD are comparable to the development of the Gini coefficient.

Much higher inequality increases are detected by the closely related Theil index and the MLD (see *subsection 2.3*). Starting in 1991 until 1999, variations in the Theil index and the MLD were very similar. During this time span, incomes in general did not increase much (real median income less than 4 percent) and incomes in different parts of the income distribution developed rather similarly (see also *figure 3.4*), leaving income concentration stable. From 1999 until 2010 the Theil index showed much larger variation than the MLD. In particular the steep increase between 1999 and 2005 reflects the fact that incomes at the top rose and incomes at the bottom fell. Given that the MLD is very sensitive to changes at the bottom of the income distribution, the increase highlights the rising inequality at this end of the income distribution, caused by the fall of low incomes. In addition to these changes at the bottom of the income distribution, the even steeper increase of the Theil index reflects increasing inequality caused by changes at the top of the income distribution. The income changes at both extremes of the distribution will be addressed more explicitly in the following subsection by considering decile ratios.

### 3.2.2 Decile Ratios of the Distribution of Net Equivalized Income

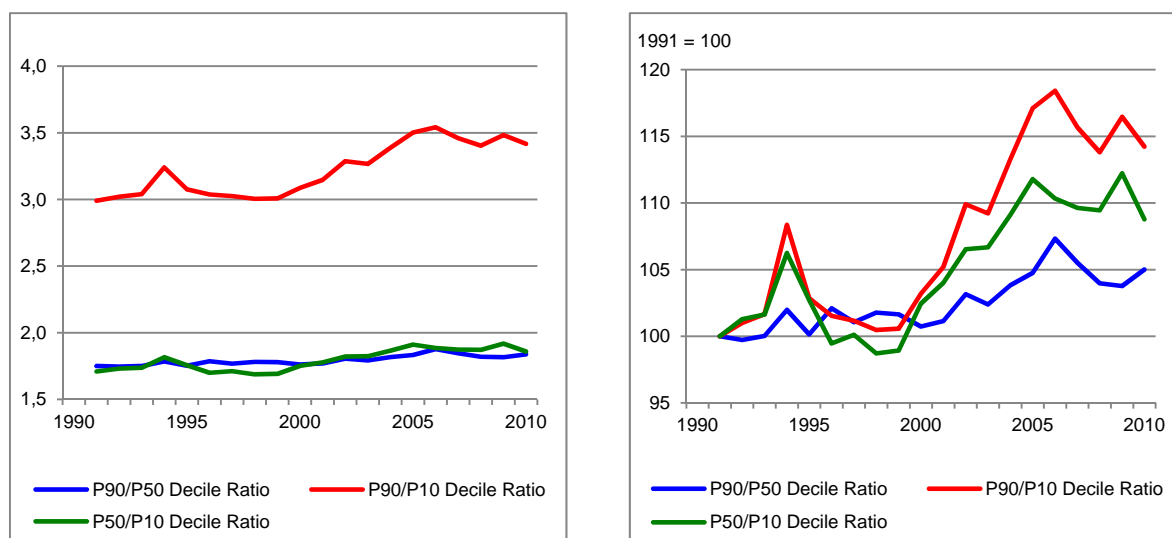
In *figure 3.3* the most common decile ratios (P90/P10, P90/P50, P50/P10) are plotted. Apart from one outlier in 1994, the income distribution remained fairly stable during the period from 1991 until 1999. In contrast, the situation in the years between 2000 and 2006 was very different. Not only did the decile ratio P90/P50 increase, but also the decile ratio P50/P10. Hence, incomes on both sides of the income distribution became more unequal.

In order to better understand this development, the corresponding income deciles (P10, P50, P90) are presented in *figure 3.4*. The developments in median income are most surprising: Despite an increasing decile ratio P50/P10, median income has fallen slightly between 2000 and 2006. Hence, the explanation is that incomes around the lowest decile have fallen even more than median income. In stark contrast to this are the developments around the ninth income decile. These incomes experienced a sharp increase. From 2006 onwards no further increase in income inequality is observable. Incomes around the ninth decile remained fairly constant and medium income as well as incomes around the first decile increased slightly, leading to small decreases in the decile ratios.

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<sup>5</sup> Note that this is not the case in East Germany though. Here, inequality increased until 2005 and there is no reduction in inequality between 2005 and 2010 (see Grabka et al. 2012).

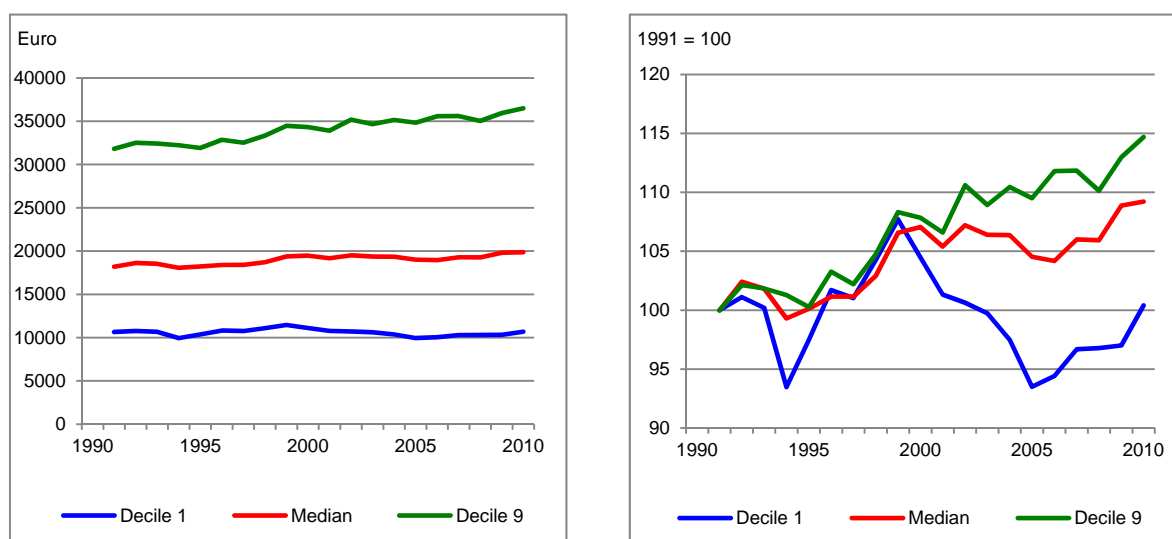
Figure 3.3 Decile Ratios of Net Equivalized Income, 1991-2010



Note: The left panel of this figure illustrates the development of the P90/P10, the P90/P50 and the P50/P10 decile ratios of the distribution of net equivalized income in Germany from 1991-2010. The right panel adds the relative evolution of the three series through an index representation (1991=100).

Source: SOEP, own calculations.

Figure 3.4 Different Income Deciles of Net Equivalized Income, 1991-2010



Note: This figure illustrates the evolution of the first, fifth and ninth decile of net equivalized income in Germany from 1991-2010. Deciles are reported as real income in 2010 prices. On the right, we provide an index representation (1991=100) to highlight the relative development of the chosen deciles.

Source: SOEP, own calculations.

### 3.2.3 Income Shares of Net Equivalized Income

Another way to assess the evolution of income inequality is to consider developments in income shares of different income groups. These are summarized in the lower half of *table 3.1*. Their

development confirms that income inequality rose in the period from 1991 to 2010. We observe that while the income share of the highest decile class increased from 20.5 percent in 1991 to more than 23 percent in 2010, all the other income classes suffered relative income losses, i.e. experienced decreasing income shares. Moreover, income dispersion took place over the whole income range. The lowest income decile group lost proportionally the most with more than an 11 percent decrease, followed by the second decile group which lost nearly 8 percent. The losses in income shares of the third up to the ninth decile class lay between 4.6 percent and 0.9 percent.

*Table 3.1 Distribution of Net Equivalized Income, 1991-2010*

	Unit	1991	1996	2001	2006	2010	% change 1991-2010	% change 2001-2010	% change 2006-2010
<b>Average Real Income</b>									
Mean	Euro (2010 = 100)	20,216	20,566	21,952	21,898	22,180	9.7	1.0	1.3
Median	Euro (2010 = 100)	18,185	18,395	19,166	18,945	19,860	9.2	3.6	4.8
<b>Aggregated Inequality Measures</b>									
Relative Mean Deviation	%	0.175	0.176	0.182	0.200	0.195	11.5	7.2	-2.2
Gini coefficient		0.248	0.251	0.261	0.285	0.280	12.7	7.0	-2.0
Mean Log Deviation		0.104	0.108	0.118	0.139	0.135	29.9	14.8	-2.8
Theil index		0.106	0.110	0.124	0.154	0.143	34.2	15.4	-7.4
<b>Decile Ratios</b>									
P90/P50		1.75	1.79	1.77	1.88	1.84	5.0	3.8	-2.1
P90/P10		2.99	3.04	3.15	3.54	3.42	14.2	8.6	-3.5
P50/P10		1.71	1.70	1.78	1.89	1.86	8.8	4.6	-1.4
<b>Income Shares by Income Deciles</b>									
Decile Class 1	%	0.04	0.04	0.04	0.04	0.04	-11.2	-4.3	2.0
Decile Class 2	%	0.06	0.06	0.06	0.05	0.05	-7.8	-5.5	0.7
Decile Class 3	%	0.07	0.07	0.07	0.06	0.06	-4.6	-4.2	1.0
Decile Class 4	%	0.08	0.08	0.08	0.07	0.07	-4.0	-3.1	0.4
Decile Class 5	%	0.09	0.09	0.08	0.08	0.08	-3.1	-2.3	1.1
Decile Class 6	%	0.09	0.09	0.09	0.09	0.09	-1.8	-0.9	1.6
Decile Class 7	%	0.11	0.10	0.10	0.10	0.10	-1.9	-0.2	0.1
Decile Class 8	%	0.12	0.12	0.12	0.12	0.12	-2.0	-0.5	-0.2
Decile Class 9	%	0.14	0.14	0.14	0.14	0.14	-0.9	0.9	-0.2
Decile Class 10	%	0.21	0.21	0.22	0.23	0.23	12.4	5.6	-1.8

*This table summarizes several measures that characterize the distribution of net equivalized income in Germany from 1991-2010. The measures comprise average income, aggregated inequality indices, decile ratios and income shares of income decile groups. The percentage changes between the chosen years are reported in the three columns on the right side of the table.*

*Source: SOEP, own calculations.*

### 3.3 Summary and Outlook

The developments of inequality in net equivalized income can be summarized as follows. Regarding the development of average net equivalized income from 1991-2010 two aspects stand out: First, only between 1997 and 2001/02, a phase of rising employment (see *section 4*), did average net equivalized income increase, while it mostly stagnated otherwise. Second, mean and median net equivalized income moved parallel to each other in the first decade. During the second decade mean and median income diverged until 2005 and converged thereafter (see *subsection 3.1*).



This rise in inequality from the beginning of the second decade until 2005 is confirmed by all aggregate concentration measures (*subsection 3.2.1*). Further, these indicators reveal that the pronounced increase in income concentration from 2000 to 2005 is due to income changes in both the upper and the lower part of the income distribution. In contrast, the slowdown of the rise in inequality from 2006 onwards was solely caused by rising incomes in the lower part of the income distribution as high incomes have risen further (see *subsections 3.2.2* and *3.2.3*).

## 4 *Inequality of Market Equivalized Income*

This section discusses the development of inequality of market equivalized income and describes various economic factors that have contributed to it. Accordingly, this section is structured as follows: First, we document the development of the distribution of market equivalized income (*subsection 4.1*). Second, we discuss the most relevant explanatory factors for changes in the distribution of market equivalized income (*subsection 4.2*). We consider the macroeconomic background and demographic changes (*subsection 4.2.1*) as well as the relevance of rising capital income shares within the structure of household market income (*subsection 4.2.2*). Finally, *subsection 4.2.3* discusses the relevance for market income inequality of changes in the labor market, i.e. changes in the employment level, changes in the structure of the labor force and the phenomenon of wage dispersion.

### 4.1 *Development of the Distribution of Market Equivalized Income*

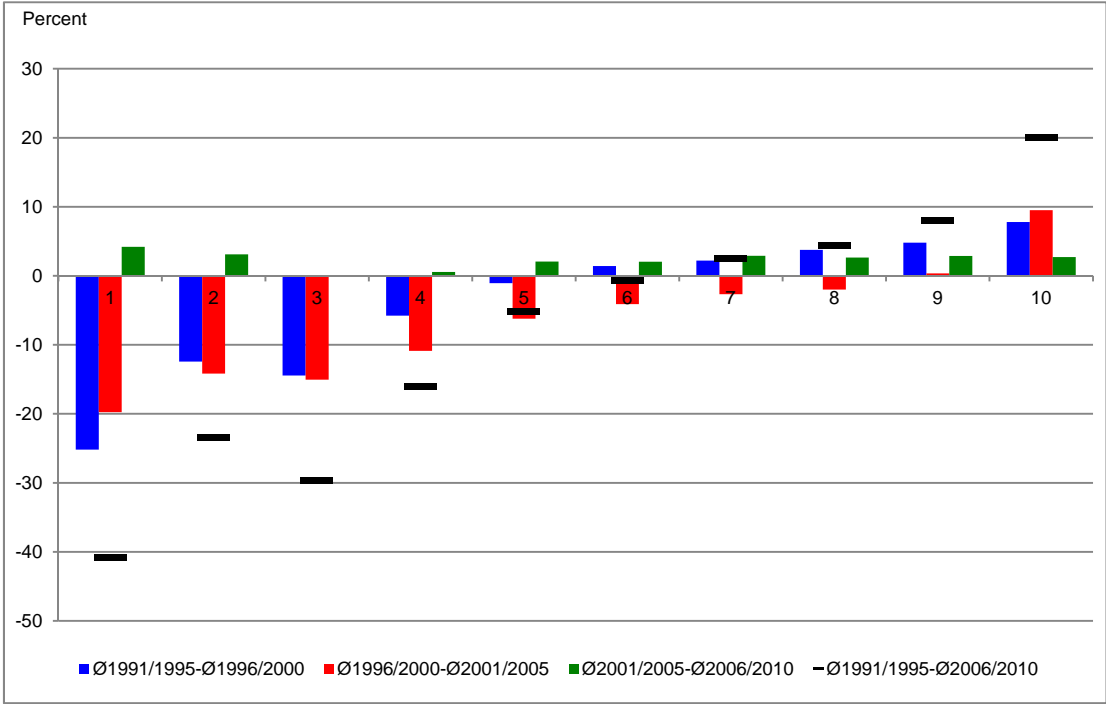
#### 4.1.1 *Development of Market Equivalized Income*

Analyzing market equivalized income is very difficult, particularly for households with small incomes because the development of market income at the lower bound of the income distribution is extremely volatile. This holds particularly for survey data. As a consequence certain measures that describe the distribution of market income, such as income shares of low income groups, some decile ratios or the mean income within low income classes, may change substantially due to the fact that either some households double or triple their market income within one year because of changes in the employment status of one household member, or simply due to normal inaccuracies in the survey responses.

To get a clear idea about the development of market income over the whole income range, we pool the income data for five-year periods and subsequently compare the averages of each five-year period over time for each income decile. This rules out erratic changes in the lower part of the income distribution and should therefore allow for a meaningful interpretation of changes in income inequality. *Figure 4.1* shows that incomes developed very differently over the whole income distribution. *Table 4.1* reports the data underlying this representation. While average income at the top of the income distribution (9th and 10th decile classes) increased in all five-year time periods, the

average incomes of the other income deciles experienced a drop in some subperiods. The blue and red bars, respectively, show that in the second period of the 1990s and the first five years of the 2000s, the bottom half of the income distribution suffered (partially very heavy) income losses. Only in the second half of the 2000s (green bar) average income also in the lower deciles (with the exception of the third decile) increased slightly.

Figure 4.1 Change of 5-year Average of Market Equivalized Income by Income Decile Groups



Note: This figure illustrates the change of 5-year average incomes between selected time periods by income decile groups. Income changes are plotted on the vertical axis in percent. Income is reported in real terms in 2010 prices.

Source: SOEP, own calculations.

The black lines show the overall change of average income between 1991 and 2010. In the second half of the 2000s, incomes in the lower half of the income distribution are between 5 percent and 40 percent lower than in the first half of the 1990s. In contrast, the average income in the highest income decile increased by 20 percent during the same period. Average income of the 7th to 9th deciles increased between 2.4 and 8 percent.

Table 4.1 Percentage Change of 5-year Average of Market Equivalized Income by Income Decile Groups

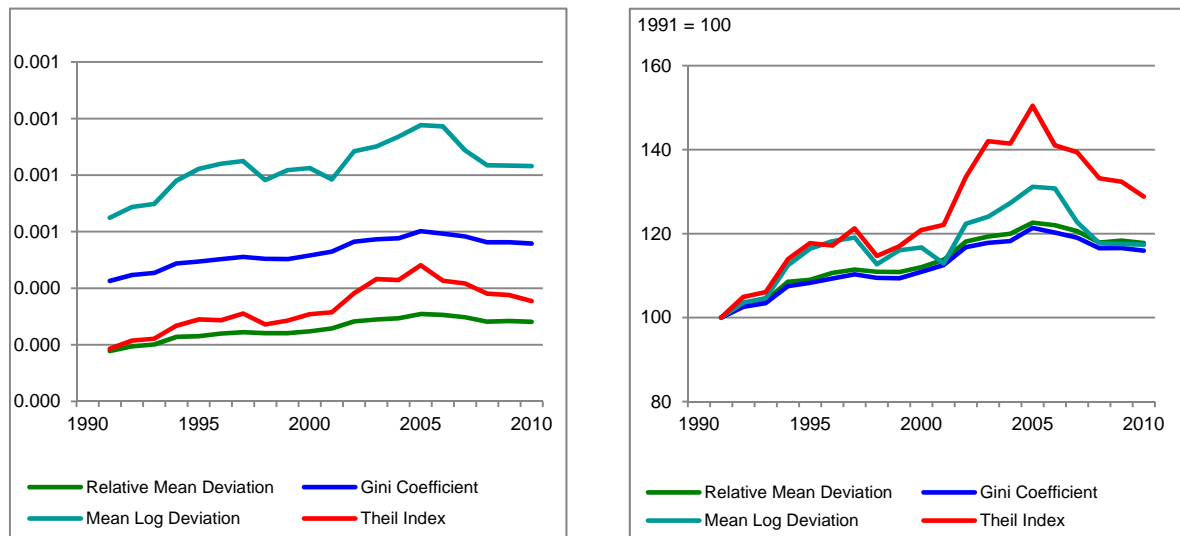
Decile Classes of Market Equivalized Income	1	2	3	4	5	6	7	8	9	10
Ø1991/1995-Ø1996/2000	-25.2	-12.4	-14.4	-5.8	-1.1	1.4	2.2	3.7	4.8	7.8
Ø1996/2000-Ø2001/2005	-19.7	-14.2	-15.1	-10.9	-6.2	-4.1	-2.7	-2.0	0.3	9.5
Ø2001/2005-Ø2006/2010	4.2	3.1	-0.2	0.6	2.1	2.0	2.9	2.7	2.9	2.7
Ø1991/1995-Ø2006/2010	-40.8	-23.5	-29.7	-16.1	-5.2	-0.7	2.4	4.4	8.0	20.0

Source: SOEP, own calculations.

#### 4.1.2 Aggregated Concentration Measures of Market Equivalized Income

As inequality of net equivalized income increased, so did inequality of market income, which is higher in 2010 than it was in 1991. This is traceable through the aggregated concentration indices. As can be seen in *figure 4.2*, since 1991 the Gini coefficient has increased by about 15.9 percent. The Theil index has risen by about 34.2 percent. However, the course of the development of inequality of market equivalized income is different from the pattern observed for net equivalized income. In contrast to the inequality indicators of net equivalized income, the corresponding indicators for market equivalized income already increased in the 1990s. Between 1998 and 2001 inequality of market equivalized income remained fairly stable, whereas inequality of net equivalized income started to increase during this period. In the following years (between 2001 and 2005) both market and net equivalized income increased strongly. However, after passing its peak in 2005, inequality of market equivalized income declined until 2010. Given the strong employment growth since 2005, it is no surprise that the inequality indicators fell because additional employment led to additional household income, particularly at the bottom of the income distribution. The decrease of the Theil index and the MLD as well as the increase in income shares of the lower decile classes since 2006 support these findings.

*Figure 4.2 Development of the Concentration of Market Equivalized Income, 1991-2010*



*Note:* This figure illustrates the development of aggregated concentration measures for market equivalized income in Germany from 1991-2010. The righthand panel shows the development in absolute terms, while the lefthand panel adds a relative representation through an index (1991=100).

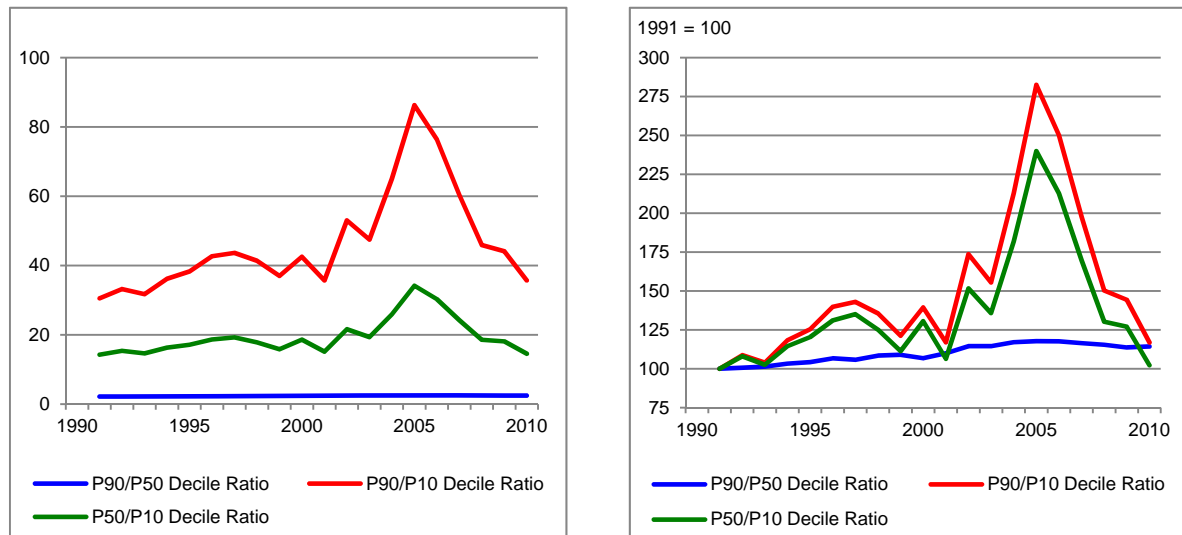
*Source:* SOEP, own calculations.

#### 4.1.3 Decile Ratios of the Distribution of Market Equivalized Income

The chosen decile ratios (illustrated in *figure 4.3*) show that compared to the pronounced movement of the P50/P10 decile ratio and the P90/P10 decile ratio, the ninth decile (upper bound of the ninth decile group) has effectively remained unchanged relative to the median (P90/P50 ratio). In fact, the

righthand panel in *figure 4.3* as well as *table 4.2* reveal that the P90/P50 ratio has increased by about 14 percent from 1991 to 2010. In contrast, both the P50/P10 ratio (median compared to first decile) as well as the P90/P10 ratio (ninth decile compared to the first decile) have changed substantially, both reaching their maximum values in 2005.

*Figure 4.3 Development of Market Equivalized Income, 1991-2010*



*Note:* The righthand panel of this figure illustrates the development of the P90/P10, the P90/P50 and the P50/P10 decile ratios for market equivalized income in Germany from 1991-2010. The lefthand panel adds the relative evolution of the three series through an index representation (1991=100).

*Source:* SOEP, own calculations.

This pattern illustrates the substantial changes within the lower part of the distribution of market equivalized income: From 2000 to 2010, low incomes predominantly drive the development of income concentration. However, the overall increase in inequality (when considering the whole time period from 1991 to 2010) is dominated by the steady increase of the ninth income decile, that is the upper part of the income distribution. This phenomenon is clearly visible when examining income shares.

#### 4.1.4 Income Shares of Market Equivalized Income

The strong fluctuations of some inequality measures are particularly visible when examining income shares of the first, the second and the top decile groups. Moreover, the development of income shares in the period 1991 to 2010 shows that the distribution of market equivalized income became even more unequal than net equivalized income (see *table 4.2*). The 32 percent fall in the market equivalized income share of the lowest decile class and the 17 percent gain of the highest decile class were much more pronounced than the corresponding changes in income shares of net equivalized

income.<sup>6</sup> With regard to the upper bound of the income distribution we observe that while for market equivalized income, the highest three decile classes gained more income share, for net equivalized income, only the highest decile class increased its income share.

Table 4.2 Distribution of Market Equivalized Income, 1991-2010

	Unit	1991	1996	2001	2006	2010	% change 1991-2010	% change 2001-2010	% change 2006-2010
<b>Average Real Income</b>									
Mean	Euro (2010 = 100)	22,475	22,715	23,740	23,118	23,582	4.9	-0.7	2.0
Median	Euro (2010 = 100)	20,446	20,135	19,752	19,365	20,401	-0.2	3.3	5.4
<b>Aggregated Inequality Measures</b>									
Relative Mean Deviation	%	0.289	0.320	0.329	0.353	0.340	17.8	3.5	-3.5
Gini coefficient		0.413	0.451	0.465	0.496	0.479	15.9	3.0	-3.6
Mean Log Deviation		0.525	0.620	0.592	0.686	0.616	17.4	4.0	-10.3
Theil index		0.293	0.343	0.358	0.413	0.377	28.8	5.5	-8.7
<b>Decile Ratios</b>									
P90/P50		2.14	2.29	2.36	2.52	2.45	14.3	4.0	-2.8
P90/P10		30.54	42.69	35.71	76.41	35.70	16.9	0.0	-53.3
P50/P10		14.25	18.67	15.15	30.31	14.56	2.2	-3.9	-52.0
<b>Income Shares by Income Deciles</b>									
Decile Class 1	%	0.00	0.00	0.00	0.00	0.00	-31.9	-5.8	110.0
Decile Class 2	%	0.02	0.01	0.01	0.01	0.01	-30.3	-9.4	36.2
Decile Class 3	%	0.05	0.03	0.03	0.02	0.03	-39.7	-12.3	13.7
Decile Class 4	%	0.07	0.06	0.05	0.05	0.05	-24.3	-7.5	5.1
Decile Class 5	%	0.08	0.08	0.08	0.07	0.08	-9.7	-2.1	2.7
Decile Class 6	%	0.10	0.10	0.09	0.09	0.09	-4.5	-1.1	1.1
Decile Class 7	%	0.12	0.12	0.11	0.11	0.12	-1.0	0.1	1.1
Decile Class 8	%	0.14	0.14	0.14	0.14	0.14	1.5	0.7	0.5
Decile Class 9	%	0.17	0.18	0.18	0.18	0.18	4.1	1.3	-1.3
Decile Class 10	%	0.26	0.28	0.30	0.32	0.31	16.9	2.8	-3.8

Note: This table summarizes several measures that characterize the distribution of market equivalized income in Germany from 1991-2010. The representation covers selected years. The measures comprise average income, aggregated inequality indices, decile ratios and income shares of income decile groups. The percentage changes between the chosen years are reported in the three columns on the right side of the table.

Source: SOEP, own calculations.

## 4.2 Explanatory Factors for the Development of Market Income Inequality

This subsection addresses the most relevant explanatory factors for changes in the distribution of market equivalized income. While *subsection 4.1* discussed inequality in market equivalized income, some of the subsequent considerations also refer to individual market income. The reason for this is that specific factors in the economy affect the distribution of individual market income more directly than the distributions of household or equivalized market income. When comparing the development of inequality in household market income to inequality in equivalized market income, we expect qualitatively similar results. This is because both concepts differ by changes in the household structure which has, compared to other factors, remained rather stable (see *subsection 4.2.1*). The development of the distribution of individual market income however does not necessarily coincide with changes in

<sup>6</sup> A more detailed comparison of net equivalized to market equivalized income is provided in *section 5*.

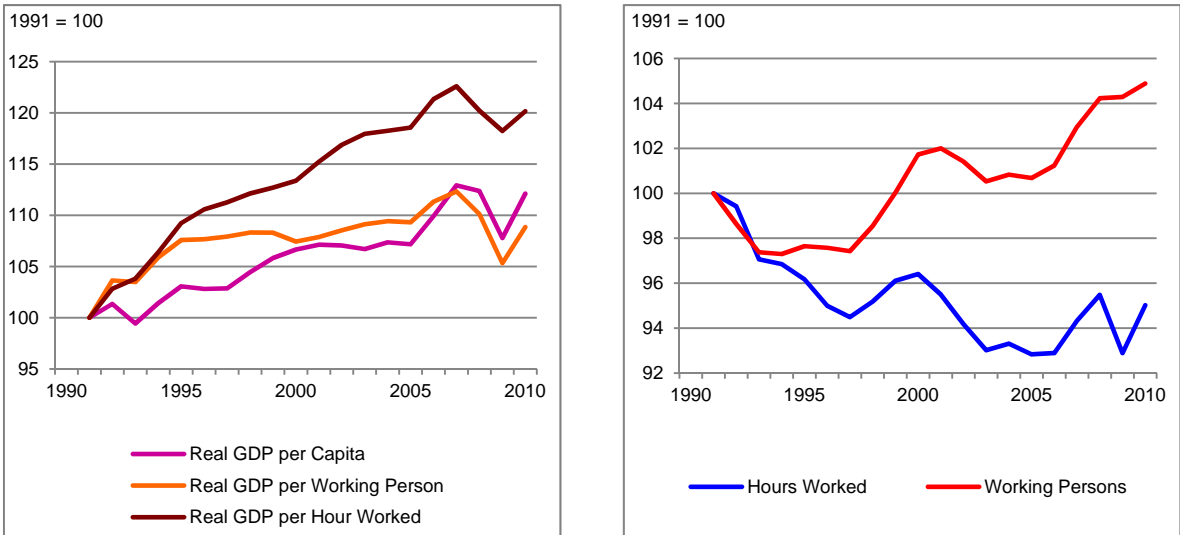
the distribution of household market income (see IAW 2011). This becomes visible when considering the development of the labor market as will be discussed below.

From a macroeconomic perspective, since the beginning of the 1990s, three trends have potentially affected the distribution of market income: First, a substantially rising profit share, second, a decreasing average number of hours worked due to rising part-time occupation, which itself is just one facet of the third aspect, namely the steady increase of atypical employment. The increasing relevance of capital income is addressed in *subsection 4.2.2*. Changes in the structure of the labor force are discussed in *subsection 4.2.3*. The development of labor productivity and hours worked will be addressed subsequently in *subsection 4.2.1*.

4.2.1 Labor Productivity and Demographic Changes

Selected key macroeconomic indicators are presented in *table 4.3*. The lefthand panel in *figure 4.4* illustrates the relative development of three productivity measures from 1991 to 2010. Depending on the measure, we observe an increase of approximately 9 to 20 percent, which is quite weak given the overall time span of 20 years. More remarkable, however, is the fact that while real GDP per hour worked rose by one fifth, real GDP per employee and real GDP per working person only rose by 12.1 percent and by 8.9 percent. The explanation for this is a sustained trend towards the reduction of average hours worked (see *figure 4.4*, righthand panel as well as *table 4.3*).

Figure 4.4 Productivity Indicators (left), Total Hours Worked and Number of Working People (right), 1991-2010



Note: The lefthand panel of this figure contrasts the relative development of three productivity indicators for the German economy from 1991-2010: Real GDP per capita, real GDP per working person and real GDP per hour worked. All three series are reported as indices (1991=100). The righthand panel illustrates the evolution of hours worked and the number of working persons, both series are also in an index representation (1991=100).

Source: German Federal Statistical Office, own calculations.

The drop in hours worked is about 7.5 percent per employee and about 9.4 percent per working person. This decline results from two developments: While total hours worked decreased by 5.0 percent from 1991 to 2010, the number of employees (working people) increased by 2.7 percent (4.9 percent). Hence, since 1991, total hours worked were substantially reallocated towards an increasing number of working people. This development implies that total labor income was earned by a larger number of people leading to a substantial drop of average labor income.<sup>7</sup> As we will illustrate below, parallel to the decrease of average labor income, the concentration of labor income has also increased remarkably. Both developments have contributed substantially to the rise in market income inequality among individuals and to some extent also across households.

*Table 4.3 Key Macroeconomic Indicators for Germany, 1991-2010*

	Unit	1991	1996	2001	2006	2010	% change 1991-2010	% change 2001-2010	% change 2006-2010
Nominal GDP	mil. Euro	1,535	1,875	2,102	2,314	2,496	62.7	18.8	7.9
Consumer Price Index	2010 = 100	70.19	81.64	87.37	93.89	100.00	42.5	14.4	6.5
Real GDP	mil. Euro (2010 = 100)	2,186	2,297	2,406	2,464	2,496	14.2	3.8	1.3
Total Population	tsd.	79,829	81,831	82,277	82,369	81,716	2.4	-0.7	-0.8
Working Population	tsd.	38,712	37,772	39,485	39,192	40,603	4.9	2.8	3.6
Employees	tsd.	35,148	33,907	35,465	34,736	36,110	2.7	1.8	4.0
Hours Worked	mil.	60,082	57,074	57,376	55,808	57,087	-5.0	-0.5	2.3
Hours Worked per Working Person	1	1,552	1,511	1,453	1,424	1,406	-9.4	-3.2	-1.3
Hours Worked per Employee	1	1,709	1,683	1,618	1,607	1,581	-7.5	-2.3	-1.6
Real GDP per Capita	tsd. Euro (2010 = 100)	27.24	28.00	29.18	29.94	30.53	12.1	4.6	2.0
Real GDP per Working Person	tsd. Euro (2010 = 100)	56.48	60.80	60.92	62.88	61.48	8.9	0.9	-2.2
Real GDP per Employee	tsd. Euro (2010 = 100)	62.20	67.73	67.83	70.95	69.13	11.1	1.9	-2.6
Real GDP per Hour Worked	Euro (2010 = 100)	36.39	40.24	41.93	44.16	43.73	20.2	4.3	-1.0

*Note: This table presents a number of basic macroeconomic indicators for Germany from 1991-2010 for selected years. The percentage changes between these years is reported in the three columns to the right of the table.*

*Source: German Federal Statistical Office, GCEE (2012), own calculations.*

Next, we turn to the discussion of demographic trends that potentially contributed to changes in the distribution of market equivalized income. We consider aging, household size and household structure as well as the educational structure of the labor force. These factors change gradually and contribute to the observed increase of inequality in equivalized incomes in the long run. *Table 4.4* summarizes changes in a selection of demographic measures.

Within the past two decades Germany experienced a steady aging of the population due to the continuing trends of increasing lifespan and declining birth rates. This is reflected in changing shares of different age groups as well as in a declining population size since 2003. The ratio of births to total population declined from 1.0 percent in 1991 to 0.8 percent in 2010. Whereas in 1991 people younger than 20 (older than 65) accounted for 21.7 percent (15.2 percent) of the total population, in 2010 their

<sup>7</sup> Note that this strong decrease of average labor income refers to the individual as the unit of observation. This decline is not automatically reflected by household or equivalized incomes, as individuals pool their labor earnings within households.

share lay at 18.3 percent (21 percent). A compact representation of this shift of age groups is the ratio of the number of people older than 64 compared to the number of people between 20 and 65. This ratio rose from about 23.6 percent in 1991 to 34.5 percent in 2010. While the effect of aging upon the distribution of market equivalized income is difficult to determine, the rising relevance of pension payments negatively affects the level of net equivalized income.

Alongside aging, we also consider changes in the household size and the household structure. Whereas in 2011 the average household consisted of 2.01 persons, in 1991 it consisted of 2.25 persons. This change is explained by the following developments: While the share of single (two) person households has increased from 33.6 percent (30.8 percent) in 1991 to 40.2 percent (34.2 percent) in 2010, the share of households consisting of three or more persons persons has steadily fallen since 1991. A decreasing average household size may (c.p.) generate a positive effect upon the level of equivalized income if the former results from falling birth rates. In contrast, if the decreasing household size is primarily driven by the breakup of former (adult) communities (due to deaths or divorces), equivalized income will be affected negatively. As the share of single person households rises, the second effect may dominate. Thus, the continuing trend of decreasing average household size tends to lower the average level of equivalized income. This is due to a reduction of the degression of fix costs within households. Hence, changes in equivalized income are partly caused by changes in the average household size even if the distribution of individual income does not change.

*Table 4.4 Basic Demographic Indicators for Germany, 1991-2010*

	Unit	1991	1996	2001	2006	2010	% change 1991-2010	% change 2001-2010	% change 2006-2010
Total Population	tsd.	79,829	81,831	82,277	82,369	81,716	2.4	-0.7	-0.8
<b>Ageing</b>									
Share of People aged < 20	%	21.7	21.3	20.7	19.6	18.3	-15.7	-11.7	-6.6
Share of People aged > 65	%	15.2	16.3	17.6	19.7	21.0	38.4	18.9	6.3
Ratio: Age > 65 / Age 20-64	%	24.0	26.1	28.6	32.5	34.5	43.9	20.7	6.2
Ratio: Newborns / Total Population	%	1.04	0.97	0.89	0.82	0.83	-20.2	-7.0	1.5
<b>Household Size and Composition</b>									
Average Household Size	1	2.25	2.18	2.13	2.06	2.01	-10.7	-5.5	-2.4
Share of Single-Person Households	%	33.6	35.4	36.6	38.8	40.2	19.5	10.0	3.5
Share of Households (2)	%	30.8	32.3	33.6	33.6	34.2	11.0	1.9	1.7
Share of Households (3+)	%	35.6	32.3	29.9	27.5	25.5	-28.3	-14.7	-7.3
Share of Single-Parent Households	%		13.8	16.0	18.5	19.4		20.9	5.1
<b>Qualification of the Labor Force</b>									
No Job-specific Qualification	%			16.9		18.8		11.4	-5.3
Academic Qualification	%	10.3	13.4	13.4		17.5	70.4	31.1	13.5

*Note: This table summarizes basic demographic indicators for Germany from 1991 to 2011. The representation covers selected years. Percentage changes between these years are reported in the right hand columns of the table. The percentage change from 2006 to 2010 for the amount of people without job-specific qualification and with academic qualification in the labor force cannot not be calculated because of missing data for the year 2006. The reported percentage changes in this column refer to the change from 2005 to 2010.*

*Source: German Federal Statistical Office, own calculations.*

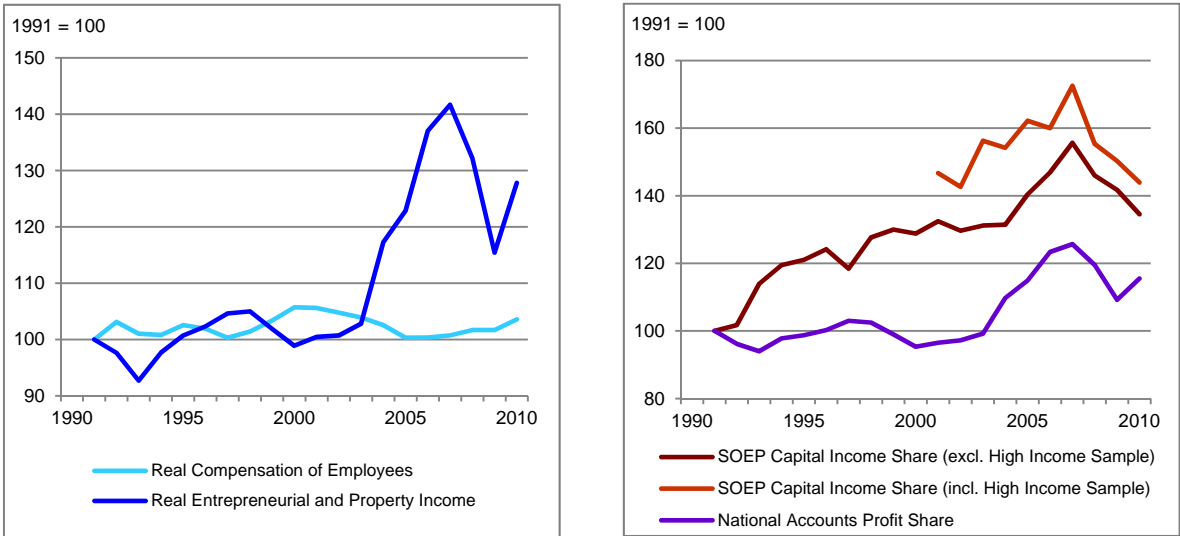


With regard to education we observe that while in 2002 the share of people in the labor force without any job-specific qualification lay at 16.9 percent, it rose to 18.8 percent in 2010. The share of people holding an academic qualification increased from 10.3 percent in 1991 to 17.5 percent in 2010.<sup>8</sup> The rising share of people in the labor force that do not hold any occupational (professional) qualification and the increasing graduate population contribute to the dispersion of individual labor income (see subsection 4.2.3). It also causes employment perspectives to deteriorate and increases poverty risk.

#### 4.2.2 Rising Capital Income Shares and Structure of Market Income

In this section we consider the effects of the increasing relevance of capital income affecting the distribution of market income in the medium and long run. According to the concept of the functional distribution of income, an economy’s national income consists of labor income and profit income. In Germany, the relative importance of these income factors has shifted at the expense of labor income in the last decades: The share of profit income rose from 29.2 percent in 1991 to 33.8 percent in 2010. At its pre-crisis maximum in 2007, profit income accounted for 36.8 percent of gross national income (see figure 4.5, lefthand panel and table 4.5).

Figure 4.5 Real Compensation of Employees and Real Profit Income (left), National Accounts Profit Share and SOEP Capital Income Shares (right), 1991-2010



Note: This figure captures the evolution of capital income shares in Germany from 1991-2010. On the left we contrast the relative evolution (index, 1991=100) of real employee compensation and real profit income as reported in national accounts. The righthand panel shows the relative evolution of capital income shares from national accounts and SOEP household data (index, 1991=100). The calculations for the survey data are based on equivalized incomes.

Source: German Federal Statistical Office, SOEP, own calculations.

<sup>8</sup> Although the classification of different qualifications has changed over the course of the observed time span, the trend towards a larger fraction of people holding an academic qualification is clearly visible.

Table 4.5 Shares of Capital Income vis-à-vis Total Income, 1991-2010

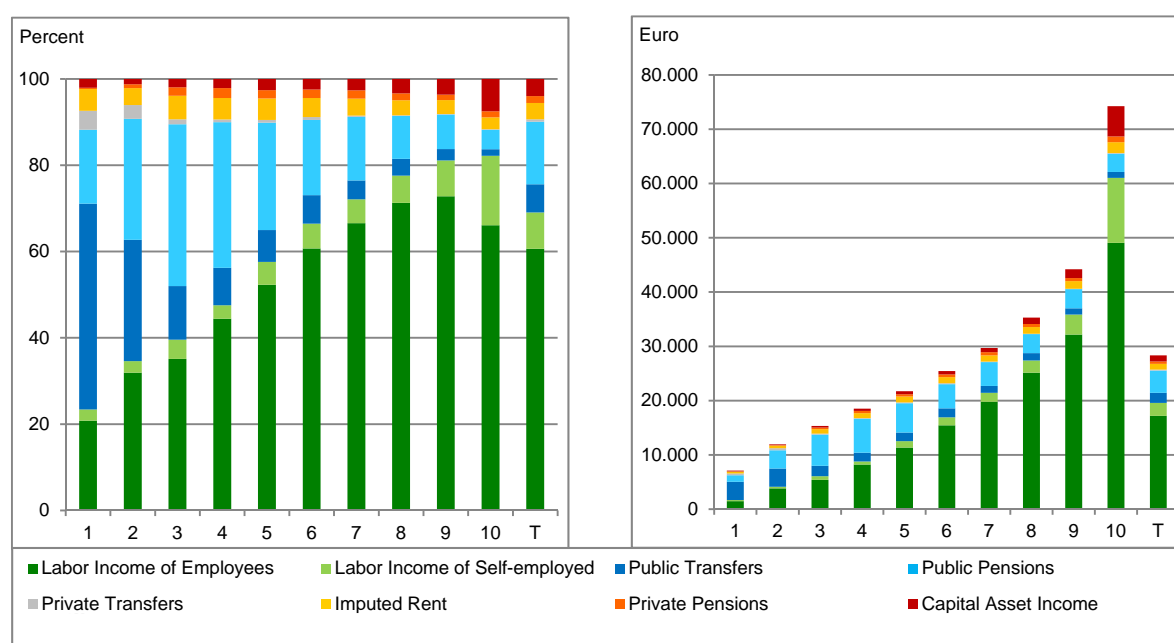
	Unit	1991	1996	2001	2006	2010	% change 1991-2010	% change 2001-2010	% change 2006-2010
Real Aggregate Income	mil. Euro (2010 = 100)	1,734	1,769	1,805	1,926	1,919	10.7	6.3	-0.4
Real Compensation of Employees	mil. Euro (2010 = 100)	1,227	1,251	1,295	1,231	1,271	3.6	-1.9	3.2
Real Entrepreneurial & Property Income	mil. Euro (2010 = 100)	507	519	509	695	648	27.8	27.3	-6.7
Profit Share	%	29.2	29.3	28.2	36.1	33.8	15.5	19.7	-6.4
<b>SOEP Capital Income Share</b>									
Excluding High Income Sample	%	5.7	6.8	7.6	8.4	7.7	35.8	1.1	-8.1
Including High Income Sample	%			8.4	9.1	8.3		-1.5	-9.3

Note: This table summarizes the above presented labor and capital income shares from national accounts and the SOEP for selected years. Percentage changes for the time periods between the reported years are given in the righthand columns. The calculations for the survey data are based on equivalized incomes.

Source: German Federal Statistical Office, own calculations.

As pointed out by Adler and Schmid (2013), this structural shift in the relative amount of labor versus capital income is not only evident in National Accounts, that is on the aggregate level of the total economy, but is also visible in the market income structure of individuals and households. While in 1991 asset income (including private pensions) accounted for approximately 5 to 6 percent of total equivalized household market income, in 2010 it was more than 7 percent and even reached as high as about 9 percent in the year 2007 (see figure 4.5, righthand panel and table 4.5).

Figure 4.6 Income Structure by Income Class in Germany, 2010



Note: The lefthand panel of this figure illustrates the structure of gross household income by income deciles groups in Germany for 2010. The respective shares of different income types add up to 100 percent. The righthand panel shows the absolute values of the different income types by income decile classes. These are reported in euros. The calculations are based on equivalized incomes.

Source: SOEP, own calculations.

A shift in the functional distribution of income does not affect the distribution of individual or household market income *per se* – it would not affect income inequality if all individuals or households gained the same percentage of their income from capital assets. However, capital income is not equally distributed across the income distribution: On average higher levels of market income are associated with higher capital income shares (see Adler and Schmid 2013 and Atkinson 2009). This is visible in *figure 4.6* which illustrates the structure of gross equivalized income by income deciles for the year 2010. Moreover, capital income itself is highly concentrated. In 2010, capital income of the highest gross equivalized income decile accounted for 41.8 percent of overall capital income, while the capital income share of the lower half of the income distribution was only 17.8 percent. As a consequence, increasing capital income shares are associated with a rising concentration of market income. Hence, the trend rise in inequality of market income might partly be driven by increasing capital income in the upper part of the income distribution.

#### *4.2.3 Changing Employment Structure and Dispersion of Individual Labor Income*

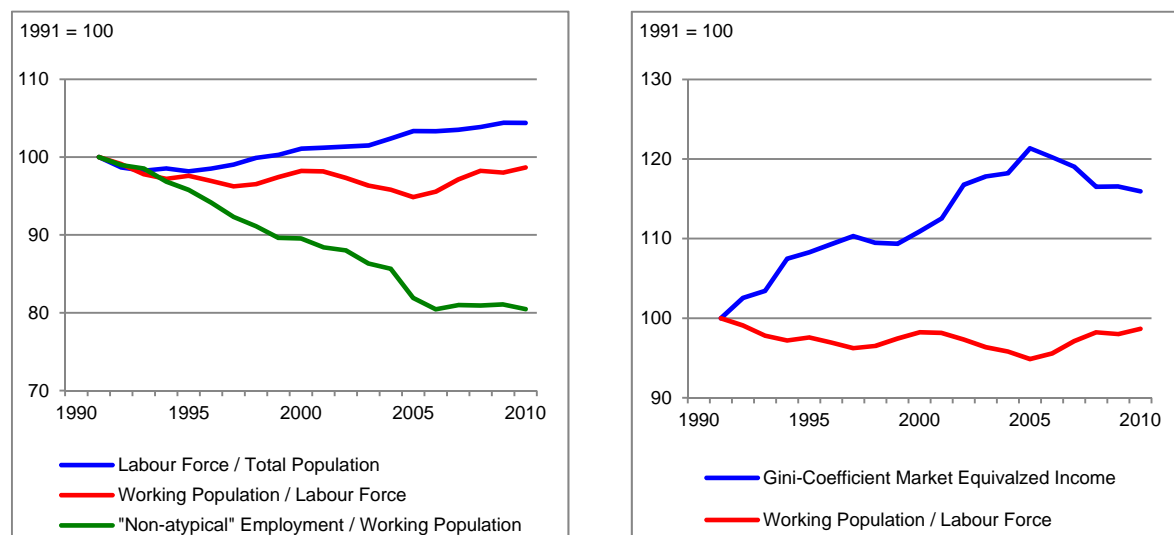
This subsection illustrates that cyclical fluctuations of the employment level as well as structural changes in the labor force are of vital importance for the explanation of the observed changes in market income inequality. *Figure 4.7* (righthand panel) shows that in times of rising employment we observe no further increase in market income inequality. During the economic upswings from 1997 to 2001 and 2005 to 2009, employment rose. This is visible from the rising ratio of the number of people in the working population to the number of people in the total labor force. Within these years inequality of market equivalized income showed no further increase.

Note that while in 2010 the share of the working population compared to the overall population is roughly at the same level as 20 years before – this holds, even though labor force participation has increased by 4.4 percent since 1991 (see *table 4.3*, *table 4.6* and *figure 4.7*, lefthand panel) – in 2010 inequality of market equivalized income measured by the Gini coefficient is about 16 percent higher than in 1991. Thus, changes in the employment level may coincide with changes in market income inequality but cannot explain the trend increase of market income concentration. Besides the aforementioned factors, rising capital income shares (*subsection 4.2.2*) and demographic changes (*subsection 4.2.3*), it is primarily the changing structure within the labor force that has contributed to the trend increase in market income inequality.

As shown above, over the last two decades the average number of hours worked declined steadily while the number of workers increased (see *figure 4.4*). This development was associated with a substantial structural change within the labor force. *Table 4.6* provides an overview of the trends in the level of employment, labor force participation and the structure of the working population. The trend increase of market income inequality and the more pronounced reduction of inequality in the second

of the two aforementioned employment upswings is most probably due to the emergence of atypical employment.

Figure 4.7 Labor Force Participation and Non-atypical Employment (left) and employment and market income inequality (right), 1991-2010



Note: This figure illustrates labor force participation and non-atypical employment in Germany in the lefthand panel. The righthand panel contrasts the development of the ratio of the number of people in the working population to the number of people in the labor force with the concentration of market equalized income.

Source: German Federal Statistical Office, GCEE (2012), own calculations.

Table 4.6 Development of the Labor Force in Germany, 1991-2010

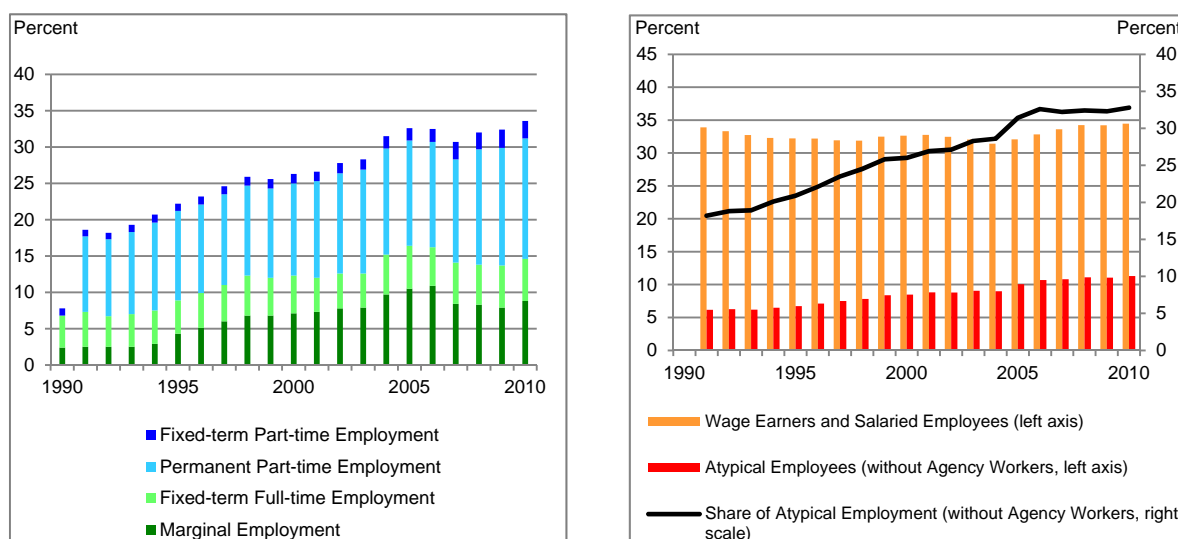
	Unit	1991	1996	2001	2006	2010	% change 1991-2010	% change 2001-2010	% change 2006-2010
Labor Force	tsd.	40,932	41,198	42,536	43,361	43,512	6.3	2.3	0.3
Working Population	tsd.	38,712	37,772	39,485	39,192	40,603	4.9	2.8	3.6
Employees	tsd.	35,148	33,907	35,465	34,736	36,110	2.7	1.8	4.0
Self-Employed	tsd.	3,564	3,865	4,020	4,456	4,493	26.1	11.8	0.8
Labor Force / Total Population	%	51.0	50.2	51.6	52.7	53.2	4.4	3.2	1.0
Working Population / Labor Force	%	94.6	91.7	92.8	90.4	93.3	-1.3	0.5	3.2
Employees / Working Population	%	90.8	89.8	89.8	88.6	88.9	-2.0	-1.0	0.3
<b>Shares of Atypical Employment of all Employees</b>									
Marginal Employment	%	2.4	4.3	7.1	10.5	7.9	229.2	11.3	-24.8
Temporary Full-time	%	4.4	4.6	5.2	5.9	5.8	31.8	11.5	-1.7
Permanent Part-time	%	10.4	12.2	13.3	14.5	16.6	59.6	24.8	14.5
Temporary Part-time	%	1.0	1.0	1.3	1.7	2.5	150.0	92.3	47.1
Permanent Full-time	%	74.3	69.9	65.7	59.7	59.8	-19.5	-9.0	0.0
<b>Gender-specific Labor Force Participation</b>									
Participation Rate Men	%	82.9	80.3	80.1	81.1	82.1	-1.0	2.6	1.2
Participation Rate Women	%	62.1	62.3	64.9	68.4	70.7	13.8	9.0	3.3
<b>Part-time Occupation</b>									
Part-time Occupation Rate (Total)	%	14.0	16.6	20.8	26.2	26.7	90.9	28.5	1.9
Part-time Occupation Rate Men	%	2.1	3.4	5.2	8.8	9.3	351.8	80.0	5.1
Part-time Occupation Rate Women	%	30.2	33.6	39.6	46.0	45.9	51.9	15.8	-0.3

Note: This table summarizes basic indicators that describe the evolution of the labor force in Germany from 1991-2010. We report selected years and calculate percentage changes that are given in the three right hand columns of this table.

Source: German Federal Statistical Office, German Council of Economic Experts (2012), FEA, own calculations.

Until 2006 the share of atypically-employed persons steadily increased, but from then onwards this has not been the case. Hence, the strong employment gains experienced since the economic expansion starting in 2005 came with a stable proportion of “normal” to atypical jobs. This clear slowdown of the expansion of atypical employment coincides with the levelling-off in market income inequality (see *figure 4.7*, right hand panel).

*Figure 4.8 Development of Different Types of Atypical Employment in Germany (lefthand panel) and Share of Atypically Employed People (righthand panel), 1991-2010*



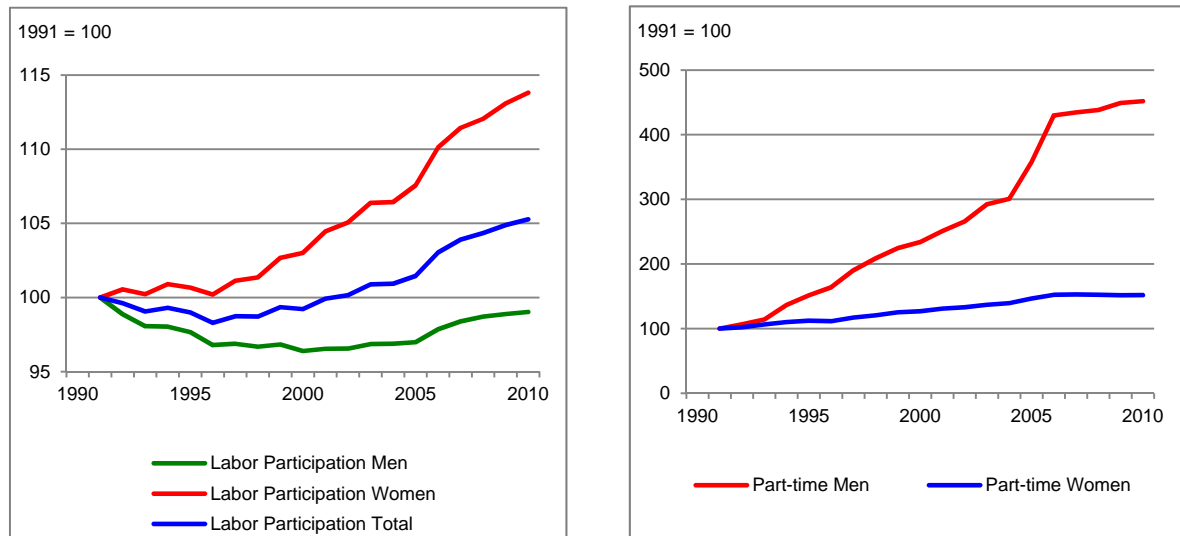
*Note:* This figure illustrates the shares of several types of atypical employment in total employment in the lefthand panel. The righthand panel contrasts the development of the aggregated share of atypical employment. Both representations refer to Germany from 1991 to 2010.

*Source:* German Federal Statistical Office, FEA, GCEE, own calculations.

In addition, *figure 4.9* summarizes gender-specific labor force participation in the lefthand panel and part-time occupation in the righthand panel. From 1991 to 2011 the labor force participation of women has increased by 13.8 percent. During this time span the part-time occupation rate has nearly doubled. Both developments have contributed to the increase in market income concentration. These developments as well as the pronounced rise of contract work have been associated with a decline in average labor income, and the increasing dispersion and concentration of individual labor income.

The steady increase of so-called atypical employment within the last two decades is illustrated in more detail in *figures 4.8* and *4.9*. *Figure 4.8* (lefthand panel) shows the shares of several forms of atypical employment in total employment from 1991 to 2011. In particular minijobs have gained relevance from 1996 onwards. The righthand panel in *figure 4.8* plots the number of employed persons, the number of atypically employed persons and the share of atypically employed people. As mentioned above, we recognize that the rise in atypical employment levels off in 2006.

Figure 4.9 Gender-specific Labor Force Participation (left), Gender-specific Part-time Occupation (right), 1991-2011



Note: The lefthand panel of this figure contrasts the relative evolution of gender-specific labor participation and labor participation in total. The righthand panel illustrates the relative development of gender-specific part-time occupation. Both subgraphs cover developments in Germany from 1991 to 2010. All series are plotted as an index representation (1991=2010).

Source: German Federal Statistical Office, FEA, own calculations.

So far we have primarily discussed the development of the employment level and changes in the structure of the labor force that explain much of the observed rise in market income inequality for the whole working population. This is quite obvious, as a declining proportion of full-time employed people is associated with a decline of average individual labor income as well as a rising concentration of the latter. However, parallel to this, there was also a remarkable increase in the concentration of full-time compensation. This phenomenon has been reported in several studies such as Antonczyk et al. 2012, Dustmann et al. 2009, Fitzenberger 2012, Fuchs-Schündeln et al. 2009, Gerndt and Pfeiffer 2007 or Riphahn and Schnitzlein 2011 that examine wage dispersion in Germany since its reunification. In general, these authors document increasing wage inequality since the mid-1990s in both the upper as well as the lower part of the wage distribution. More specifically, while there has been rising wage inequality in the lower part of the wage distribution since the beginning of 1990s, within the last decade this development has accelerated, charting the growth of an extensive low-pay sector (see Card et al. 2012, Fitzenberger 2012 and Kohn 2006 as well as *subsection 6.2*). With respect to the upper part of the wage distribution, increased wage dispersion has already existed since the 1980s (Fitzenberger 1999). Underlying this literature there is a number of factors that explain rising wage inequality. The most popular theories for the explanation of increasing wage inequality are summarized in *infobox 4.1*.

#### **Skill Bias in Labor Demand triggered by Skill-biased Technological Change**

According to the concept of “skill-biased technological change”, coined by Katz and Autor (1999), computers and other new technologies appear to be substitutes for low-skilled labor, but complementary for more skilled workers. According to this theory, technological progress tends to induce a shift in labor demand in favor of higher skilled or more experienced workers. As a result, the upper part of the wage distribution benefits from technological innovation through an increase in returns on education. Hence, the theory of skill-biased technological change appears helpful in explaining wage dispersion of higher incomes (see Fitzenberger 2012), but it fails to explain the strong rise in wage inequality at the lower end of the spectrum (see Antonczyk et al. 2012 as well as Dustmann et al. 2009).

#### **Task-based Approach, Globalization and Offshoring**

This approach was, for example, brought up by Spitz-Oener (2006) who showed empirically, how the allocation of tasks to workers has changed over the last decades in Germany: While routine cognitive and routine manual tasks have largely been automatized or outsourced, the input of analytic, interactive and manual non-routine tasks has increased. These changes are in line with rising competition in labor markets due to the deepening of global division of labor: Expanding offshoring opportunities, triggered by technology, facilitate the substitution of domestic workers with foreign workers (see also Acemoglu 2011). Thereby, cheap labor supply intensifies the pressure upon the lower parts of the wage distribution, while wage inequality in the upper part of the distribution might decrease due to skill bonuses. Empirically, there is strong evidence for negative effects of offshoring on both wages and employment for low-skilled workers (see Marin 2004, Geishecker and Görg 2008, Becker et al. 2009, Milberg and Winkler 2009, Horgos 2009). Positive wage effects for highly skilled workers are also confirmed by, e.g., Geishecker and Görg (2008). Regarding the wage dispersion within qualification groups, Horgos (2007) found that wage inequality decreased for low-skilled workers, but increased for the high-skilled.

#### **Institutional Explications: Labor Market Reforms and Flexibilization**

Next to this it is often argued that changes in labor market institutions play an important role in the increase in wage inequality. Changes in dismissal protection, labor market flexibilization for temporary work and minijobs, as well as reduced unemployment benefits are among the most important factors which increase labor supply and are accompanied by downward pressure on wages. Theoretically, labor market reforms may have ambiguous effects, and improvements in the matching process and productivity growth could exhibit positive effects on wages. However, according to Fitzenberger (2012) given the observed developments on the German labor market, there is little evidence that these are the dominant effects. In the relevant literature, findings as to the importance of labor market reforms are split. Dustmann et al. (2009) argue that labor market institutions help to explain the rise in inequality in the lower part of the distribution. Burda and Kvasnicka (2006) show the increasing importance of temporary service work, but they do not find evidence for long-term adverse effects on wages. Furthermore, the limited explanatory power of labor market reforms is shown by the fact that institutional changes were preceded by the increase in wage inequality by nearly one decade (see e.g. Fitzenberger 2012 and Biewen and Juasz 2012).

#### **Decline in Unionization**

Since the mid-1990s Germany has experienced a large decline in unionization and collective bargaining. Within one decade, union membership dwindled from around 40 percent to 31 percent (Schnabel and Wagner 2006) and union coverage fell from 76 (63) percent to 61 (49) percent in West (East) Germany (see WSI-Tarifarchiv 2013). According to Fitzenberger and Kohn (2005) and Gerlach and Stephen (2005) there is strong empirical evidence for a connection between the decline in unionization and increasing wage inequality, especially at the lower end of the wage distribution. However, there is no unanimity about the importance of these effects: While Dustmann et al. (2009) assume that 28 percent of wage inequality at the lower part can be attributed to de-unionization, Fitzenberger (2012) argues that it only exhibited much smaller effects, as wage dispersion increased equally in areas with and without collective bargaining.

#### **Firm-specific Pay**

Instead of considering the rise of wage inequality in Germany as an effect of higher flexibility in the German labor market, Card et al. (2012) argue that much of this trend can be attributed to an increased heterogeneity in firm-specific payments. According to this, firms tend to prefer a similar pay scheme for all of their staff over individual wage bargaining. As the pay scheme influences the matching process between firms and employees, this process tends to homogenize the qualification structure within firms while it tends to increase differences in the medium qualification level between firms (or even sectors). As a result of these firm effects on wages, the wage distribution for employees with comparable skills diverges. According to Antonczyk et al. (2010), firm specific payment is the single most important factor when it comes to explaining the increase in wage inequality in the lower half of the wage distribution.

### 4.3 Summary

This section documented the development of the distribution of market equivalized income and discussed the major factors driving inequality between 1991 and 2010. *Subsection 4.1* summarized the development of income inequality. Here, we saw that while in the upper part of the income distribution – namely in the highest quintile of the income distribution – incomes steadily increased over the whole time span, in the lower half of the distribution this was not the case (*subsection 4.1.1*). In contrast to net equivalized income, aggregate concentration measures of market equivalized income reveal that income inequality rose overall since the early 1990s and over both decades (*subsection 4.1.2*). Moreover, in the second decade, between 2002 and 2005, we observe a strong increase in inequality. However, from 2006 onwards income concentration decreased. The consideration of decile ratios (*subsection 4.1.3*) illustrated in more detail that, over the whole period, incomes around the 9th decile steadily increased relative to median income. The strong upward and downward movement of income inequality in the 2000s, however, is driven by income changes in the lower part of the income distribution.

*Subsection 4.2* discussed the most relevant explanatory factors for changes in the distribution of market income. *Subsection 4.2.1* addressed labor productivity and demographic changes. The latter primarily revealed declining household sizes and a dispersion of education within the labor force. These aspects represent slowly changing determinants of the distribution of market equivalized income that may have contributed to the trend increase of inequality in equivalized incomes and individual labor incomes. However, these factors cannot explain short-term fluctuations of income concentration, regardless whether inequality refers to individual, household or equivalized income. *Subsection 4.2.2* further illustrated that, given the high concentration of capital income and the positive association of capital income shares and the level of household market income, increasing capital income shares may also have contributed to the trend of rising market income inequality. Finally, *subsection 4.2.3* highlighted the major relevance of changes in the labor market for the evolution of the distribution of market income. Here we see that rising employment generally lowers market income inequality. This is visible during the two phases from 1997 to 2001 and from 2006 to 2009. Furthermore, the steady increase of atypical employment from 1991 to 2006 has contributed to the rise of market income inequality, and the halting of this increase that coincided with strong employment gains from 2006 onwards can explain the remarkable trend reversion, that is the only four years without any further increase of market income concentration since the German reunification.



## 5 *Redistribution Effects of the Tax and Public Transfer System*

The second step of our analysis focuses on the effectiveness of the redistributive mechanisms from the primary to the secondary distribution of income. First, we compare the concentration of net equivalized income to the concentration of market equivalized income and examine to what extent the relation of the two changed over time. Second, we discuss potential institutional reforms, such as adjustments of tax rates or transfer payments that generated changes in the effectiveness of the redistribution.

### 5.1 *Decreasing Effectiveness of Public Redistribution*

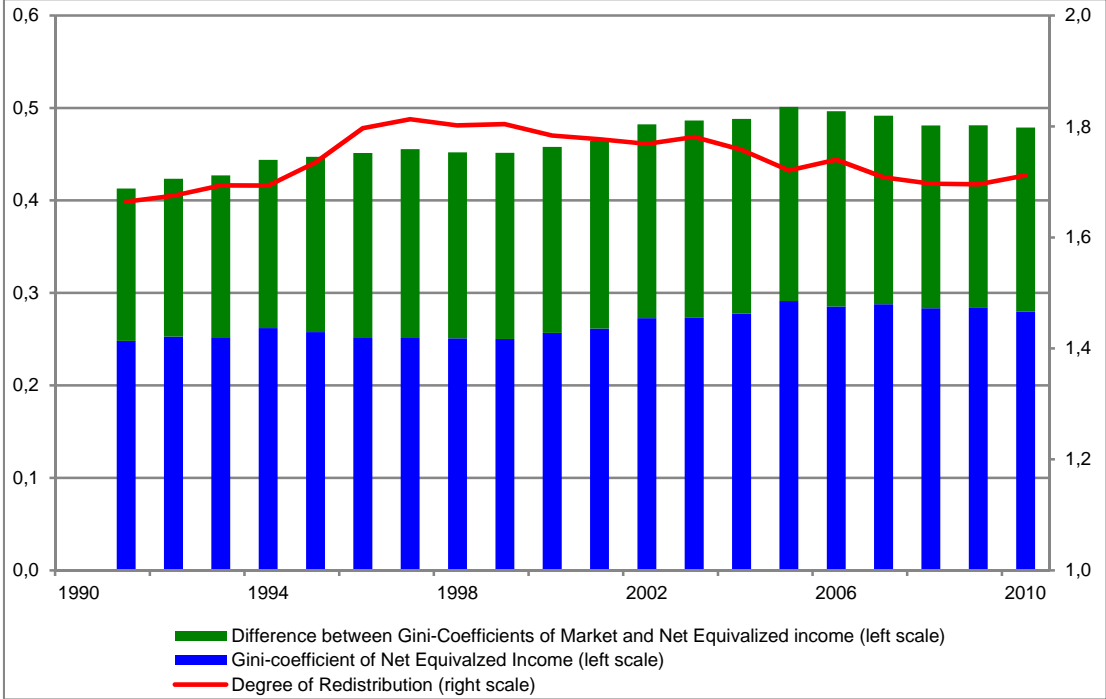
To approximate the strength of redistributive mechanisms we first compare trend inequality in net and market equivalized incomes. *Figure 5.1* contrasts developments in the concentration of market income to the concentration of net income, both measured in terms of Gini coefficients. In principal, different movements of the Gini coefficients indicate a changing degree of the effectiveness of public redistribution.

We observe that inequality of market equivalized income is considerably higher than inequality of net equivalized income, and thus redistribution mechanisms actually stabilize income distribution. However, the representation in *figure 5.1* clearly illustrates that the two Gini coefficients developed differently over the years from 1991 to 2010. Three different phases can be roughly identified: In the first phase, which begins with reunification and extends to the end of the 1990s, inequality of market equivalized income increased, while inequality of net equivalized income did not. In the second phase (between 2000 and 2005) both inequality of market income and net income rose. And in the third phase, which includes the years 2006 to 2010, inequality of net equivalized income remained rather constant despite the slight decrease in inequality of market equivalized income. The differing patterns of the two Gini coefficients indicate how redistribution changed over the years. This is visible from the evolution of the ratio of the two Gini coefficients which is added to *figure 5.1* as a red line. This line shows that despite an increase in inequality of market equivalized income, state redistribution was effective in preventing an increase in inequality of net equivalized income until 1998. However, the effectiveness of government redistribution has declined since then. This is particularly evident since 2003.

Moreover, the strength of redistribution may be examined by the comparison of developments in income shares. Income shares of net equivalized and of market equivalized income were presented in *tables 3.1* and *4.2*. Considering the period from 1991 to 2010 we observe that not only the highest decile group of market equivalized income gained more income share but also the highest decile group of net equivalized income. This is in contrast to the income shares of the 8th and 9th decile groups

which increased on the basis of market equalized income but decreased after redistribution through taxes and transfers. This is particularly interesting given that it might indicate that redistribution works well for a certain income range but the highest income decile is not contributing equally to redistribution.

Figure 5.1 Effectiveness of Redistribution from Market Equalized to Net Equalized Income, 1991-2010



Note: This figure approximates the effectiveness of the tax and public transfer system in redistributing market income among households for Germany from 1991-2010. We contrast the Gini coefficients of net with market equalized income. The dark red line illustrates the ratio of the two concentration measures and captures the degree to which market income is redistributed.

Source: German Federal Statistical Office, SOEP, own calculations.

### 5.2 Explanatory Factors

The effectiveness of public redistribution has decreased since the late 1990s for a number of reasons. Although it is hard to quantify the respective impacts, within the last two decades, there have been several institutional changes that have most probably modified the extent of redistribution. These changes will be discussed in the following.

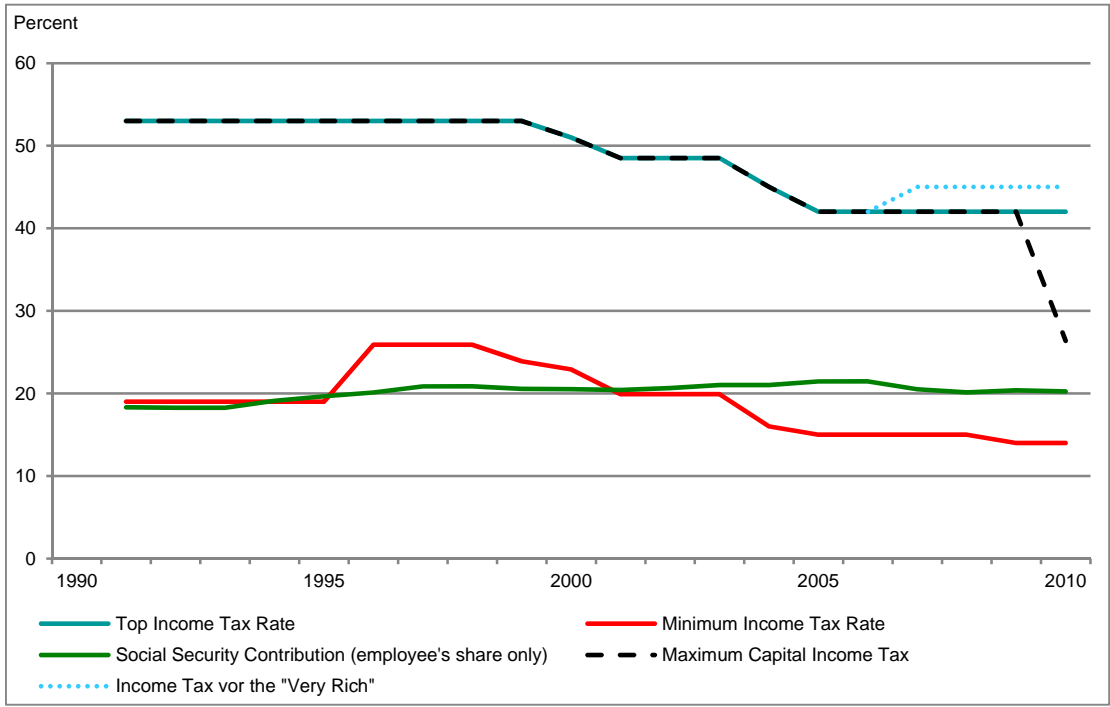
#### 5.2.1 Taxes

First, we address income taxes at the upper bound of the income distribution. In the period from 1991 to 2010, the top income tax rate was reduced by 11 percentage points, while the minimum tax rate decreased only by 5 percentage points (see figure 5.2). The top tax rate was constant at 53 percent

during the 1990s and was reduced in several steps between 2000 and 2004 to 42 percent. This contributed substantially to the observed decrease in the redistribution from market to net income.<sup>9</sup>

The effects of changes in minimum tax rates on the redistribution are much more difficult to analyze because from 1991 to 2010 there were not only frequent changes in the minimum tax rate but also several adjustments in the tax free allowance. The changes in 1996 were particularly substantial. As a consequence of a court judgement, the tax free allowance was more than doubled together with an increase in the minimum tax rate. Although all income earners who actually pay taxes benefit from an increase in the tax free allowance, low income earners benefit disproportionately more than high income earners. This is one important factor that most probably contributed to the observed strengthening of redistribution between 1995 and 1997.

Figure 5.2 Income Tax Rates and Social Security Contributions, 1991-2010



Note: This graph illustrates income tax rates and social security contributions for Germany from 1991-2010.

Source: <http://www.statistik.baden-wuerttemberg.de/GesundhSozRecht/Landesdaten/LRSozVers.asp>, own calculations.

Summing up, while the tax reliefs at the minimum tax rates and the increase of the tax free allowance help explain the rising effectiveness of redistribution in the second half of the 1990s, the reduction of top income tax rates seems to be one of the key factors explaining the steady weakening of redistribution through income taxes during the 2000s.

<sup>9</sup> Note that from 2007 onwards an additional maximum income tax was introduced for incomes above a threshold of 250,000 euros for singles, which is, however, only a small correction to the tax rate reductions since 2000.

Parallel to the changes in income taxes, the abandonment of the wealth tax in 1997 has contributed to the decreasing effectiveness of redistribution. Before this move, i.e. between 1991 and 1996, this tax yielded revenues between 3.4 and 4.6 billion euros.<sup>10</sup> In 1995 the tax rate on wealth was increased from 0.5 percent to 1 percent with an annual increase in tax revenues of 0.6 billion euros in the years 1995 and 1996. Moreover, the flat rate taxation of capital gains since 2009 might have reduced the redistribution further. Before that year, capital gains had been taxed with the individual income tax rates and had yielded more than the flat rate tax of 25 percent for high income households. Thus the contribution from the taxation of capital gains to public redistribution has decreased.

### 5.2.2 *Public Transfers System*

The legislation on child benefits and child allowance has changed frequently over the years. In the first half of the 1990s child benefits were low but families were additionally eligible for child allowance. In 1996, legislation changed significantly. The child benefit for the first child has almost tripled since then, but at the same time the simultaneous claim for the child allowance was deleted. From 1996 onwards, households could claim either child benefit or child allowance. The effects of changes in child benefits and child allowances on the concentration of net income are not clear. On the one hand, increases in child benefits tend to lower inequality as families receive extra transfer payments. On the other hand, from an increase in child allowance only families with higher incomes benefit, implying a reduction of redistribution.

The total percentage of social security contributions, comprising pension insurance, unemployment insurance, health insurance, long-term care insurance, that employees have to pay from their labor income has increased from 1991 to 2006 by more than 3 percentage points to a total of 21.45 percent. Thereafter, between 2006 and 2010, total contributions decreased by one percentage point. Given that social security contributions are subject to an income threshold beyond which absolute contributions do not further increase, changes of the proportion of social security contributions are negatively associated with the effectiveness of the redistribution system. In other words, since 2006 the decrease in social security contributions has enhanced redistribution.

### 5.2.3 *Substitution of Transfer Payments by Labor Income*

Next to the discussed changes in the tax and public transfer system, labor market reforms and corresponding changes in the public transfers system have been of high relevance in explaining the relative developments in the concentration of net and market equivalized income, particularly from 2005 onwards. As described above (see *subsection 4.2.3*), between 2006 and 2009, employment increased remarkably. This was associated with the emergence of many atypical jobs. This positive employment effect implied additional labor income, which is reflected in the decrease of market

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<sup>10</sup> Source: Data freely available on the Website of the GCEE, own calculations.

income inequality (see *subsection 4.1.2*) in this period. At the same time, labor market reforms and the associated transfer changes led to substantial cuts in transfer payments, implying a decrease of net income for affected households.

As a consequence of both effects, decreasing market income inequality resulting from strong employment gains, and falling net income in low income households due to the reductions of transfer payments indicate decreasing effectiveness of redistribution mechanisms from 2005 to 2010, as presented in *figure 5.1*.

### 5.3 Summary

A comparison of concentration measures for net equivalized income and market equivalized income illustrates how state redistribution evolved between 1991 and 2010. In the mid-1990s there was a brief period in which the effectiveness of government redistribution increased. However, from 1998 to 2009 governmental redistribution decreased steadily. Three explanations for this were presented above: First, the changes in the tax system, in particular the decrease of the maximum tax rate, contributed significantly to the decline in redistribution. Also, changes in property taxes affected redistribution. The increase in the wealth tax in the mid of the 1990s coincides with the short phase in which governmental redistribution increased significantly. The abolishment of the wealth tax helps to explain the declining redistribution thereafter. Second, frequent changes in the public transfer system, for instance with respect to child benefit and social security contributions, can help account for some changes in public redistribution. Finally, the labor market reforms and corresponding transfer adjustments of the 2000s exhibited a significant impact on redistribution. On the one hand, these changes promoted the further creation of atypical and marginal employment which is associated with additional labor income at the bottom of the income distribution, lowering market income concentration. On the other hand, it involved massive transfer cuts which counteracted the reduction of market income inequality vis-à-vis the concentration of net income. Taken together, both effects decreased the effectiveness of redistribution.

## 6 Further Discussion

Major parts of the analysis so far focused on explaining developments in the concentration of net equivalized income. As described in *subsection 2.2*, using equivalized income is common practice for the analysis of the development of income inequality and poverty. However, there are several facets of the distribution of economic resources that are not captured adequately by focusing on inequality measures derived from the distribution of net equivalized income. To provide a broader perspective, this section discusses some issues, that have not been included in our analysis so far. *Subsection 6.1* addresses the labor market reforms implemented in the years 2003 to 2005. *Subsection 6.2* considers increasing wage dispersion and the emergence of the low-pay sector in Germany. *Subsection 6.3*

addresses poverty risk. *Subsection 6.4* discusses the effectiveness of the tax and public transfer mechanisms across the income distribution. Finally, *subsection 6.5* explores distributional effects of the rising significance of consumption taxes.

### *6.1 Labor Market Reforms and Changes in the Public Transfer System*

Between 2003 and 2005 several labor market reforms, including adjustments in the public transfer system known as the “Hartz Reforms”, have been set in place. In 2003 and 2004 these actions comprised a number of institutional changes to enhance the effectiveness of public job services and aimed at simplifying job creation by lowering taxes and insurance payments for several types of atypical employment. In 2005 the reform merged and actually cut the standing unemployment benefits for long-term unemployed, cut welfare benefits, and reduced the duration of unemployment benefits.

As a consequence of these changes in the labor market institutions and the corresponding adjustments in the public transfer system, the implied transfer cuts led to a reduction of net income of affected households. At the same time the intensified acceptance of comparably low-paid jobs (which has been discussed above in *subsection 4.2.3*) contributed to the decline of average individual labor income. The actual impact of these effects on income inequality is difficult to measure and must not be overrated. The major argument, which qualifies the consequences, is that income inequality has started increasing before 2005 (see Biewen and Juhasz 2012 and IAW 2011).

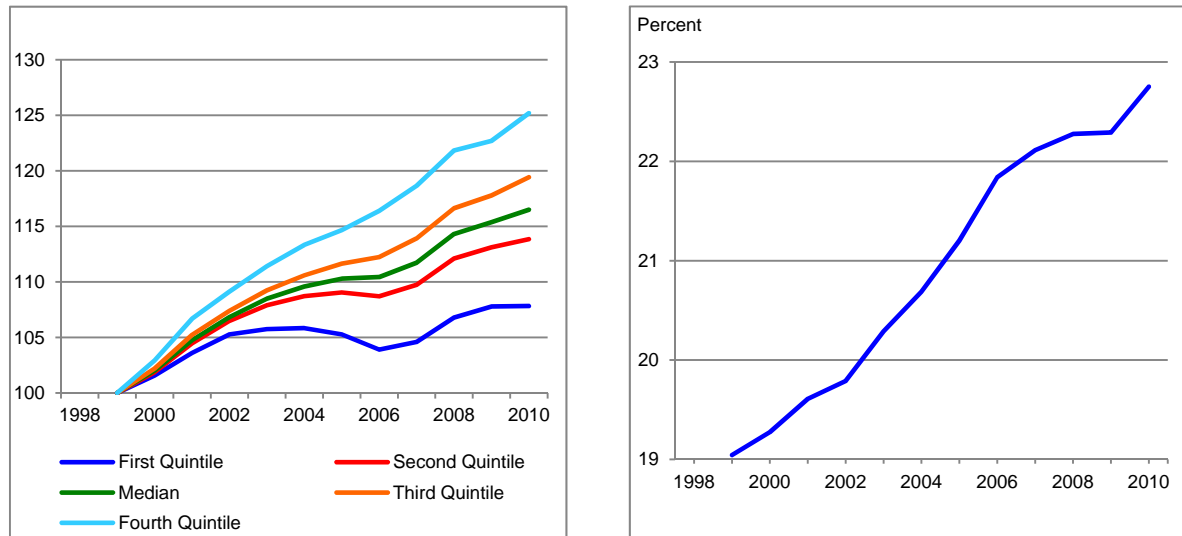
Nevertheless, the evaluation of these labor market reforms and adjustments of the public transfer system is highly controversial and its impact on employment changes not clear. From 2005 onwards, Germany has experienced considerable reduction in short-term and long-term unemployment (see *subsection 4.2.2*). However, the actual impact of the supply-side reforms on this margin is questionable, since employment as a whole has increased enormously. In contrast, the hardships associated with the transfer cuts are clearly visible: For example, the number of children living in affected households has risen tremendously and the poverty rate has not fallen despite the strong employment gains (see *subsection 6.4*).

Besides this, the actual magnitude of the cut of unemployment benefits as well as the conditions under which people receive these transfers – in particular the deductions from transfer payments of labor income earned through marginal employment – might have exhibited and still exhibit a downward pressure on wages and potentially hamper the formation of full-time jobs.

## 6.2 Wage Dispersion and Increasing Low-Pay Sector

As argued in *subsection 4.2.3*, the German labor market has been subject to a clear trend of increasing wage dispersion since the 1990s. The Federal Employment Agency explored the question as to which pay category experienced above and below average increases in remuneration from 1999 to 2010 on the basis of employment statistics.<sup>11</sup> In *figure 6.1* (left panel), the development of wage quintiles is shown. As a reference line the median pay is chosen.

*Figure 6.1 Average Monthly Gross Salary and Share of Low-Pay Sector (Full-time Employees), 1999-2010*



*Note:* The left panel of this graph contrasts the four quintiles and the median of the distribution of average monthly gross salaries for full-time employees in Germany from 1999-2010. The data comprises all full-time employees subject to social security contributions. Reference date: 31st December 2010. The right panel of this figure shows the share of the low-pay sector in Germany from 1999-2010. The illustration refers to full-time employees and is based on the low-wage threshold for the entire German economy.

*Source:* FEA Employment Statistic.

While the median wage increased by 16 percent between 1999 and 2010, the first and the second quintile rose below average, whereas the third and the fourth quintile rose above average. This was more or less the case during the whole time period as can be seen from the increasing spread of all lines with respect to the median. The trend in the first wage quintile is noteworthy: In the early 2000s, this pay category did not experience any increase, but suffered a loss in 2005 and 2006. From 2007 onwards, average pay in this category increased again, but nevertheless, the spread to the other quintiles increased. This is particularly obvious in the year 2010 where average pay in the second, third and fourth wage quintiles increased but stagnated in the first quintile.

<sup>11</sup> German: "Entgeltstatistik der Bundesagentur für Arbeit". This statistic collects reported data from the social security system. Hence wage income refers to the average monthly gross salary of all full-time workers who were employed at the 31st of December in their main job.

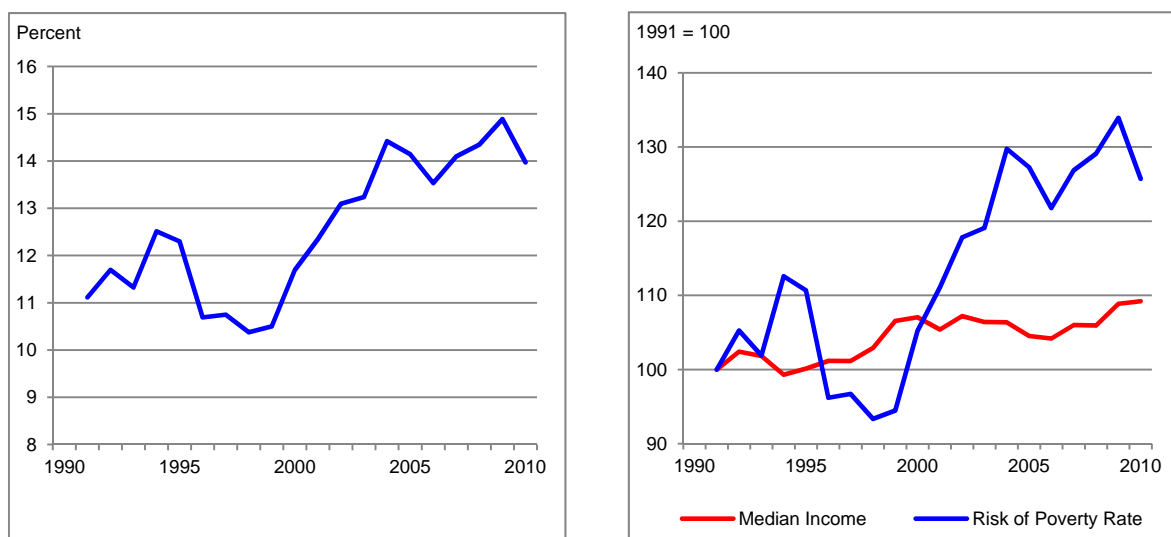
This illustrates that while the concentration of market equivalized income has decreased since 2005 (see *subsection 4.1*) individual full-time labor incomes steadily diverged. Thus, the reduction of inequality of market equivalized income reported above is due to a reallocation of labor and labor income as well as a structural change in labor force participation of different employment types (particularly visible in the strong increase of atypical work) across households.

This continuous trend of rising wage inequality expresses itself in an increasing share of the low-pay sector. According to figures from the employment statistics of the Federal Employment Agency, the share of the low-pay sector has continuously increased from 1999 to 2010 by almost 4 percentage points, with only one exception. In the crisis year 2009 the share of the low-pay sector stagnated (see *figure 6.1*, right panel).

### 6.3 Sustained Risk of Income Poverty

Another important issue that is not appropriately reflected when considering standard measures of inequality of net equivalized income is the risk of income poverty. The risk of poverty rate, which measures the share of people living on less than 60 percent of median net equivalized income, increased from 1991 to 2010 by almost 3 percentage points (see *figure 6.2*). Most striking is the fact that despite the strong employment gains and the reduction of market income inequality, the risk of poverty rate has remained high since 2005.

Figure 6.2 Risk of Poverty Rate (left) and Poverty Risk and Median Income (right), 1991-2010



Note: This figure shows the development of the risk of poverty rate (on the left) and the relative evolution of this rate and real median net equivalized income (on the right). Both representations are for Germany and cover the years 1991-2010. Median income is in real terms and calculated in 2010 prices.

Source: SOEP, own calculations.



Increasing poverty risk implies that people fall back relative to others and are limited in their social participation which might lead to social unrest. As the risk of poverty rate is a relative measure, an increase might be driven by rising median income. However, as illustrated in the years 1999 to 2004, median income did not change but poverty risk increased by more than 27 percent, implying that people lost in absolute terms. Within this period, the risk of poverty rate increased by about 4 percentage points.

#### *6.4 Taxes and Social Security Contributions Across the Income Distribution*

Two further distributional aspects not directly addressed in our analyses of net and market equivalized incomes arise from the burden of taxes and social security contributions across the income distribution. These issues focus on contributions to financing government revenues. Two facts are worth stressing: First, top incomes contribute comparably little in terms of taxes and social security contributions. Second, value added taxes work to the disfavor of low income households.

The comparably small contribution of top incomes to public redistribution has recently been documented in a study from the IW (Institut der Deutschen Wirtschaft, see Schäfer 2013). Based on official data from the survey on income and expenditure (EVS)<sup>12</sup> the author compares shares of income and sales taxes and social insurance contributions on net equivalized income by income classes (see *figure 6.3*). Three aspects stand out: First, only income tax works progressively, that is the percentage tax burden by the income tax increases with income. Second, the value added tax, however, is a regressive tax, which works the other way round: The lower the income of a person, the higher is their percentage tax burden from this tax. Third, in the bottom half of the income distribution social security contributions are progressive and in the upper half regressive.

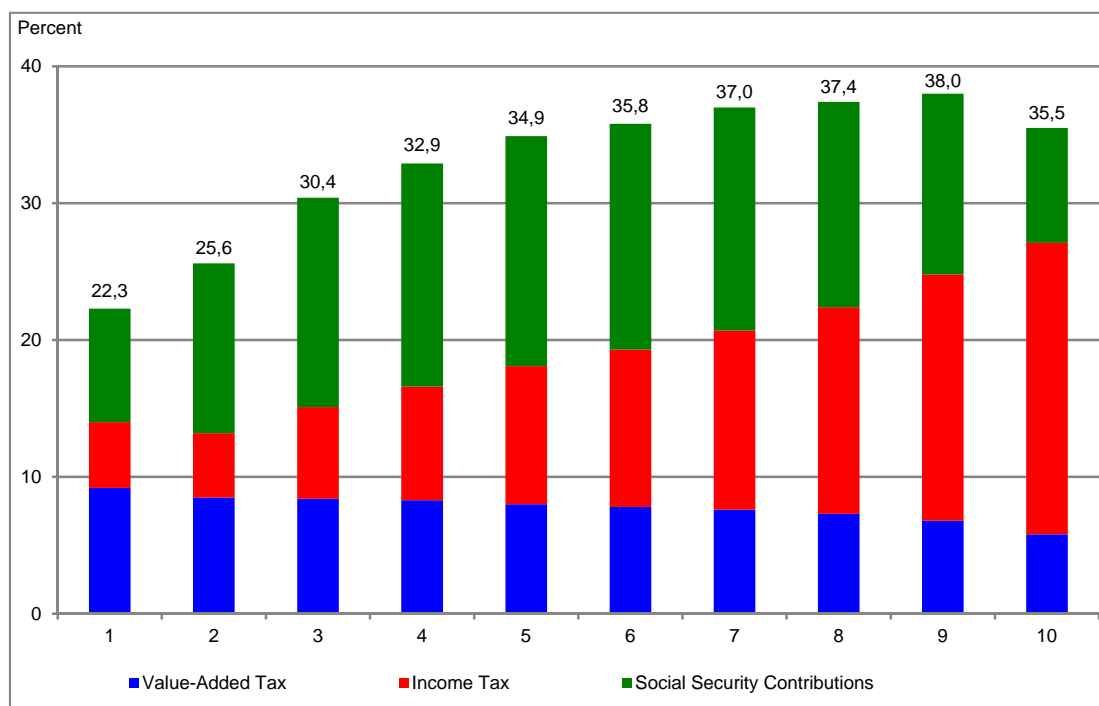
However, for a welfare analysis, the total burden, i.e. the sum of income taxes, value added taxes and social security contributions, rather than single components, matter. The total burden is highly progressive in the lower half of the income distribution, but the progression flattens significantly between the sixth and ninth income deciles. It is worth noting that the overall tax burden of the highest income decile, at only 35.5 percent, is lower than for the sixth decile.

Given the fact that the tenth income decile was the only group which increased its income share of net equivalized income in the period 1991 to 2010 (see *subsection 3.4*), these findings suggest that one source for the reduction in the redistributive effect (as discussed in *subsection 5.1*) is that high incomes contribute proportionally less to the financing of government revenues.

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<sup>12</sup> The EVS (Einkommens- und Verbrauchsstichprobe) is an important statistic on living conditions of private households in Germany. The survey takes place every five years. The latest available year is 2008. In the survey information on income and expenditures of households is recorded.

Figure 6.3 Share of Total Burden (Taxes and Social Security Contributions) in Percentage of Net Equivalized Income by Income Deciles, 2012



Note: The evaluation is based on data from the Income and Expenditure Survey (EVS) from the Federal Statistical Office. The basic data was collected in 2008 and was approximated for 2012 by Schäfer (2013). The shares are reported in percent.

Source: Schäfer (2013).

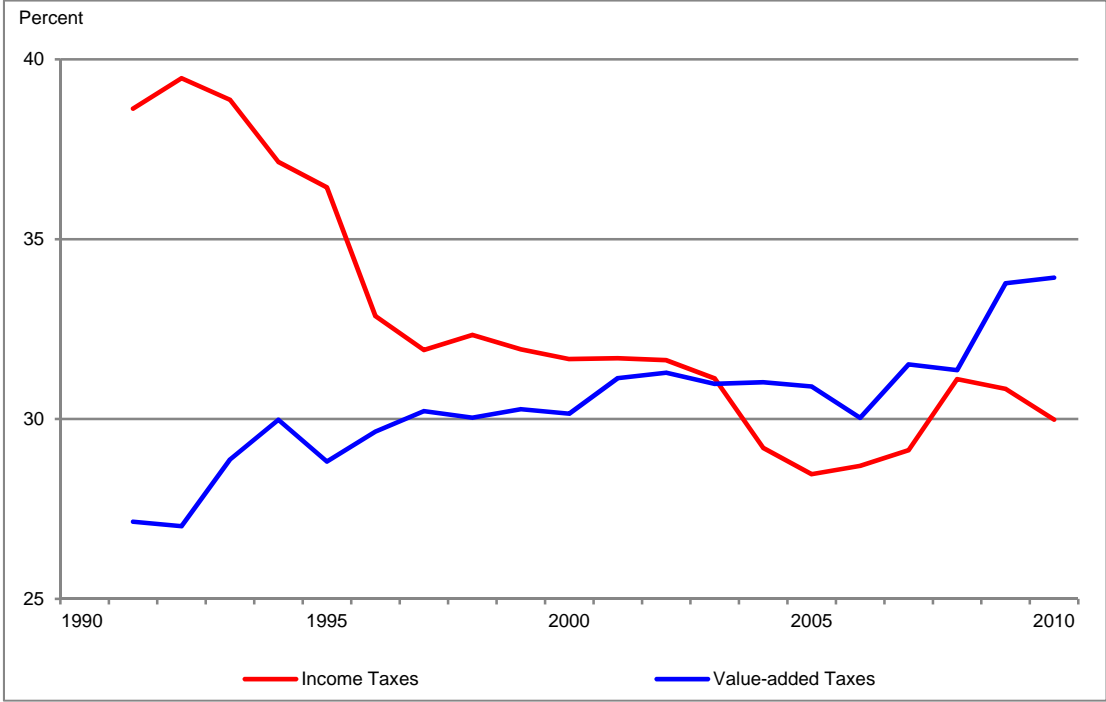
### 6.5 Increasing Importance of Consumption Taxes

In addition to the described allocation of the total burden across the income distribution, the development of the relative importance of the different types of taxes over time also reveals implications for the income distribution that are not measurable using the standard concepts applied above. We argue that the increase in value added taxes has effectively worked as a redistributor from low to high income households.

The share of different taxes in total tax revenue changed considerably over the last two decades (see figure 6.4). Income tax used to be the most important single tax with a share of more than 38 percent in the early 1990s. This share decreased over the years to less than 29 percent in the mid-2000s. In 2010 the share of income tax was 30 percent. While income tax proportionally lost some of its contribution to overall tax revenues, value added tax became more and more important and increased its share from around 27 percent in 1991 to more than 33 percent in 2010. In 2007 the government increased value-added taxes from 16 percent to 19 percent, causing an increase in its tax revenue of far

more than 30 billion euros from 146.7 billion euros in 2006 to 180 billion euros in 2010.<sup>13</sup> In comparison, the total yearly tax revenues from either capital gains tax or corporation tax has never been above 30 and 23.6 billion euros, respectively.

Figure 6.4 Share of Income and Value Added Taxes of Total Tax Revenues, 1991-2010



Note: This figure contrasts the shares of income and value added taxes in total tax revenues for Germany from 1991-2010. Shares are reported in percent.

Source: Data freely available on the Website of the GCEE, own calculations.

## 7 Summary and Implications

In this study we discussed the development of income inequality in Germany from 1991 to 2010. The goal of our examination was to shed light on the main explanatory factors for the development of income inequality in order to better understand changes in the distribution of net equivalized income in Germany. To this end our analysis aimed at providing insights into the circumstances under which inequality evolved and which trends in the economy are most likely to provide an explanation for changes in income concentration.

Table 7.1 summarizes our main results. The steady increase of inequality in market equivalized income observed during the whole time period can be explained by a number of demographic trends, such as declining household sizes and shifts in the educational structure but also by rising capital income shares, the increasing significance of atypical employment and the increasing wage spread

<sup>13</sup> Source: Data freely available on the Website of the GCEE, own calculations.

among full-time employees. The trend increase of inequality in net equivalized income is caused by the steady increase in the concentration of market equivalized income and the decreasing redistributive effectiveness of taxes and public transfers.

Table 7.1 Main Drivers of Income Inequality in Germany, 1991-2010

	Market Equivalized Income	Net Equivalized Income
<b>1991-2010: Long-term trend</b>	<p><b>Steady increase in inequality through:</b></p> <ul style="list-style-type: none"> <li>• demographic trends (declining household size, shifts in the educational structure)</li> <li>• increasing significance of atypical employment, rising capital income shares</li> <li>• rising wage spread among full-time employees</li> </ul>	<p><b>Rising inequality through:</b></p> <ul style="list-style-type: none"> <li>• steady increase in concentration of market income</li> <li>• decreasing redistributive effect of taxes and public transfers</li> </ul>
<b>2000-2005: Acceleration</b>	<p><b>Slight acceleration of the increase in income concentration due to:</b></p> <ul style="list-style-type: none"> <li>• rising unemployment, increase in atypical employment, strong increase of capital income shares</li> </ul>	<p><b>Significant increase in concentration through:</b></p> <ul style="list-style-type: none"> <li>• accelerated concentration of market income</li> <li>• cut of the maximum income tax rate</li> </ul>
<b>2006-2010: Stagnation</b>	<p><b>Decreasing inequality from 2006 onwards because of:</b></p> <ul style="list-style-type: none"> <li>• strong increase in employment</li> <li>• no further expansion of the share of atypical employment</li> </ul>	<p><b>No further increase in inequality since 2005 because of:</b></p> <ul style="list-style-type: none"> <li>• decreasing market income concentration</li> <li>• reduced effectiveness of the taxes and public transfer system</li> </ul>

The slight acceleration of the increase in the concentration of market equivalized income in the first half of the 2000s was primarily due to rising unemployment, a pronounced increase in atypical employment and in the upper part of the income distribution also driven by a strong increase of capital income shares. The significant increase in the concentration of net equivalized income can be attributed to the accelerated concentration of market income and the reduction of the maximum income tax rate.

Between 2006 and 2010 inequality of market equivalized income decreased due to the strong increase in employment and the fact that the proportion of atypically employed persons in the labor force did not rise further. Given the developments in the labor market, the fall in market income concentration as such is not surprising. However, it seems remarkable that inequality did not decrease any further. Moreover, in contrast to the fall in concentration of market equivalized income, wage inequality kept rising and the low-pay sector continued to expand. The decline in inequality of market equivalized income positively affected the development of the concentration of net equivalized income, which did not increase further in this period. However, due to the reduced effectiveness of the tax and public transfer system, inequality in net equivalized income did not fall and the risk of poverty rate remained high despite considerable job growth.

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