

# **No Rise in Income Inequality?**

## **A Reappraisal of the German Income Distribution 1992 - 2001**

by

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**Abstract:** We analyze the distribution and concentration of market incomes in Germany in the period 1992 to 2001 on the basis of an integrated data set of individual tax returns and the German Socio-Economic Panel. The unique feature of this integrated data set is that it encompasses the whole spectrum of the population, from the very poor to the very rich. We find a modest increase in overall inequality of market incomes in Germany in the period 1992 to 2001, most of which occurred in east Germany during the first few years of the transition period. However, this relative stability of overall inequality disguises significant changes that occurred at the very top of the income distribution. The increase of income inequality can be mainly attributed to a substantial increase of market incomes of the German economic elite, which we define as the richest 0.001% persons in the population. In that group, the income share received in form of wage income substantially increased.

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# 1 Introduction

During the last few years, empirical studies have documented a rise of income inequality in several OECD countries. There is a consensus that income inequality in the United States today is substantially larger than twenty years ago. Other English-speaking countries, like the United Kingdom and Canada, seem to have made the same experience, whereas the evolution of income inequality is more uncertain in the case of other countries, e.g. in the case of the largest European economy, Germany. These country differences are typically explained by institutional factors that impact on the functioning of labor markets: While skill-biased technological change and globalization might have increased earnings inequality in more market oriented countries, they might have primarily reduced employment and increased unemployment of low-skilled workers in countries with less flexible market wages.

Whereas the early empirical literature has focused on inequality across the earnings distribution (see, e.g., Gottschalk and Danziger, 2005. Autor, Katz and Kearsey, 2005), recent empirical research has shifted attention to inequality of total market income, especially at the top of the distribution. Using income tax statistics, Piketty and Saez (2003, 2006) as well as Dew-Becker and Gordon (2005) show that income inequality in the US has increased substantially over recent decades, and that this increase has mostly occurred at the very top of the income distribution, which is typically not represented in household questionnaires used in previous empirical research on earnings inequality. They also show that the increase of top incomes is to a large extent due to gains in wage income rather than capital income. A similar but less pronounced picture is also observed for the United Kingdom and for Canada, whereas for other European countries no such increase in income inequality seems to have occurred (for a summary of the international evidence, see Piketty and Saez, 2006).

For Germany, previous research on the evolution of inequality of market income after reunification in 1990 suggests the following developments (see, in particular, Hauser, 2003, Becker and Hauser, 2004, German Council of Economic Advisors, 2006). First, overall inequality of market incomes increased only slightly in the decade after reunification, and this modest increase was mostly driven by a marked increase of inequality in east Germany in the first five years after reunification. Second, inequality in market incomes started to increase significantly only after 2002. Third, increased inequality in market income seems to be related to increased unemployment, especially in recent years (German Council of Economic Advisors, 2006). Fourth, there seems to have been no marked increase in the share of top incomes in the 1990s (Bach, Corneo and Steiner, 2005; Dell, 2005).

Previous research on the evolution of income inequality was either based on data sets that severely underrepresented the very high incomes or on data sets that contain little information about bottom segments of the distribution. As an example of the former, studies based on the German Socio-Economic Panel (SOEP) or the German Income and Consumption Survey (EVS) cannot assess the extent of income concentration at the top, since the rich do not participate in those surveys. Symmetrically, studies based on income tax statistics do not allow one to analyze low income segments, as the

corresponding households typically do not pay income tax. In both cases, a mutilated picture of the overall distribution obtains.

In this paper we aim at shedding light on the evolution of income inequality and income concentration in Germany in the period 1992 to 2001. For this purpose, we merge information from the SOEP into official income tax returns data at the individual level, accessed to through the Research Data Centre of the Federal Statistical Office of Germany, which are currently available for the years 1992, 1995, 1998, and 2001. This new integrated data set contains reliable information about the entire income distribution, including both the very poor and the very rich. The data from the tax statistics include stratified 10% samples of the total taxpayer population in Germany. Noticeably, *all* taxpayers that belong to the top percentile of the income distribution are included in our data set. This allows us to look at very small fractiles within the top 1% of the income distribution. On the other hand, the data from the SOEP contains a sample that is highly representative of households with very low incomes. As a result of exploiting those two data sources jointly, a reliable picture of the entire income distribution is obtained.

The focus of this paper is on the evolution of primary – or market – incomes which has hitherto not been analyzed in a consistent way on the basis of micro data representing the German population as a whole. Changes in the distribution of primary incomes are the result of a complex interaction of market forces, economic policies, and changes in social institutions, e.g. the trade unions and the system of collective wage negotiations. A comprehensive assessment of the evolution of primary incomes can provide a useful guide to better understanding how markets, policy and institutions affect the economy. Moreover, assessing the distribution of primary incomes constitutes a necessary prerequisite in order to study the redistributive impact of the tax-transfer system. Thus, the empirical analysis of primary incomes is an important first step in a more general analysis of net household incomes which have traditionally been the focus of most research on income inequality.

The remainder of this paper is organized as follows: In the next section, we describe the macro-economic development in Germany over the last decade and provide some institutional background to set the scene for the subsequent empirical analysis of the distribution of incomes. In Section 3, the integrated data set used for this analysis and the underlying methodology are described. Sections 4 and 5 contain the main results of our analysis. We find a modest increase in overall inequality of market incomes in Germany in the period 1992 to 2001. For instance, the Gini coefficient for Germany as a whole increased from 0.59 to 0.61. The increase of income inequality can be mainly attributed to a substantial increase of market incomes of the economic elite, which we define as the 0.001% richest individuals in the population. In 2001, this group included about 650 persons, with an average income of about 15 million Euro, not including capital gains. We also show that the substantial increase in market incomes of the economic elite in Germany, too, is driven by a strong increase of this group's share in wage income. Section 6 contains a summary and a discussion of these results.

## 2 Macroeconomic and Institutional Background

To set the scene for the subsequent empirical analysis of the evolution of market income inequality in Germany over the last decade, we start with a brief description of macroeconomic developments in this period and a review of relevant institutions that may have affected the German income distribution in this period. The major historical and economic development in Germany within this period has been the reunification of east and west Germany (see, e.g., Burda and Hunt, 2001). Reunification has, first of all, had a tremendous impact on the distribution of incomes in east Germany (see, e.g., Franz and Steiner, 2000) but has also had significant repercussions on the German economy as a whole, and may thereby have also impacted on the income distribution more generally. Thus, we will also summarize differences in the evolution of important economic indicators between the two regions below.

Following unification in 1990 and the brief subsequent post-unification boom, the German economy experienced a long period of slow economic growth. In the period 1992 to 2001, German national income increased by 290 billion Euro (22.9%) in nominal but only about 55 billion Euro (3.8%) in real terms (deflated by the consumer price index). The average yearly growth rate of real national income thus amounted to a meagre 0.4% in this period. Average productivity growth, i.e. the growth rate of real GDP per employed person, increased by 12.6 between 1992 and 2001, or by an average of only 1.3% per year. In the period under investigation, Germany thus became the laggard in productivity growth in the European Union and fell dramatically behind the US, where productivity increased by an average of more than 2% percent per year (see Dew-Becker and Gordon, 2005). In this period, compensation of employees (including employers' social security contributions) and gross wages and salaries increased by, respectively, 22.2% and 20.3%, entrepreneurial and property income increased by about 25%. Labor's share in national income remained fairly stable at roughly 72% during the observation period; adjusting for the change in total working hours, the share of wage income in national income increased by 1.2 percentage points between 1992 and 2001.

The weak productivity performance of the German economy was accompanied by a modest increase in overall employment by 3% in the period 1992 to 2001, from 38.0 to 39.2 million employed people (including the self-employed). The labor force increased by roughly 1.8 million people in this period, with a much stronger increase of the self-employed (11.4%) than employees (2.1%). Total working hours declined by almost 4% in this period. This decline was more pronounced among employees (5.9%) than the self-employed. This was mainly related to the strong increase of part-time work among women and also to the extension of so-called 'marginal jobs' with low earnings and small hours, not covered by the social security system. The unemployment rate increased from 5.7% in 1992 to 6.9% in 2001 as measured according to the harmonized OECD definition, and from 8.5% to 10.3% according to the national definition.

Table 1

**Macroeconomic indicators for Germany, 1991-2005**

	unit	1992	1995	1998	2001	2005	% change 1992- 2001	% change 1992- 2005
Real GDP	2000=100	87.3	90.5	95.0	101.2	103.2	16.0	18.3
Real GDP per employed person	Euro	47 279	49 736	51 778	53 255	54 984	12.6	16.3
Real national income <sup>1)</sup>	billion Euro	1 475	1 488	1 496	1 530	1 547	3.8	4.9
Nominal national income	billion Euro	1 270	1 397	1 466	1 561	1 675	22.9	31.9
Compensation of employees	billion Euro	917	997	1 032	1 121	1 129	22.2	23.1
Gross wages and salaries	billion Euro	750	805	830	902	911	20.3	21.5
Entrepreneurial and property income	billion Euro	353	400	434	440	546	24.9	54.8
Labor's share in national income	%	72.2	71.4	70.4	71.8	67.4	- 0.6	- 6.7
Labor's share at 1991 working hours	%	72.4	72.4	72.1	73.6	69.8	1.6	- 3.6
Population	1 000	80 594	81 661	82 029	82 340	82 464	2.2	2.3
Labor Force	1 000	40 385	40 413	41 180	42 109	42 619	4.3	5.5
Employed persons (national concept)	1 000	38 066	37 546	37 834	39 209	38 726	3.0	1.7
Employees	1 000	34 489	33 797	33 969	35 226	34 370	2.1	- 0.3
Self-employed persons	1 000	3 577	3 749	3 865	3 983	4 356	11.4	21.8
Working hours (domestic concept)	mill. hours	59 608	57 665	56 992	57 338	55 804	- 3.8	- 6.4
thereof: employees	mill. hours	51 613	49 326	48 298	48 590	46 761	- 5.9	- 9.4
Unemployed persons	1 000	2 319	2 867	3 346	2 900	3 893	25.1	67.9
Unemployment rate (% of labor force)	%	5.7	7.1	8.1	6.9	9.1	19.9	59.1
Unemployment rate (registered, national stat.)	%	8.5	10.4	12.3	10.3	13.0	21.8	53.3
Gross fixed capital at 2000 prices	billion Euro	8 320	9 055	9 714	10 390	11 085	24.9	33.2
Net fixed capital at current purchasers' prices	billion Euro	4 832	5 717	6 088	6 487	6 843	34.3	41.6
GDP deflator	2000=100	91.5	99.0	100.3	101.2	105.2	10.6	15.0
Consumer price index	2000=100	86.1	93.9	98.0	102.0	108.3	18.5	25.8
West Germany incl. Berlin	2000=100	87.0	94.1	97.9	102.0	108.3	17.2	24.4
East Germany excl. Berlin	2000=100	79.9	93.3	98.2	102.0	108.3	27.7	35.6
East/west relations								
GDP per capita employed person	%	48.7	66.4	69.6	74.1	77.2	52.3	58.6
Gross wages and salaries per employee	%	62.0	74.5	75.6	77.0	77.7	24.3	25.5
Employed persons (domestic concept)	%	18.5	19.2	18.6	17.3	16.8	- 6.3	- 9.1
Unemployment rate (registered, nat. stat.)	%	225.0	162.6	186.7	234.9	186.3	4.4	- 17.2

1) Deflated by consumer price index.

Source: National Accounts; Federal Employment Agency (BA).

In the subsequent period until 2005, growth rates of real national income productivity growth remained fairly low, wage income changed little, and entrepreneurial and property income markedly increased. Consequently, labor's share in national income declined by 4.4 percentage points between 2001 and 2005. Adjusting for the change in total working hours, the decline in labor's share is 3.7 percentage points. In this period, the unemployment rate increased by more than 2 percentage points (OECD definition) and almost 3 percentage points (national definition), respectively. Working hours of employees decreased by 3.5% between 2001 and 2005, compared to about 9.4% over the whole period since the early 1990s.

Several institutional factors might have contributed to these macroeconomic developments. The single most important of these factors has probably been the transition of the east German economy in the wake of reunification. Starting from less than half of the west German level in 1992, real GDP per employed person in east Germany increased to almost 75% of the west German level in 2001 (Table 1). The east-west ratio of gross average wage income increased from 62% to 77% in this period,

with most of this increase occurring between 1992 and 1995. Employment in east Germany relative to west Germany declined from 18.5% to 16.8% between 1992 and 2005, while the unemployment rate in east Germany remained at roughly double the west German level throughout the period. These developments were accompanied by a marked increase in income inequality in east Germany in the first few years after reunification, which were mainly driven by an increase in wage inequality (see, e.g., Franz and Steiner, 2000).

Other factors which might have contributed to the macroeconomic developments depicted in Table 1 include: First, since the beginning of the 1990s the German economy faced a tremendous increase of international economic integration. Trade, foreign direct investment and migration between Germany and the former socialist countries including China substantially increased in the 1990s. Second, as most other developed economies, the German economy was affected by conspicuous advances in information technologies during that period. As a consequence, skill-biased technological change is likely to have impacted on the German employment structure (see, e.g., Steiner and Wagner 1998). Third, a wave of privatizations occurred in Germany. To some extent this was the consequence of reunification and the political decision to privatize state-owned firms of the former GDR, although large-scale privatizations also occurred in public utilities in west Germany. Fourth, employment in the public sector dramatically decreased, both in relative and absolute terms. This was due to the over-manning of the public administration at the start of the 1990s as well as the fiscal goal of improving the public budget, that goal being stressed by the commitment of Germany to the Maastricht Treaty of the European Union. Fifth, the German trade unions lost a significant fraction of their members during this period, leading to a sharp decline in the share of workers covered by collective wage agreements.

### **3 Data and Methodology**

#### **3.1 Data sources**

Our empirical investigation relies on the integration of individual-level data from the German Socio-Economic Panel and official income tax returns for re-unified Germany in the years 1992, 1995, 1998, and 2001. More recent data on individual tax returns are presently not available. This is due to long-lasting assessment procedures and a triennial interval between subsequent income tax statistics. We merge these data with individual level data for the same years to account for the fact that only a fraction of the overall population living in Germany is covered by the income tax statistics. As we describe below, this not only affects the bottom of the income distribution but, due to special regulations in the tax code, may affect people in the middle of the distribution as well.

#### **Income tax returns (ITR) data**

For each of the currently available 4 years, the ITR data include a representative sample of about 3 million tax returns, i.e. roughly 10% of the entire taxpayer population. Samples are drawn by the Ger-

man Federal Statistical Office from the set of all tax files of each year so as to build a stratified random sample. The sampling fraction for pre-defined cells according to gross taxable income and other tax-relevant characteristics is determined by minimizing the standard error with respect to taxable income (Zwick, 2001). In particular, tax return samples include *all* taxpayers with high incomes or high income losses.

In our sample, a tax unit may consist of a single taxpayer or a married couple. Single taxpayers are taxed according to the tax schedule for individuals (“Grundtabelle”). Nearly all married couples are taxed jointly with full income splitting. Slightly more than fifty percent of all tax returns were joint files of married couples. In the case of joint filing, the couple’s tax liability equals twice the tax liability of a single taxpayer whose income is half of the couple’s income. In nearly all cases, joint taxation with full income splitting is less onerous than individual taxation, therefore the former procedure is used by default in tax assessment. Importantly for the present empirical analysis, we can identify the various income components for each individual within a household and thus analyze personal incomes rather than just household incomes, which is more appropriate for the analysis of the distribution of primary (market) incomes.

The original data set includes all assessed taxpayers, i.e. single persons or married couples who file a tax return in a given year. Households living on social assistance or income replacement benefits (e.g. from private insurance or social security) usually do not file, unless they have other taxable income. Approximately, more than two-thirds of all German retirees do not file a tax return. Furthermore, households with wage earnings only file a tax return if they want to claim itemized deductions that are not already taken into account by their wage tax, which is withheld at source by the employer. By international standards, the share of the German population that pays income tax is rather large. Assuming that one taxpayer corresponds to one household, more than three quarters of all German households pay income tax. Although, the ITR data do not well portray the lower tail of the income distribution, in the medium and especially upper range of the income distribution these data are very representative, as nearly all domestic residents of these groups file a tax return.

## **German Socio-Economic Panel (SOEP)**

To get a comprehensive picture of the distribution of incomes in Germany we merge our tax return data with data from the German Socio-Economic Panel (SOEP).<sup>1</sup> The SOEP is a representative sample of private households living in Germany with detailed information on incomes, both at the individual and household level. It started in 1984 and is conducted on a yearly basis, the latest available wave refers to the year 2005. Detailed information on individual and household gross incomes as well as income components is collected retrospectively in each wave for the previous year. Since 1990 it also

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<sup>1</sup> A description of the SOEP can be downloaded from [www.diw.de/soep](http://www.diw.de/soep); see also Haisken-DeNew and Frick (2005).

covers the east German population. The sample size is much smaller than that of the ITR; for example, in the year 2001 about 12,000 households were interviewed representing 38.8 million private households living in Germany. Still, the SOEP represents a larger share of the population than the ITR since it also includes people who do not file tax returns. Furthermore, it is not top-coded like the other individual-level data set, the Income and Consumption Survey (EVS), which has extensively been used for distributional analyses in Germany (see, e.g.. Hauser and Becker, 2000; Hauser 2003). However, the SOEP only contains a relatively small number of people with high incomes. Starting in 2002 (S-wave), the SOEP includes a disproportionately large sample of “high-income” households. This so-called *high-income sample* consists of over 1,200 households with monthly net incomes of at least 3,750 Euro. Although the implied level of gross income would put all members of this sample in the top decile of the gross personal income distribution, the great majority of them would fall at the bottom of the top decile and only very few would make it to the top 1%. Thus, even taking advantage of the high-income sample, the SOEP is not representative for the population of individuals at the top 5% or 1% of the income distribution.

### 3.2 Gross market income

In this study, we focus on gross market income, also termed primary income at the individual level. Since gross market income is closely related to national income, it seems the best measure to analyze the impact of economic factors on the evolution and composition of the income distribution. In the following analysis, we will distinguish between the following three components of gross market income: (i) wage income, (ii) business income, and (iii) capital income.

We have tried to make the definition of gross market income and its components in the ITR data and the SOEP as close as possible, given the inherent differences in the way information is collected in the two data sets. In principle, German tax law employs a comprehensive notion of income which includes all earned income and capital income. However, exemptions and various types of tax reliefs create a substantial gap between taxable income and gross market income. To cope with this problem and to derive a measure of gross market income, we have adjusted taxable income by adding all tax-exempted incomes and tax reliefs as well as by accounting for certain tax avoidance strategies that can be identified within the ITR data, as described below. Since the SOEP uses a broader definition of income and contains detailed information on various income components, we can construct a measure of gross market income which is very close to the one we can derive from the ITR data.

Our measure of *wage income* consists of wages and salaries and calculated before deduction of allowable expenses. We do not include employers’ social security contributions, however, since the required information is neither directly available in the ITR nor the SOEP data.<sup>2</sup> Income from *business*

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<sup>2</sup> Employers’ social security contributions could be simulated on the basis of other information contained in both data sets and some simplifying assumptions, which we plan to do in future work.

*activity* includes taxable income from agriculture and forestry, from unincorporated business enterprise and from self-employed activities (professional services). *Capital income* includes all capital income from private investments (interest and dividends), except income from business activities, from renting and leasing, and from capital gains.<sup>3</sup> For the following reasons, we do not include capital gains in the definition of capital income. First, a significant fraction of capital gains was exempted from the income tax and no information on them is therefore available in the ITR data. Second, observed capital gains are predominantly capital gains that were realized from transfer of an enterprise, parts of an enterprise, or shareholdings. They thus form a very volatile component of income since they do not stem from regular business and are realized by individuals in a lumpy way. Third, one observes an abnormal increase in realized capital gains from business activity in 1998 (29.3 billion Euro against 8.8 billion Euro in 1995 and 8.3 billion Euro in 1992).

We also do not include income derived from public pensions, the unemployment compensation system and health and disability insurance in the definition of market income because they are only partly determined by previous contributions. In principle, these social insurance systems are all run on a pay-as-you-go basis, although there are substantial subsidies from the federal budget, especially in case of the public pension system.<sup>4</sup> Finally, we do not include the net rental value of owner-occupied housing nor the value of household production activities because we do not observe them in the ITC data.

Due to our definition of market income, a relatively large share of the population reports zero individual market income. This simply reflects the fact that a very large share of the German population mainly lives on transfers provided by relatives or the German welfare state. A relatively small share of the population also reports negative incomes. This often occurs in ITR data where only taxable income is reported, but may also arise in household surveys in the case of households whose primary source of income is not from dependent employment. In some studies negative incomes are simply disregarded in the calculation of market incomes on the basis of the argument that they mainly arise for tax reasons, see, e.g. Dew-Becker and Gordon (2005: 40). Since we have adjusted taxable income for tax reliefs and tax avoidance strategies identifiable in the ITR data, we see no reason to exclude negative incomes generally, given that, especially for business income, these may in fact occur in certain years. However, we do disregard losses from *renting and leasing* exceeding some thresholds, since most of these losses are likely to arise from tax avoidance.<sup>5</sup>

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<sup>3</sup> Piketty (2003), Piketty and Saez (2003), Dew-Becker and Gordon (2005) and Dell (2005) also excluded capital gains from their income measure.

<sup>4</sup> These subsidies are meant to cover expenditures on certain groups of the population who did not contribute to the system, like citizens of the former GDR, widows who never contributed themselves to the system, and mothers with short contribution periods because of child-rearing activities.

<sup>5</sup> As described in Bach, Corneo and Steiner (2005), renting and leasing has been a vast loophole for tax-saving activities in Germany especially in the 1990s. Depreciation allowances, tax reliefs and generous accounting rules in combination with tax-free capital gains led to massive budgetary losses that could be set off against

### 3.3 Data matching and integration

The integrated data file we develop for the subsequent analysis is obtained by matching the ITR data to *individual* data from the SOEP for the respective years. We perform the analysis at the individual level by exploiting the common information contained in both datasets to make incomes match as closely as possible to the concept of gross market income presented in the previous section. We first edit the SOEP accurately at the level of taxpayers, i.e. married couples represent one taxpayer, unmarried couples represent two taxpayers. Children and young adults below 20 years without own market income and those eligible to the child benefit are ignored in our analysis.

Our matching approach, which is briefly described in Appendix 2, selects for each person in the SOEP a certain number of persons in the ITR data base, the number being given by the relation of the respective weighting factors in the two data sets. Given that the ITR data contains a smaller subset of the population than the SOEP, as described above, not all individuals contained in the SOEP can be matched to the appropriate number of “statistical twins” in the ITR. After all observations in the ITR data are exhausted by this matching algorithm, we are left with a certain number of unmatched individuals in the SOEP, which we add to the ITR data set to get the integrated ITR-SOEP data set. Thereby, not only individuals who have no or little income and, therefore, do not pay taxes, are added, but also those who, due to specific regulations in the German tax system, do not file tax returns.<sup>6</sup> Since the SOEP does not provide information on the filing status of individuals or households, we match conditionally on a number of variables, such as main income source, occupational status, marital status, age group, family type and the number of children. We also use our matching approach to impute capital income from the SOEP because income from interest or dividends below the savers allowance need not be stated in the income tax return and is thus under-reported in the ITR data.

Table 2 shows summary statistics for the total population, the number of tax payers, gross market income, and relevant income components calculated from tax return statistics, our integrated data base and, for comparison, the national accounts. The number of assessed taxpayers fell by 1 million units from 1995 to 1998 after that the income tax reform of 1996 relaxed some provisions for filing tax returns. Since then, taxpayers with only wage income often are not obliged to file, independently of their level of taxable income.

Total overall market income recorded in the integrated data base was about 1.1 trillion Euro in 2001. This represents almost three quarters of the primary income of private households as documented by the national accounts. As shown by Table 2, the discrepancy between gross income and income from national accounts is mainly due to incomes from business and capital. Unfortunately, German national accounts do not provide differentiated information on business and capital income

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income from other sources to a large extent. In 1998, positive incomes from renting and leasing amounting to 20.1 billion Euro were offset against losses of 37.7 billion Euro.

<sup>6</sup> Single households who only have wage income, which is taxed at source in Germany subject to specific assessment regulations, typically do not file tax returns even if they earn above-average wage income.

according to the categories used for the income tax assessment as well as surveyed within the SOEP. It should also be kept in mind that in the national accounts business income is calculated as a residual. Furthermore, non-profit organizations, which often have substantial capital income which regularly remains tax-free, are classified as part of private households in national accounts. To some extent, the discrepancy between our estimates and those from the national accounts may be due to the fact that some fraction of corporate income is received in form of capital gains, rather than dividends. Furthermore, we may underestimate capital income because of tax evasion. Wage income, on the other hand, is slightly over-represented in our database. Within the SOEP survey, some replacement amounts from social security insurances for loss of earned income (e.g. sick pay) might be classified as wage income. Moreover, activities within the shadow economy might play a role, as well as incidental earnings from self-employed secondary employment that could have been itemized as wage income.

Table 2

**Structure of the integrated ITR-SOEP data base compared to the national accounts, 1992-2001**

	unit	1992	1995	1998	2001
Income taxpayers (assessment)	1 000	29 479	29 676	28 673	29 104
Single assessment (singles)	1 000	13 961	14 299	13 789	14 595
Joint assessment (married couples) <sup>1)</sup>	1 000	15 518	15 377	14 884	14 509
Potential tax units total <sup>2)</sup>	1 000	44 000	44 506	45 338	46 014
Estimated non-filers	1 000	14 521	14 830	16 665	16 910
Taxpayers as percentage of potential tax units	%	67.0	66.7	63.2	63.3
Population of age >=20	1 000	63 806	64 088	64 425	65 025
Gross market income <sup>3)</sup> (integrated data base, less capital gains)	mill. Euro	938 529	1 002 205	1 052 155	1 128 382
Gross domestic product <sup>4)</sup>	mill. Euro	1 646 620	1 848 450	1 965 380	2 113 160
Primary income of private households <sup>4)</sup>	mill. Euro	1 270 240	1 402 200	1 466 590	1 599 320
Gross market income as percentage of primary income private households	%	73.9	71.5	71.7	70.6
Wage income (integrated data base)	mill. Euro	769 326	830 509	848 082	907 875
Wages and salaries (national accounts)	mill. Euro	749 850	805 340	829 810	902 020
Wage income from integrated data base as percentage of wages from national accounts	%	102.6	103.1	102.2	100.6
Income from business activities and capital income (integrated data base, less capital gains)	mill. Euro	169 203	171 696	204 073	220 507
Entrepreneurial and received property income of private households (national accounts) <sup>5)</sup>	mill. Euro	336 810	388 030	427 630	472 880
Entrepreneurial income	mill. Euro	124 990	143 280	142 120	132 970
Received property income <sup>5)</sup>	mill. Euro	211 820	244 750	285 510	339 910
Business and capital income from integrated data base as percentage of entrepreneurial and property income from national accounts	%	50.2	44.2	47.7	46.6
1) Married couples living together are assessed as one tax payer.- 2) Derived from population census statistics: Entire population of 20 years and older, less young adults eligible for child benefit; married couples counted as one tax unit.- 3) Income from business activity, wage income, capital income, exclusive public and private pensions.- 4) At current prices, national accounts.- 5) Including non-profit institutions serving households (NPISHs), less financial intermediation services indirectly measured (FISIM). Source: Income tax statistics 1992-2001; integrated data base from income tax statistics and German Socio-Economic Panel Study (SOEP); national accounts.					

## 4 The Overall Evolution of Income Inequality 1992-2001

To portray the evolution of income inequality over time, we calculate a number of standard summary measures of inequality (see, e.g., Cowell, 1995). The relative difference between the mean and the median measures the skewness of the distribution: a rise in this measure of inequality indicates that incomes in the upper half of the distribution have increased more than in the lower part. The Gini coefficient is relatively sensitive to changes in the middle of the distribution whereas the two Theil coefficients are more sensitive to changes in the tails: the entropy measure, which is sensitive to changes in the top of the income distribution, and the mean log deviation which is sensitive to changes in its bottom part. Table 3 presents our main results on the evolution of overall income inequality in Germany as a whole. On top of the table, we report the development of the mean and median of real gross market income, i.e. nominal income deflated by the consumer price index. In the lower part of the table, a more detailed picture of the evolution of overall inequality is provided by the distribution of incomes across deciles and, in particular, percentiles at the top of the income distribution.

Since we include people with negative or zero market income in the distribution, both the mean and the median of yearly real gross market income reported in Table 3 are rather low, amounting to roughly 17,300 Euro for the mean and only 8,400 Euro for the median in 2001. This relation indicates that the income distribution is very skewed and income differences are large between its lower and upper part. Comparing the evolution of the mean and the median also shows that income inequality has increased markedly in the observation period. Whereas real mean income decreased by 1% between 1992 and 2001, median income fell by more than 25% in this period. Thus, the relative difference between the mean and the median increased by almost 60 percentage points in this period, indicating that income inequality has markedly increased over time. This is mainly related to an increasing number of people with no or very little market income who have led to the strong decline of the median in the observation period.

The increase in income concentration at the top of the distribution is also confirmed by the other summary inequality measures reported in Table 3. The Gini coefficient increases from 0.588 to 0.614 (roughly 4%), the two Theil measures increase by 10% and 7%, respectively. The somewhat stronger increase in the entropy measure confirms that the rise in income inequality in the period 1992 to 2001 was driven by changes in the upper part of the distribution. This is also confirmed by the increase in the ratio between the 90% percentile and the median (50% percentile) – the P90/50, for short – which increased from 3.6 to 5.0, i.e. by more than a third, between 1992 and 2001. Note, however, that percentile ratios within the top decile, such as the P95/90 or P99.9/90, seem to indicate that inequality within the top decile has increased very little or not at all. Looking at the P99.999/90, which has increased by almost 12% in the observation period, tells a different story, however.

As documented in Appendix 3, calculations based on SOEP data alone (and not including the “high-income” sample mentioned in section 3.1) yield a similar picture on the evolution of income

inequality when measured by the Gini coefficient and other summary measures of inequality. The much higher level of the top-sensitive Theil coefficient we derive on the basis of our integrated data base is due to the fact that top incomes are not well represented in the SOEP data. Consequently, the income share absorbed by the top decile as measured in the SOEP is significantly smaller than the respective share in our integrated data base. Note, however, that the percentage increase in the income share going to the top decile between 1992 and 2001 has been very similar in both data sets.

Table 3

**Distribution of gross market income in Germany, 1992-2001**

	Gross market income <sup>1)</sup> less capital gains				1992 = 100		
	1992	1995	1998	2001	1995	1998	2001
Average income at 2000 prices <sup>2)</sup>							
Mean income (Euro)	17 529	17 084	17 023	17 340	97.5	97.1	98.9
Median income (Euro)	11 084	10 083	9 165	8 434	91.0	82.7	76.1
Relative difference <sup>3)</sup> (%)	45.8	52.7	61.9	72.1	115.0	135.1	157.2
Gini coefficient <sup>4)</sup>	0.5883	0.5926	0.6050	0.6136	100.7	102.8	104.3
Theil measures <sup>4)</sup>							
Entropy measure	0.7310	0.7318	0.7801	0.8004	100.1	106.7	109.5
Mean log deviation	1.3603	1.4284	1.4577	1.4512	105.0	107.2	106.7
Ratio of percentiles							
90 / 50	3.57	3.94	4.39	4.95	110.2	122.7	138.5
95 / 90	1.30	1.32	1.29	1.31	101.5	99.7	100.9
99 / 90	2.48	2.39	2.49	2.50	96.4	100.4	101.0
99.9 / 90	8.52	7.75	8.29	8.30	90.9	97.3	97.4
99.999 / 90	139.06	132.28	153.68	155.15	95.1	110.5	111.6
Structure in % by income fractiles							
1 <sup>st</sup> decile	- 1.0	- 1.4	- 1.2	- 1.2	138.0	115.4	114.7
2 <sup>nd</sup> decile	0.1	0.0	0.0	0.0	71.9	61.4	55.9
3 <sup>rd</sup> decile	0.2	0.2	0.2	0.1	78.2	65.0	61.4
4 <sup>th</sup> decile	1.5	1.1	0.9	0.8	75.3	58.6	55.6
5 <sup>th</sup> decile	4.6	4.0	3.5	3.1	88.5	76.4	68.7
6 <sup>th</sup> decile	8.1	8.0	7.5	6.9	98.3	92.0	85.0
7 <sup>th</sup> decile	11.7	12.0	11.5	11.1	102.6	98.4	94.9
8 <sup>th</sup> decile	15.2	15.6	15.4	15.4	102.6	101.6	101.3
9 <sup>th</sup> decile	19.4	20.0	20.2	20.4	102.9	103.7	104.9
10 <sup>th</sup> decile	40.2	40.5	42.1	43.3	100.6	104.5	107.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Top 1%	12.5	12.0	13.1	13.5	95.6	104.6	107.5
Top 0.1%	4.8	4.4	5.1	5.2	93.2	106.6	110.2
Top 0.01%	1.9	1.8	2.1	2.2	96.7	114.5	118.4
Top 0.001%	0.6	0.7	0.8	0.9	108.6	132.8	136.7

1) Income from business activity, wage income, capital income, exclusive public and private pensions.- 2) Deflated by consumer price index.- 3) Difference of ln(mean) and ln(median).- 4) Exclusive cases with zero or negative income.  
Source: Integrated data base from income tax statistics and German Socio-Economic Panel Study (SOEP).

The distribution of market incomes across deciles reveals that roughly a third of the population receives almost no market income. In other words, a large share of the German adult population lives more or less completely either on public or private transfers. This group includes the retired, housewives, the unemployed, and the disabled. On the other extreme, more than 40% of market income goes to the top decile, and this share has increased by 3.1 percentage points in the observation period. At the same time, the income share going to the middle of the distribution declined: for example, the share received by the 5<sup>th</sup> decile fell from 4.6 to 3.1%, a decline of almost one third. Similar developments can also be observed for other deciles in the middle of the income distribution, i.e. the 4<sup>th</sup> and the 6<sup>th</sup> decile (see Table 3). This extreme fall in the share of market income going to the middle deciles indicates that compositional effects may have been at work. As discussed in section 2, unemployment increased significantly in the period 1992 to 2001, and this might have had composition effects. Such effects, also affecting the middle deciles of the distribution, may be expected from the east German transition process, to which we turn below.

Several studies for the US have also found evidence for the increasing concentration of income gains at the top of the distribution in recent years. For example, Piketty and Saez (2006, Figure 1) report an increase in the top decile income share from 40% in 1992 to 43% in 2000, which is almost the same as the increase we observe in our data for Germany over a similar period. Dew-Becker and Gordon (2005) also show that the top 10 percent have gained almost half of the increase in real incomes during the recent years of strong productivity growth in the US. Both studies report a relatively strong increase in the top 1% percentile which outpaces the increase we observe for Germany in this period. A similar but less pronounced picture is also observed for the United Kingdom and for Canada, whereas for other European countries no pronounced increase in inequality at the top of the market income distribution seems to have occurred.<sup>7</sup> As mentioned in the introduction, the studies by Dell (2005) and Bach, Corneo and Steiner (2005) for Germany, which are based on ITR data only, show no increase in the income share of the top decile and the 1% percentile between the years 1992 and 1998 which overlaps with our observation period.

Breaking down the top decile further, results in the bottom part of Table 3 reveal some marked differences between percentiles. The share of the top 1% in overall market income increased from 12.5% to 13.5% in the observation period, which gives exactly the same percentage change as for the top decile. Comparing this change to the percentage change estimated on basis of the SOEP data alone (see Appendix 3) shows that the percentage increase in the income share going to the top 1% of the population over the whole observation period was similar.

Looking at the 0.001% top fractile, which we take as representing the *economic elite* in Germany, we observe an increase in this small group's share in overall market income from 0.6% in 1992

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<sup>7</sup> See, e.g., Piketty (2003) for France, Saez and Veall (2005) for Canada, Atkinson and Salverda (2005) for the United Kingdom and the Netherlands, and Dell (2005) for Germany and Switzerland.

to 0.9% in 2001, which means a relative increase by more than a third from its 1992 level. This relative increase in the economic elite's share in overall market income is two times the increase we observe for the top 0.01% and almost four times the relative increase in the share of the top 0.1%. Given the fact that the increase in market income is strongly concentrated at the very top of the income distribution, we will look at this relatively small group of people in much greater detail in the next section. Note that, although the percentage increase in the share absorbed by the top decile in the observation period has been very similar between the SOEP and our integrated data base, the two data sets give completely different results regarding income changes *within* the top percentile of the distribution (see Appendix 3).

Before we provide a more thorough analysis of the evolution of top incomes in Germany, we will investigate to what extent the development of overall income inequality after reunification was driven by the transition process in east Germany. In Table 4, we compare the evolution of the distribution of market incomes between east and west Germany in the period 1992 to 2001. As it is no longer possible to distinguish between east and west Berlin in the IRT data since 1998, we include Berlin as a whole in west Germany for all of the observation period. Given the still substantial differences in average and median incomes between east and west Germany, we define income deciles for the two regions separately. Since relative prices between east and west Germany moved quite differently in the first few years after reunification (see Table 1), we use separate consumer price indices for the two regions to calculate real incomes.

To shed some light on the question how the transition process in east Germany has affected the distribution of market incomes in Germany, we focus on the major differences in the development of income inequality in the two regions summarized in Table 4. First, we observe that in east Germany mean real market income has remained virtually constant over the whole decade, and that median income has dropped by about a third relative to its 1992 level. This extreme drop in median market income can be explained by the dramatic decline in the level of employment and the substantial increase in unemployment which accompanied the east German transition process, thereby increasing the number of people with zero market income included in the calculations.

Second, as shown by the development of the relative difference of the mean and the median, the skewness of the income distribution in east Germany increased much more than in the west, from 15% to 57%. This is also reflected by the larger relative change in the top-sensitive entropy measure in east Germany, where it increased by about 30%, relative to the west, whereas changes in the other two summary inequality measures differ little between the two regions. Likewise the increase in the P90/50 ratio increased by almost 75% in east Germany between 1992 and 2001, compared to about 35% in the west.

Third, regarding regional differences in the distribution of market incomes across deciles, in east Germany a much larger share of regional market income goes to the middle deciles (3<sup>rd</sup> to 6<sup>th</sup> decile) than in west Germany, and a smaller share is absorbed by the top decile: in 2001, about 39%

compared to more than 43% in the west. Similarly to the development in west Germany, the share of income which goes to the middle deciles has fallen over the observation period, and the income share absorbed by the top decile has significantly increased in east Germany as well.

Table 4

**Distribution of gross market income in east and west Germany, 1992-2001**

Gross market income <sup>1)</sup> less capital gains	West Germany (incl. Berlin, 1992: incl. West Berlin)				East Germany (excl. Berlin, 1992: excl. East Berlin)			
	1992	1995	1998	2001	1992	1995	1998	2001
Average income at 2000 prices <sup>2)</sup>								
Mean income (Euro)	18 685	17 935	17 968	18 357	13 041	12 652	12 434	12 301
Median income (Euro)	11 437	10 159	9 308	8 848	11 185	9 834	8 593	6 976
Relative difference <sup>3)</sup> (%)	49.1	56.8	65.8	73.0	15.3	25.2	37.0	56.7
Gini coefficient <sup>4)</sup>	0.5921	0.5951	0.6063	0.6135	0.5128	0.5446	0.5652	0.5841
Theil measures <sup>4)</sup>								
Entropy measure	0.7515	0.7441	0.7928	0.8096	0.5024	0.5779	0.6139	0.6488
Mean log deviation	1.3974	1.4344	1.4656	1.4536	1.1374	1.3467	1.3599	1.3744
Ratio of percentiles								
90 / 50	3.65	4.10	4.52	4.93	2.51	2.93	3.41	4.39
95 / 90	1.29	1.31	1.30	1.32	1.29	1.24	1.26	1.26
99 / 90	2.53	2.41	2.52	2.54	2.09	2.07	2.16	2.24
99.9 / 90	8.99	7.97	8.65	8.71	5.13	5.68	5.70	5.69
99.999 / 90	149.50	137.67	161.82	166.39	29.53	36.17	40.22	39.07
Structure in % by income fractiles								
1 <sup>st</sup> decile	- 1.0	- 1.3	- 1.2	- 1.2	- 1.0	- 2.1	- 1.0	- 0.7
2 <sup>nd</sup> decile	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0
3 <sup>rd</sup> decile	0.2	0.2	0.1	0.1	0.4	0.2	0.2	0.2
4 <sup>th</sup> decile	1.2	1.0	0.8	0.8	3.2	1.6	1.3	0.8
5 <sup>th</sup> decile	4.2	3.8	3.3	3.1	7.0	5.8	4.9	3.6
6 <sup>th</sup> decile	8.2	7.9	7.4	6.9	10.1	9.7	9.0	7.9
7 <sup>th</sup> decile	12.1	12.1	11.6	11.2	12.8	13.3	12.6	12.0
8 <sup>th</sup> decile	15.3	15.6	15.5	15.4	15.6	16.6	16.1	16.2
9 <sup>th</sup> decile	19.3	19.9	20.0	20.2	19.0	20.1	20.4	21.3
10 <sup>th</sup> decile	40.4	40.7	42.3	43.4	32.9	34.7	36.4	38.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Top 1%	13.0	12.3	13.5	13.9	7.2	8.3	8.8	9.3
Top 0.1%	5.0	4.6	5.3	5.5	1.9	2.3	2.3	2.4
Top 0.01%	1.9	1.9	2.2	2.3	0.5	0.6	0.6	0.7
Top 0.001%	0.7	0.7	0.9	0.9	0.1	0.2	0.2	0.2

1) Income from business activity, wage income, capital income, exclusive public and private pensions.- 2) Deflated by consumer price index.- 3) Difference of ln(mean) and ln(median).- 4) Exclusive cases with zero or negative income.  
Source: Integrated data base from income tax statistics and German Socio-Economic Panel Study (SOEP).

Regional differences in the evolution of the income distribution may mirror convergence along two dimensions: First, the wage structure was compressed in the former GDR compared to west Germany and wage inequality has increased in the transition to a market economy, especially during the first

few years after reunification (see, e.g., Franz and Steiner, 2000; Burda and Hunt, 2001). Second, there were almost no entrepreneurs and self-employed professionals in the former GDR; the growth of these social groups after reunification should also have increased their share of market income. In fact, the share accruing to the top percentile in east Germany increased from 7% in 1992 to 9% in 2001. Thus, although this group in east Germany still receives a significantly smaller share of regional income than in the west, income concentration at the top has also markedly increased in east Germany.

## 5 The Evolution and Composition of Top Incomes

In the previous section we have established that the overall increase in the inequality in the distribution of market income in Germany over the decade following reunification was mainly driven by the increase in market income accruing to the top income decile, and in the top percentile in particular. We have also shown that this development basically holds for both east and west Germany, although the economic elite in east Germany still only absorbs a relatively small share of regional income, and there has been little change in this respect since the mid-1990s. Therefore, we will restrict the following detailed analysis of the evolution of top incomes over the period 1992 to 2001 to Germany as a whole. As our integrated data base contains *all* people in the top 1%, we can break down the top percentile further into very small fractiles, such as the economic elite we defined above as the 0.001% and even the top 0.0001% of the population without sampling error. Since the integrated data base contains information on the components of market income, we can also analyze the contribution of changes in the composition of top incomes to increased income inequality, as described in section 5.2.

### 5.1 Evolution of market incomes at the top

In contrast to the distributional analysis of top incomes in section 4, here we focus on the evolution of top incomes in absolute rather than relative terms. That is, we are interested in the amount of market income that the top 1% percent of the population, say, received in a particular year, and how market incomes within this group have changed in real terms over the observation period. This analysis thus also sheds light on how the increase of real national income in the decade after German reunification was distributed within top incomes.

Table 5 presents results for our breakdown of the top percentile into fractiles for the years 1992 to 2001. In addition to average real income, we also report the lowest income in each fractile of the top percentile. In the first part of the table, income levels for each quantile are given for each year within our observation period (in 1,000 Euro at 2000 prices); income changes within quantiles are shown in the second part of the table with the respective value for 1992 as the base year. For comparison we also report levels and changes of market incomes within the top decile as well as, at the top of the table, the mean and median incomes (*cf.* Table 3).

Table 5

**Top average real market incomes in Germany, 1992 and 2001**

Gross market income <sup>1)</sup> less capital gains	1992	1995	1998	2001	1995	1998	2001
	1 000 Euro at 2000 prices <sup>2)</sup>				1992 = 100		
Mean income	17.5	17.1	17.0	17.3	97.5	97.1	98.9
Median income	11.1	10.1	9.2	8.4	91.0	82.7	76.1
Average income							
Top 10%	70.5	69.1	71.6	75.0	98.0	101.5	106.3
Top 1%	219.8	204.8	223.4	233.8	93.2	101.6	106.4
Top 0.1%	833.9	757.3	862.9	908.7	90.8	103.5	109.0
Top 0.01%	3 248.7	3 062.9	3 613.3	3 805.8	94.3	111.2	117.1
Top 0.001%	11 079.6	11 718.0	14 276.7	14 976.7	105.8	128.9	135.2
Top 0.0001%	31 435.4	39 047.8	47 226.1	48 148.7	124.2	150.2	153.2
Lowest income							
Top 10%	39.6	39.7	40.2	41.8	100.2	101.5	105.4
Top 1%	98.1	94.7	99.9	104.5	96.5	101.8	106.5
Top 0.1%	337.7	307.7	333.4	346.7	91.1	98.7	102.7
Top 0.01%	1 397.4	1 206.7	1 380.3	1 466.6	86.3	98.8	105.0
Top 0.001%	5 510.0	5 251.9	6 178.6	6 480.9	95.3	112.1	117.6
Top 0.0001%	18 360.4	19 696.6	25 456.4	26 245.8	107.3	138.6	142.9

1) Income from business activity, wage income, capital income, exclusive public and private pensions.- 2) Deflated by consumer price index.  
Source: Integrated data base from income tax statistics and German Socio-Economic Panel Study (SOEP).

The top decile is made up of a very heterogeneous group of people including both families from the middle class and the super rich. In 2001, the lower income threshold for this group was 41,800 Euro (in 2000 prices), the average income in the top decile amounted to 75,000 Euro in that year. This average income is still relatively close to a widely held notion of middle class. To become a member of the top 1%, you had to have a yearly market income of more than 104,500 Euro. In that year, members of this group had an average income of about 233,800 Euro. To make it to the top 0.01% – about 6,500 people in Germany – you had to earn a market income of more than 1.4 million Euro, while the average income of these millionaires amounted to 3.8 million Euro.

In section 4, we defined the group of people who make up the top 0.001% of the income distribution as the *economic elite* of Germany. To become a member of this group of roughly 650 persons, your market income had to exceed 6.5 million Euro in 2001. On average, a member of this group made almost 15 million Euro in that year, which is almost 1,800 times the median income. Perhaps more tellingly, in this year the average income in this group was more than 350 times the lowest income in the top decile of about 42,000 Euro, and 200 times the average income in this decile. However, even the average member of the German economic elite could feel relatively poor if she compared herself to the 65 comrades at the very top with an average income of almost 50 million in the year 2001. The income of this top 65 persons together amounted to more than 3 billion Euro.

The second part of Table 5 reveals some pronounced differences in the evolution of market incomes within the top 1% of the distribution. Whereas the increase in average income of the top percentile increased by 6% between 1992 and 2001, and thus a little less than in the top decile, average income of the economic elite increased by more than a third (35.2%) in this period; in absolute terms, this amounted to an increase in average real market income for this group of almost 4 million Euro. In the period 1992 to 2001, this economic elite of some 650 persons absorbed almost 17% of the overall increase in real market income of about 16 billion Euro.

Even more pronounced than for the economic elite was the increase in real average market income at the very top of the distribution, where income of the 65 richest people increased by more than 50%. Note that we have excluded capital gains from our definition of market income, so that these very high incomes are not affected by random realization proceeds of (parts of) an enterprise or shareholdings. Nevertheless, in the period 1992 – 2001 this small group absorbed about 7% of the overall increase in real market income. This very strong income concentration naturally leads to the question of changes in the composition of income at the very top of the distribution in recent years, to which we now turn.

## **5.2 The composition of top incomes**

The rich are not only different because they have more money. One further difference relates to their income sources. This is shown in Table 6, which presents evidence on the distribution of market income by percentile and the composition of income. Here, we restrict our analysis to the distribution within the 1% percentile up to the 0.001% percentile, given the small number of observations above this fractile in case the data are also cross-classified by income source. For comparison, we also report the composition of mean market incomes and in the top decile of the income distribution. To save space, we only report results for the years 1992 and 2001 here.

For the year 2001, we observe that wage income represents more than 80% of mean market income, the remainder being made up of income from business activity (13%) and capital income. While the top decile still receives about 70% of market income in form of wages and salaries, for the top percentile this share drops to less than 40%. Correspondingly, the share of capital income is about a sixth of overall market income in the top percentile, compared to less than 8% in the top decile. This tendency for the top decile to rely more heavily on income from business and capital is well documented also for other countries (see, e.g., Piketty and Saez, 2003, for the US, and Piketty, 2003, for France). For Germany we observe a similar result with respect to market income.<sup>8</sup> Within the top percentile, the share of wages on total income monotonically declines with income. While, on average, households in the top percentile received almost 40% of their market income in form of wages, only

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<sup>8</sup> For a comparison between the US, France, and Germany based on taxable income for the year 1998, see Bach, Corneo and Steiner (2005).

about 5% of the income received by the German economic elite in 2001 was made up of wage income, whereas more than two thirds were earned from business activity and about 27% from capital. In absolute terms, this means that this group earned, on average, some 800,000 Euro in form of salary; this amount was complemented by 10 million Euro derived from business income and about 4 million Euro from capital income.

Table 6

**Composition of top market incomes by income component (in %), 1992 and 2001**

Gross market income <sup>1)</sup> less capital gains	Gross market income <sup>1)</sup> less capital gains	Income from business activity less capital gains			Wage income	Capital income less capital gains		
		Total	business enterprise	profess. services		Total	Interest, dividends	Renting and leasing
		2001						
Mean income	100.0	13.2	8.1	5.1	80.5	6.4	4.8	1.6
Top 10%	100.0	23.8	14.0	9.8	68.2	8.0	6.0	1.9
Top 1%	100.0	44.5	25.7	18.8	38.8	16.7	13.4	3.3
Top 0.1%	100.0	52.6	40.6	12.0	22.1	25.3	22.2	3.1
Top 0.01%	100.0	60.7	57.2	3.5	11.4	27.9	26.1	1.8
Top 0.001%	100.0	68.2	67.2	1.0	5.1	26.7	25.9	0.7
		1992						
Mean income	100.0	12.9	8.5	4.4	82.0	5.2	3.9	1.3
Top 10%	100.0	24.9	15.7	9.2	68.3	6.8	5.1	1.6
Top 1%	100.0	51.9	32.6	19.3	33.5	14.5	11.5	3.0
Top 0.1%	100.0	64.7	50.4	14.2	14.4	21.0	18.2	2.8
Top 0.01%	100.0	71.4	67.2	4.2	5.7	22.9	21.0	1.9
Top 0.001%	100.0	76.5	75.6	0.8	1.9	21.7	20.8	0.8
1) Income from business activity, wage income, capital income, exclusive public and private pensions. Source: Integrated data base from income tax statistics and German Socio-Economic Panel Study (SOEP).								

Compared to France and the US, the share of wage income at the top is quite small in Germany. In the US, about 45% of all income accruing to the top 0.01% in 1998 consists of wage income; for the corresponding group in France the share was about 22% in that year (see Piketty and Saez, 2003, Piketty, 2003).<sup>9</sup> Thus, our analysis adds a novel aspect to the comparison of Germany with the US and France, as developed by Dell (2005). He found that, with respect to the concentration of income, Germany is a middle case between the highly concentrated US income distribution and the less concentrated French one. With respect to the income composition pattern, our analysis suggests that it is France which lies between the US and Germany. The German affluent rely much less on wages and salaries for their incomes than their counterparts in France and the US.

<sup>9</sup> Note, however, that these studies use a somewhat different definition of market income (taxable income) and of household population; for a discussion and comparison, see Bach, Corneo and Steiner (2005).

In the period 1992 to 2001, the share of salary and wages in mean market income in the whole population declined by 1.5 percentage points. While there was little change in the top decile, the wage share of the top percentile increased by 5 percentage points, from about 34 to 39 percent, and that of the economic elite from 1.9 to 5.1 percentage points. As shown in Figure 1, the share of wages and salaries in market income increased monotonously across all fractiles of the top percentile, with a relatively strong increase for the economic elite in the second half of the observation period. This corresponds to recent developments in the US where increasing income inequality seems to be largely driven by an increasing share of wage income in the top percentile of the market income distribution (see Kopczuk and Saez, 2004, and Dew-Becker and Gordon, 2005).

As shown in Figure 1, the share of business income in the top percentile declined significantly between 1992 and 2001, from about 52 to 45%, whereas for this group the share of income from capital increased by about 2 percentage points. For the economic elite, the respective shares moved in the same direction: the share of business income dropped by roughly 8 percentage points, and the share of income from capital increased by 5 percentage points. In relative terms, however, the increase in the share of wage income in this group's market income outpaced the changes in the other two income components.

In order to shed some more light on the composition of top incomes in Germany, we further investigate, at the individual level, the concentration of income by source. We do this in the left part of Table 7 by ordering all taxpayers in the top percentile according to their income share stemming from the three main income sources: wages and salaries, business activity, and capital income. For 2001, the table reveals that almost 40% of people in the top percentile can clearly be identified as employees or managers since their personal income stemmed by more than 90% from wage income. Some 30% in this group can be identified as entrepreneurs and professionals, since more than 90% of their personal income stemmed from business activity. Only about 4% of the top percentile can be identified as rentiers, whose income is mainly generated by interests, dividends, and rents. About a third of the top 1% includes people with mixed income from the various sources. Compared to 1992, the size of the first group has increased by 3.6 percentage points, the second group declined by 2 percentage points and the third group remained fairly constant.

The right-hand side of Table 7 summarizes the results of the same analysis for the German economic elite. In 2001, one can identify in this group a portion of employees and managers equal to about 4.1%, a portion of entrepreneurs equal to 54.4% and a portion of rentiers equal to 16.9%. Compared to 1992, the share of people we identify as employees or managers in German economic elite has increased by 4 percentage points. On the other hand, the share of rentiers has also increased significantly within the economic elite, from roughly a tenth to a sixth in this group.

Figure 1

Share of income components in top market incomes in Germany, 1992-2001

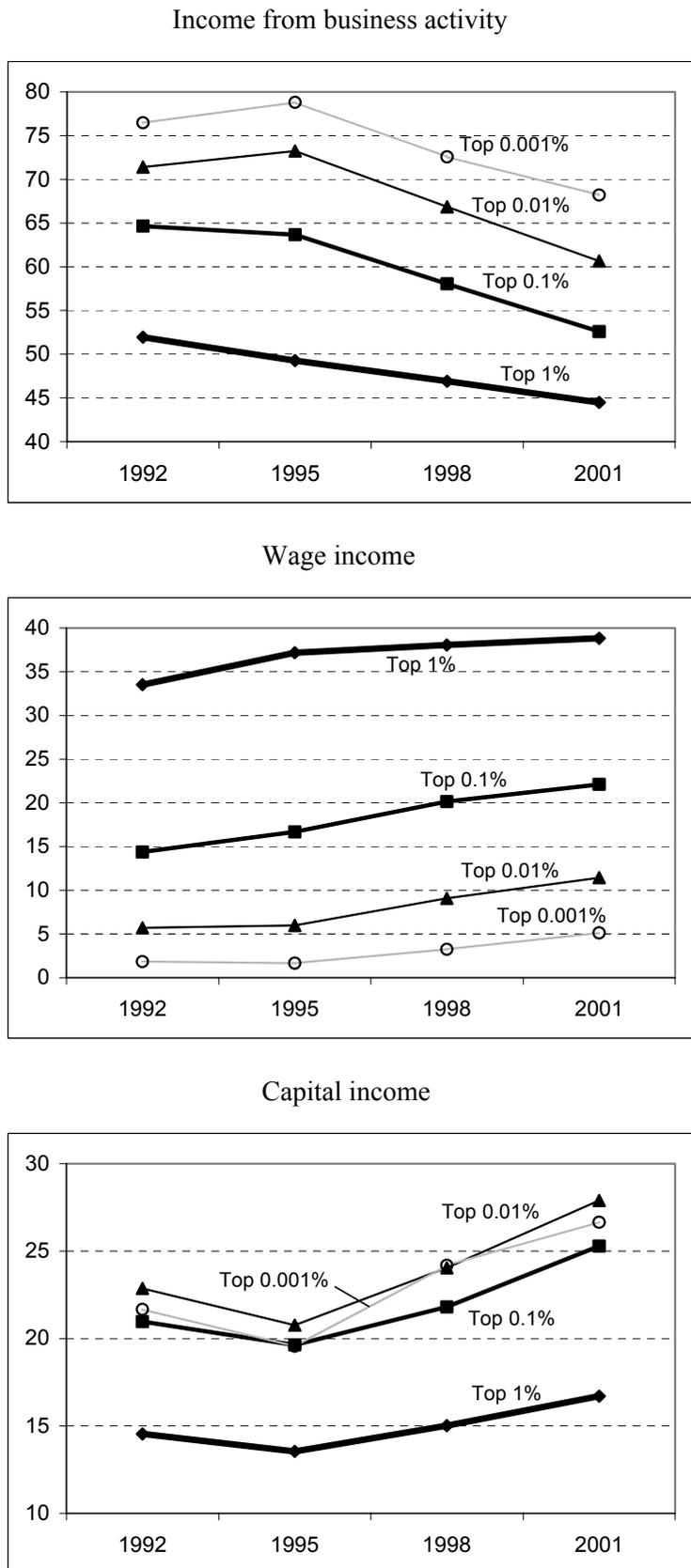


Table 7

**Distribution within the top 1% and the top 0.001%, by share of income type, 1992 and 2001**

Share of income type in gross market income <sup>1)</sup>	Top 1%			Top 0.001%		
	Persons by share of			Persons by share of		
from ... to ...	Wage income	Income fr. business activity	Capital income less capital gains	Wage income	Income fr. business activity	Capital income less capital gains
	% of total			% of total		
2001						
0 - 10 %	40.3	52.1	77.7	90.4	25.1	61.9
10 - 20 %	2.0	2.5	6.3	2.0	1.1	8.2
20 - 30 %	2.2	1.9	3.2	0.9	1.1	2.8
30 - 40 %	2.4	1.8	2.4	} 1.7	1.3	1.7
40 - 50 %	2.6	1.7	1.9		1.3	2.2
50 - 60 %	2.8	1.7	1.5		1.1	1.1
60 - 70 %	3.0	1.8	1.3		1.9	1.4
70 - 80 %	3.1	2.1	1.1		2.8	1.7
80 - 90 %	4.2	3.5	0.9	0.9	10.0	2.0
90 - 100 %	37.5	31.0	3.7	4.1	54.4	16.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
1992						
0 - 10 %	44.2	47.1	76.8	94.4	13.7	58.1
10 - 20 %	2.1	2.5	8.1	3.5	} 1.1	15.5
20 - 30 %	2.2	2.0	3.6	1.0		6.6
30 - 40 %	2.3	1.8	2.4	} 1.1	1.1	2.6
40 - 50 %	2.4	1.8	1.8		1.1	1.3
50 - 60 %	2.7	1.8	1.3		0.8	1.1
60 - 70 %	2.7	2.2	1.1		3.2	1.1
70 - 80 %	3.0	2.7	0.9		8.1	1.0
80 - 90 %	4.5	5.0	0.7		17.2	1.9
90 - 100 %	33.9	33.0	3.3		53.6	10.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
1) Income from business activity, wage income, capital income, exclusive public and private pensions.						
Source: Integrated data base from income tax statistics and German Socio-Economic Panel Study (SOEP).						

Hence, although the share of employees or managers in the German economic elite has significantly increased since the early 1990s, it still consists almost entirely of entrepreneurs and rentiers. What could explain the different composition of top incomes in Germany as compared to France and the US? Why does *Das Kapital* matter so much in Germany? We conjecture that the following two factors may substantially contribute to account for the observed differences. First, as suggested by Dell (2005), the relatively favorable tax treatment of capital income in Germany as compared to France and

the US over the last decades may be part of the answer.<sup>10</sup> Second, the relatively low remuneration of German CEOs up to the end of the nineties might explain the difference in top income composition with respect to the US.

Another distinctive feature of the German case that emerges from our study is the relative weight of income from business activity and income from interests and dividends. The former is substantially larger than the latter. This finding may be due to the very large share of unincorporated firms in Germany. There, even firms of considerable size are often unincorporated. This may be caused by various cross-country differences with respect to tax rules, legal frameworks, and financial systems.

## 6 Summary and Concluding Discussion

The current paper has provided an empirical analysis of the distribution of primary – or market – income in Germany for the period 1992 to 2001. Knowledge about the distribution of market income and its evolution over time is not only important for the evaluation of economic hypotheses on the working of labor and capital markets but also a requisite for the analysis of the impact of the tax-benefit system. The major contribution of our paper is that it portrays, for the first time, the evolution of the distribution of market incomes on the basis of an integrated micro database representing the German population as a whole. Whereas previous research for Germany has either analyzed household surveys containing little information on very high incomes or, in a few cases, data from income tax returns that severely under-represent the bottom segments of the distribution, our integrated ITR-SOEP data base enables us to analyze both the upper tail and the lower tail of the income distribution. Since all taxpayers that belong to the top percentile of the income distribution in Germany are included in our integrated data base, we can analyze the evolution of market income and its composition within this group. In particular, we have for the first time provided a detailed analysis of the top 0.001% fractile of the income distribution, the *economic elite* of Germany.

Inequality of market incomes in Germany as measured by standard summary indicators, such as the Gini coefficients, moderately increased in the period 1992 to 2001. This finding is broadly in line with those reported in previous studies for Germany that failed to incorporate both tails of the income distribution. However, our detailed empirical analysis has shown that standard summary measures of inequality disguise important changes in the distribution of market incomes after German reunification. The distribution of market incomes across deciles reveals that roughly a third of the population receives almost no market income, and that the share of market income going to the middle deciles

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<sup>10</sup> In particular, German inheritance and gift taxes have a small effective burden because of low assessment values and high personal allowances. Nowadays (2004), revenue from inheritance and gift taxes in Germany accounts for 0.19% of GDP, compared to 0.26% in the USA and 0.52% in France. The 1996 abolished wealth tax on personal and corporate wealth suffered from the same problems and generated little tax revenue. See OECD (2006).

sharply declined since the early 1990s. Consequently, median real market income declined sharply, both in absolute terms and relative to mean income.

These developments at the bottom and the middle part of the market income distribution are likely to be related to the general increase in unemployment and the transition process in east Germany. Our empirical analysis has shown that inequality of market incomes in east Germany increased much more than in the west, and that the decline in median real market incomes in the east was especially severe. This is related to the marked decline in full-time employment and the increase in unemployment in east Germany. In general, demographic factors and economic forces, such as skill-biased technological change and globalization, seem to affect the distribution of market incomes in Germany by increasing unemployment and reducing working hours rather than earnings differentials of full-time workers at the bottom and the middle of the distribution (see, e.g., Steiner and Wagner, 1998).

While median market income significantly diminished relative to mean income, average income of the top decile significantly increased relative to the mean in the observation period. In 2001, more than 40% of market income accrued to the top decile, and this share has increased by about 3 percentage points since the early 1990s. Within the top decile, the economic elite is the group that displays the largest relative gain. In 2001, this group included about 650 households, with an average income without capital gains of roughly 15 million Euro. Roughly, a typical member representing the German economic elite earns as much as one thousand workers – a village or a small town – can earn together in Germany. We have also shown that income is very unequally distributed within the economic elite: while it was sufficient to have a market income of about 6.5 million Euro in 2001 to become a member of the German economic elite, the handful of people at the very top of this elite had an average income of more than 140 million Euro in that year. Average real income of the economic elite increased by roughly a third between 1992 and 2001, compared to an increase of about 6% for the top 10% percentile. In absolute terms, this small group absorbed almost 3% of the overall increase in real market income of about 16 billion Euro.

Our analysis of the composition of market income in various groups has confirmed that the rich are not only different from the rest of us because they have more money. The composition of income according to its sources is very different for the top of the income hierarchy and the rest of the German population. Although the share of wage income in top incomes has increased significantly since the early 1990s in Germany, too, it is still relatively small compared to the US and some European countries. Strikingly, only about 4% of the households that belong to the German economic elite can be identified as managers. The rest of it is, by and large, formed by entrepreneurs and rentiers. Interestingly, the predominance of capitalists within top income groups seems to be much stronger in Germany than in the US or even France.

The study of economic elites has hitherto been largely neglected by the literature, partly because there is no straightforward access to suitable data (for exceptions, see Slemrod, 1994, and Dew-Becker and Gordon, 2005). However, recent investigations suggest – and ours confirms – that even in con-

temporary welfare states, economic elites not only exist but dispose of an enormous economic power, measured in terms of income relative to ordinary people's income. Thus, elites constitute an important ingredient of contemporary economic systems, one that deserves enhanced research efforts. Specifically, exploring the income composition of elites may contribute to a better understanding of the determinants of economic success and therefore of the chances of upward mobility in our societies. A deeper knowledge of economic elites may also provide hints about the intensity and direction of forces that those groups can exert upon processes of collective decision making (see, e.g., Corneo, 2006).

After 2001, Germany has experienced a strong increase in unemployment and a significant drop in labor's share in national income while entrepreneurial and property income have boomed. We therefore expect the pattern of income inequality revealed by our analysis to carry over to the present situation in an even more accentuated form.

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## Appendix

### Appendix 1: From Taxable Gross Income to Gross Market Income

Based on the individual tax returns, we obtain (economic) gross income by adding all tax-exempted incomes as well as tax reliefs that can be identified within the tax file information. Specifically, the various income categories are computed as follows:

- Income from *business activity* includes taxable income from agriculture and forestry, from unincorporated business enterprise and from self-employed activities (professional services). Tax reliefs are taken into account as far as they are identifiable, just as the tax-exempted profits from outbound business investments. Capital gains from business activity could be identified separately. Unfortunately, German income tax statistics do not provide information from financial accounting of firms (tax balance sheet, profit and loss statement). Therefore, we do not know to what extent firms exploit depreciations according to the declining balance method or provisions for impending losses or pension reserves. German tax law was deemed to be quite generous in this field up to the end of the 1990s. A fortiori we cannot quantify the extent to which the self-employed avoid taxation by disguising private expenses as operating expenditures or transferring part of their profits abroad via a manipulation of transfer prices.
- Our measure of *wage income* is calculated before deduction of allowable expenses. Taxable pensions from former employment, which are part of the statutory income from employment, are accounted as transfer income (see below). Tax-exempted foreign wage income is added.
- *Capital income* includes all capital income from private investments, except income from business activities. Especially in this field we face difficult measurement issues. First, interest and dividend income was granted in the 1990s a rather high savers allowance of 6,000 DM / 3,070 Euro per year (double this amount for married couples). We compute those allowances as part of gross income whenever tax units claim them. However, many taxpayers with financial income did not claim them since their financial income was lower. Second, bank secrecy law might have encouraged tax evasion of financial income to some extent. By definition, evaded income is not recorded by tax returns and is therefore neglected by our study. Third, in Germany, capital gains from financial investments are taxable solely if they are classified as “speculation gains”, i.e. if sale of the asset closely follows acquisition of that asset. In 1998, this meant that the time lapse between buying and selling had to be less than two years in the case of real estate and less than six month in the case of other assets (e.g. securities) for the capital gain to be legally counted as taxable income.
- For decades, taxable income from *renting and leasing* has been a vast loophole for tax-saving activities in Germany. Depreciation allowances, tax reliefs and generous accounting rules in combination with tax-free capital gains led to massive budgetary losses that could be set off against income from other sources to a large extent. In 1998, positive incomes from renting and leasing amounting to 20.1 billion Euro were offset against losses of 37.7 billion Euro. Since most of this activities are likely to be motivated by tax avoidance, we ignore losses exceeding some thresholds: Losses of more than 5,000 Euro from direct investments in real estate and of more than 2,500 Euro from shareholdings (closed property funds, property developer partnerships etc.) are disregarded in calculating gross income.

## Appendix 2: Data Matching and Integration – Methodology

The merging of the ITR data and the SOEP is performed by a constrained matching approach: The constraints are set in such a way that each observation (record) contained in the SOEP is matched to a certain number of records in the ITR. The number of records matched depends on the sample weights for the two data sets, i.e. for each data set records are used proportional to their original weights. The main advantage of this approach, relative to alternative data integration strategies, such as mean imputation by regression or propensity score matching (see, e.g., O’Hare, 2000), is that the correlation structure between the variables only observed in one of the two data sets and the common matching variables is maintained in the integrated data set. Matching of the two data sets under these constraints is analogous to the *standard transport* problem in linear programming and can thus be performed using standard optimization routines.<sup>11</sup>

The analogy to the classical transportation problem in linear programming becomes apparent if we define records of data set A (B) as supply (demand) nodes, the survey weights,  $w_{ij}$ , of A and B as volumes supplied (demanded) by each A (B) record, and the mathematical distance between two records from A and B,  $d_{ij}$ , as the costs of shipped goods between A and B. The mathematical problem then is to minimize the weighted costs over all data records ( $n_A, n_B$ ) under the restrictions that, for each record, the weighted number of cases matched from A to B equals the sum of weights in the respective data set:

$$\begin{aligned} & \min \sum_{i=1}^{n_A} \sum_{j=1}^{n_B} d_{ij} w_{ij} \\ \text{s.t. } & \sum_{j=1}^{n_B} w_{ij} = w_i, \forall i, \quad \sum_{i=1}^{n_A} w_{ij} = w_j, \forall j, \quad w_{ij} \geq 0, \forall i, j \end{aligned}$$

To proceed, one has to choose a distance measure, such as the absolute deviation between variables, the Euclidian, or the Mahalanobis distance. Here, we choose the absolute deviation after normalizing all variables, i.e.  $d_{ij} = \sum_{k=1}^K |z_{ik} - z_{jk}|$ , with  $z :=$  normalized variable.

Since, for each data set, records are used proportionally to the original weights, the distribution of all variables in the integrated data set will replicate the source distributions. There are, however, also disadvantages of constrained matching. First, due to the constraints, not each record in A might be matched to its closest B record. We check this by comparing the distribution of observable variables between matched records from the two data sets. Second, the very large number of constraints, equal to the number of records to be matched, renders constrained matching computationally very demanding in our case. We tackle this by splitting up the original data sets into subsets defined by a number of matching variables observed in both data sets, such as income group and marital status. Within these subsets, the distance between the records in both datasets is measured by income, type of household/family, occupational status, age group, region (east and west Germany) and the predominant source of income. Of course, the basic Conditional Independence Assumption (CIA), which states that conditional on the matching variables,  $M$ , which are contained in A and B, the set of variables  $X$  from A and  $Y$  from B are independent, has to hold for constrained matching as well.

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<sup>11</sup> We use the network simplex algorithm performed by CPLEX and implemented in AMPL, provided by [www.ilog.com](http://www.ilog.com).

### Appendix 3: Distribution of market income in Germany, 1992-2001, SOEP data only

	Gross market income <sup>1)</sup> less capital gains				1992 = 100		
	1992	1995	1998	2001	1995	1998	2001
Average income at 2000 prices <sup>2)</sup>							
Mean income (Euro)	15 928	15 933	15 800	16 347	100.0	99.2	102.6
Median income (Euro)	10 145	9 012	7 807	7 469	88.8	77.0	73.6
Relative difference <sup>3)</sup> (%)	45.1	57.0	70.5	78.3	126.3	156.3	173.6
Gini coefficient <sup>4)</sup>	0.5682	0.5817	0.5838	0.5949	102.4	102.8	104.7
Theil measures <sup>4)</sup>							
Entropy measure	0.5984	0.6286	0.6248	0.6464	105.0	104.4	108.0
Mean log deviation	1.3759	1.4686	1.4718	1.4674	106.7	107.0	106.6
Ratio of percentiles							
90 / 50	3.83	4.38	5.13	5.71	114.3	134.1	149.1
95 / 90	1.29	1.32	1.29	1.30	102.9	100.2	101.1
99 / 90	2.02	1.99	2.18	2.17	98.4	108.0	107.4
99.9 / 90	4.22	4.89	3.35	3.73	115.8	79.2	88.4
99.999 / 90	.	.	.	.	.	.	.
Structure in % by income fractiles							
1 <sup>st</sup> decile	- 0.2	- 0.3	- 0.1	- 0.3	220.8	50.6	183.9
2 <sup>nd</sup> decile	0.1	0.0	0.0	0.0	75.1	64.3	61.3
3 <sup>rd</sup> decile	0.2	0.2	0.1	0.1	75.4	65.0	67.7
4 <sup>th</sup> decile	1.1	0.9	0.7	0.7	79.7	64.8	65.6
5 <sup>th</sup> decile	4.3	3.5	3.1	2.8	81.6	71.7	65.7
6 <sup>th</sup> decile	8.6	8.2	7.8	7.1	95.2	91.0	82.8
7 <sup>th</sup> decile	12.7	12.7	12.6	12.1	100.2	99.4	95.1
8 <sup>th</sup> decile	16.4	16.5	16.6	16.5	100.4	101.1	100.7
9 <sup>th</sup> decile	20.9	21.3	21.6	22.2	101.7	103.4	105.9
10 <sup>th</sup> decile	35.9	37.1	37.4	38.7	103.4	104.4	107.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Top 1%	22.2	22.9	23.2	24.2	103.5	104.5	109.2
Top 0.1%	7.2	7.5	6.9	7.5	104.6	96.1	104.9
Top 0.01%	1.7	1.4	1.2	1.3	80.9	69.4	73.7
Top 0.001%	.	.	.	.	.	.	.

1) Income from business activity, wage income, capital income, exclusive public and private pensions.- 2) Deflated by consumer price index.- 3) Difference of ln(mean) and ln(median).- 4) Exclusive cases with zero or negative income.  
Source: German Socio-Economic Panel Study (SOEP).