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Stefan Bach
Giacomo Corneo
Viktor Steiner

From Bottom to Top: The Entire Distribution of Market Income in Germany, 1992 - 2001

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German Socio-Economic Panel Study (SOEP)
DIW Berlin
Mohrenstrasse 58
10117 Berlin, Germany

Contact: Uta Rahmann | urahmann@diw.de

From Bottom to Top:
The Entire Distribution of Market Income in Germany, 1992 - 2001

by

Stefan Bach*, Giacomo Corneo** and Viktor Steiner* ** ***

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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 as measured by the Gini coefficient. However, we also document a substantial drop of median income and a remarkable income growth at the top 0.1% of the income distribution. The increase of income inequality was stronger in East Germany than in West Germany. In both regions, the income concentration process strongly benefited the economic elite, which we define as the richest 0.001% persons in the population. While the elite mainly obtains its income from business and capital, the income share that it receives in form of wage income is increasing.

Keywords: Income Distribution, Top Incomes, Inequality.

JEL Classification: D31, D33, H24.

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* German Institute for Economic Research, Berlin (DIW Berlin). sbach@diw.de vsteiner@diw.de

** Free University of Berlin (FU Berlin). gcorneo@wiwiss.fu-berlin.de

*** IZA Bonn.

1 Introduction

During the last three decades, income inequality has been on the rise in the US. Other English-speaking countries, like the United Kingdom and Canada, have later joined this movement. Whether income inequality increased in continental Europe is still a matter of debate. This holds true in particular for Germany, the third largest economy in the world.

Whereas the empirical literature on inequality has traditionally focused on the earnings distribution (see, e.g., Gottschalk and Danzinger; 2005. Autor, Katz and Kearsey, 2005), a recent line of 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 substantially increased over recent decades, and that this increase has mostly occurred at the very top of the income distribution. Furthermore, the increase of top incomes was due to a large extent 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 similar 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 incomes after 1990 has put forward the following developments (see e.g. Hauser, 2003; Becker and Hauser, 2004; German Council of Economic Advisors, 2006). First, overall inequality of market incomes slightly increased in the decade after reunification. This modest increase was mostly driven by an increase of inequality in East Germany during the first five years after reunification. Second, the share of income accruing to the top 1% of the income distribution increased from 1992 to 1995 and then declined in the following three years, so that its level in 1998 was only slightly above the 1992 level (Bach, Corneo and Steiner, 2005; Dell, 2005). Third, a sharp increase in inequality started after 2002. The main culprit for increased market-income inequality seems to be the higher unemployment rate (German Council of Economic Advisors, 2006).

A common feature of the existing literature on income inequality in Germany is that it is either based on data sets that severely underrepresent 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 very 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 emerges.

The current paper sheds light on the evolution of the whole income distribution in Germany in the period from 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. This new integrated data set contains reliable information about the entire

income distribution, including both the very poor and the very rich. On the one hand, 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 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 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 system of collective wage negotiations. A comprehensive assessment of the evolution of primary incomes can provide a useful guide to a better understanding of how markets, policy and institutions affect the income distribution. Moreover, the distribution of primary incomes has important consequences for the perceived legitimacy of the market economy and is the starting point for positive and normative analyses of governmental redistribution of income.

We find a modest increase in overall inequality of market incomes in Germany in the period 1992 to 2001. For instance, the Gini coefficient increased from 0.58 to 0.61. However, we also document a substantial drop of median income and a remarkable income growth at the top 0.1% of the income distribution. The increase of income inequality was stronger in East Germany than in the West. In both regions, the income concentration process strongly benefited the economic elite, which we define as the richest 0.001% persons in the population. While the elite mainly derives its income from business and capital, its income share received in form of wage income has been increasing. We conclude that the evolution of income concentration at the top in Germany is less different from the Anglo-saxon experience than commonly believed.

The remainder of this paper is organized as follows: In the next section, we describe the macroeconomic 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. Section 6 contains a summary and a discussion of these results.

2 Macroeconomic and Institutional Background

Following unification of East and West Germany on October 3, 1990, a brief economic boom occurred, after which the German economy experienced a long period of slow economic growth (see, e.g., Burda and Hunt, 2001). In the period 1992 to 2001, German national income increased by about 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%; 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.

Table 1 Macroeconomic indicators for Germany, 1992-2005

	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[1)]	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).

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%. This decline was more pronounced among employees (5.9%) than the self-

employed. This was mainly caused by the strong increase of part-time work among women and 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.

In the period after 2001 and until 2005, growth rates of real national income and productivity 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. In 2006, the German economy began to recover.

Among the likely factors driving these macroeconomic developments, the transition in Eastern German in the wake of reunification is a very strong candidate. 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 (see 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 might have contributed to the macroeconomic developments depicted in Table 1: 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 and China substantially increased in the 1990s. Second, as most other advanced economies, Germany 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. 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 mainly due to the over-manning of the public administration at the start of the 1990s as well as the commitment of Germany to the fiscal rules established by 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 also affect people in the middle of the distribution.

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 German 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 that data set, 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 withhold 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 in-

come tax. Although the ITR data do not portray the lower tail of the income distribution in an accurate way, in the medium and especially upper range of the income distribution these data are very representative, as nearly all domestic residents who belong to 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).[1] The SOEP is an annual survey 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. Since 1990 it also covers the population in Eastern Germany. Detailed information on individual and household gross incomes as well as income components is collected retrospectively in each wave for the previous year. 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 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

We analyze the evolution of gross market income, also termed primary income, at the individual level for the entire population aged twenty or older. 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 (see Appendix 1 for the details).

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

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. In order 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 relief 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, including employers' social security contributions (SSC), calculated before deduction of allowable expenses. Since they are neither directly recorded in the ITR nor the SOEP data, employers' SSC have been simulated on the basis of other information contained in both data sets. Since civil servants are not covered by the social security system but are also entitled to pensions and health insurance, we have imputed social security contributions to them, following the approach applied in national accounts.

Income from *business activity* includes taxable income from agriculture and forestry, from unincorporated business enterprise and from self-employed activities, including professional services.

Capital income includes interest and dividends as well as incomes from renting and leasing. We do not include capital gains for the following reasons. First, a significant fraction of capital gains is exempted from the income tax, and there is no information on these exemptions in the ITR data. Second, taxed 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. A dramatic example of this is the abnormal increase in realized capital gains from business activity in 1998 (29,3 billion Euro, compared to 7,7 billion Euro in 2001, 8.8 billion Euro in 1995 and 8.3 billion Euro in 1992) that was mainly triggered by the expectation of a more strict taxation regime.

A relatively large share of the German adult population is found to have zero individual market income, as many persons live on transfers provided to them by their family and/or the 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, and it also arises in household surveys in the case of households whose primary source of income is not 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. 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.[2]

3.3 Data matching and integration

The integrated data set that we have created for the subsequent analysis was obtained by matching the ITR data to *individual* data from the SOEP for the corresponding 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 selects for each person in the SOEP a certain number of persons in the ITR data base, the number being determined by the relation of the respective weighting factors in the two data sets (see Appendix 2 for the details). 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 income tax, are added, but also those who, due to specific regulations in the German tax system, do not file tax returns.[3] 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.

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2 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 offset 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.

3 Single or couple taxpayers who only have wage income which is taxed at the source in Germany are not obliged to file tax returns independently of their level of taxable income.

Total overall market income recorded in the integrated data base was about 1.3 trillion Euro in 2001. This represents 81.5% of total primary income of private households as documented by the national accounts. There is very little difference in total wage income in our integrated data base and the national accounts. As revealed 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 according to the categories used for the income tax assessment, or recorded by 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, capital income is likely to be underestimated because of tax evasion.

Table 2 Structure of the 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)[1)]	1 000	15 518	15 377	14 884	14 509
Potential tax units total[2)]	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[3)] (integrated data base, less capital gains)	mill. Euro	1 073 158	1 159 620	1 224 326	1 303 268
Gross domestic product[4)]	mill. Euro	1 646 620	1 848 450	1 965 380	2 113 160
Primary income of private households[4)]	mill. Euro	1 270 240	1 402 200	1 466 590	1 599 320
Gross market income as percentage of primary income private households	%	84.5	82.7	83.5	81.5
Wage income (integrated data base)[5)]	mill. Euro	903 337	987 550	1 020 171	1 082 478
Compensation of employees (national accounts)[5)]	mill. Euro	917 170	997 020	1 032 250	1 120 610
Wage income from integrated data base as percentage of wages from national accounts	%	98.5	99.1	98.8	96.6
Income from business activities and capital income (integrated data base, less capital gains)	mill. Euro	169 820	172 070	204 155	220 790
Entrepreneurial and received property income of private households (national accounts)[6)]	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[6)]	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	%	50.4	44.3	47.7	46.7

1) Married couples living together are assesed 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 employers' social security contributions and imputed social security contributions for civil servants.- 6) Including non-profit institutions serving households (NPISHs), less financial intermediation services indirectly measured (FISIM).
Source: Income tax statistics 1992-2001; ITR-SOEP data base; national accounts.

4 The Overall Evolution of Income Inequality, 1992-2001

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. To portray the evolution of income inequality over time, we calculate a number of standard summary measures of inequality (see, e.g., Cowell, 2000). 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 half. The Gini coefficient is relatively sensitive to changes in the middle of the distribution. We display three entropy measures: GE(0) (mean logarithmic deviation), which is "bottom sensitive", the Theil index GE(1), and GE(2) (half the square of the coefficient of variation) that stronger responds to changes at the top of the distribution. 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 20,000 Euro for the mean and less than 10,000 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 remained virtually constant between 1992 and 2001, median income fell by almost 25% in this period. Thus, the relative difference between the mean and the median increased by more than 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 pulling down the median.

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 0.58 to 0.61 (roughly 4%), the GE(0) and GE(1) measures increase by 9% and 7%, respectively. The much stronger increase in the GE(2) measure confirms that the rise in income inequality in the period 1992 to 2001 was driven by changes at the top 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 5.1, i.e. by more than 40%, 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. The 10% increase in the P99.999/90 ratio 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 GE(2) measure derived 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[1], capital gains excluded				1992 = 100		
	1992	1995	1998	2001	1995	1998	2001
Average income at 2000 prices[2]							
Mean income (Euro)	20 044	19 767	19 808	20 028	98.6	98.8	99.9
Median income (Euro)	12 915	11 761	10 615	9 790	91.1	82.2	75.8
Relative difference[3] (%)	44.0	51.9	62.4	71.6	118.1	141.9	162.8
Gini coefficient[4]	0.5813	0.5861	0.5983	0.6064	100.8	102.9	104.3
Generalized entropie measures[4] [5]							
GE(0)	1.3863	1.4603	1.4916	1.4813	105.3	107.6	106.9
GE(1)	0.6961	0.6988	0.7409	0.7603	100.4	106.4	109.2
GE(2)	3.9909	4.9532	6.6778	7.4735	124.1	167.3	187.3
Ratio of percentiles							
90 / 50	3.60	4.01	4.55	5.09	111.4	126.3	141.3
95 / 90	1.27	1.29	1.28	1.28	101.2	100.2	100.4
99 / 90	2.23	2.15	2.23	2.24	96.5	99.8	100.4
99.9 / 90	7.34	6.62	7.01	7.06	90.2	95.6	96.2
99.999 / 90	118.44	111.42	127.92	130.05	94.1	108.0	109.8
Structure in % by income fractiles							
1st decile	- 0.87	- 1.19	- 0.99	- 0.99	136.2	114.2	114.0
2nd decile	0.05	0.04	0.03	0.03	71.8	60.8	56.0
3rd decile	0.22	0.17	0.13	0.13	76.5	61.5	60.1
4th decile	1.42	1.04	0.80	0.76	73.3	56.4	53.6
5th decile	4.59	4.02	3.46	3.09	87.6	75.4	67.4
6th decile	8.28	8.12	7.58	7.02	98.1	91.5	84.8
7th decile	11.96	12.26	11.75	11.35	102.5	98.2	94.9
8th decile	15.59	15.99	15.88	15.89	102.6	101.8	101.9
9th decile	19.98	20.54	20.84	21.10	102.8	104.3	105.6
10th decile	38.78	39.00	40.53	41.62	100.6	104.5	107.3
Total	100.00	100.00	100.00	100.00	100.0	100.0	100.0
Top 1%	11.20	10.64	11.60	11.98	95.0	103.5	106.9
Top 0.1%	4.18	3.85	4.38	4.56	92.2	104.9	109.2
Top 0.01%	1.62	1.55	1.83	1.90	95.6	112.6	117.3
Top 0.001%	0.55	0.59	0.72	0.75	107.3	130.5	135.4
Top 0.0001%	0.16	0.20	0.24	0.24	125.4	152.3	153.0

1) Income from business activity, wage income, capital income, exclusive public and private pensions; measured at the individual level.- 2) Deflated by consumer price index.- 3) Difference of ln(mean) and ln(median).- 4) Not including cases with zero or negative income.- 5) GE(0) is the mean logarithmic deviation, GE(1) is the Theil index, and GE(2) is half the square of the coefficient of variation.
Source: ITR-SOEP data base.

The distribution of market incomes across deciles reveals that roughly a third of the adult 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 total market income accrues to the top decile, and its share has increased by 7.3% 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 5th decile fell from 4.6 to 3.1%. Similar developments can also be observed for other deciles in the middle of the income distribution, i.e. the 4th and the 6th decile (see Table 3). This extreme fall in the share of market income going to the middle deciles suggests that compositional effects are at work; as mentioned in Section 2, unemployment significantly increased in the period 1992 to 2001, especially in East Germany.

Turning to changes at the top of the market income distribution, the bottom part of Table 3 reveals some marked differences across the various percentiles. The share of the top 1% in overall market income increased from 11.2% to 12% in the observation period, which gives a similar percentage change as for the top decile. As our integrated data base contains *all* people in the top 1%, we can break down the top percentile further into very small fractiles without sampling error. Looking at the 0.001% top fractile, which we take as representing the *economic elite* in Germany, we observe a relative increase in this small group's share in overall market income by more than a third from its 1992 level. Even more pronounced is the increase in the share of market income at the very top, i.e. the 0.0001 percentile: This tiny group of 65 persons increased their share by more than 50%.

Note that, although the percentage increase in the share absorbed by the top decile in the observation period has been very similar in 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). 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.

Studies for the US have also found evidence of an increasing concentration of income at the top of the distribution. For example, Piketty and Saez (2006) 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 that we observe for Germany. Dew-Becker and Gordon (2005) show that the top 10% of the income distribution gained almost half of the increase in real incomes during the recent years of strong productivity growth in the US. Both studies also report an outstanding income increase for the top 1% of the distribution; that increase clearly outpaces the increase that we observe for Germany in approximately the same period.[4]

Before providing 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

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[4] 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. 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; as reported by Gustafsson and Jansson (2007), Sweden seems to hold a middle position between the Anglo-Saxon countries and the mentioned other European countries regarding the increase of the income share at the top.

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 the entire 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 the price level behaved quite differently in East and West Germany in the first few years after reunification (see Table 1), we use separate consumer price indices for the two regions to calculate real incomes.

Table 4 Distribution of gross market income in West and East Germany, 1992-2001

Gross market income[1], capital gains excluded	West Germany (1992: incl. West Berlin; 1995-2001 excl. Berlin)				East Germany (1992: incl. East Berlin; 1995-2001 incl. Berlin)			
	1992	1995	1998	2001	1992	1995	1998	2001
Average income at 2000 prices[2]								
Mean income (Euro)	21 317	20 710	20 859	21 151	15 122	14 853	14 709	14 465
Median income (Euro)	13 272	11 810	10 751	10 244	13 057	11 606	10 221	8 270
Relative difference[3] (%)	47.4	56.2	66.3	72.5	14.7	24.7	36.4	55.9
Gini coefficient[4]	0.5849	0.5883	0.5994	0.6059	0.5075	0.5404	0.5607	0.5807
Generalized entropie measures[4] [5]								
GE(0)	1.4237	1.4657	1.4990	1.4829	1.1671	1.3851	1.4017	1.4152
GE(1)	0.7147	0.7095	0.7518	0.7675	0.4884	0.5626	0.5970	0.6333
GE(2)	4.2311	5.1751	7.1158	7.9358	1.1795	3.7692	1.9668	1.9431
Ratio of percentiles								
90 / 50	3.69	4.19	4.69	5.08	2.53	2.95	3.43	4.43
95 / 90	1.27	1.28	1.27	1.27	1.27	1.23	1.26	1.26
99 / 90	2.27	2.16	2.25	2.26	1.97	1.93	1.99	2.07
99.9 / 90	7.75	6.80	7.33	7.40	4.41	4.83	4.87	4.87
99.999 / 90	127.59	116.08	135.23	139.45	25.22	30.37	33.59	32.74
Structure in % by income fractiles								
1st decile	- 0.88	- 1.12	- 1.02	- 1.05	- 0.82	- 1.65	- 0.80	- 0.59
2nd decile	0.05	0.03	0.03	0.03	0.08	0.05	0.05	0.04
3rd decile	0.20	0.17	0.13	0.13	0.36	0.17	0.17	0.15
4th decile	1.18	0.98	0.75	0.77	3.16	1.54	1.20	0.76
5th decile	4.15	3.76	3.24	3.04	7.02	5.80	4.92	3.57
6th decile	8.35	8.00	7.47	7.03	10.17	9.80	9.06	7.95
7th decile	12.43	12.37	11.90	11.51	12.94	13.38	12.82	12.19
8th decile	15.74	16.14	16.00	15.92	15.83	16.75	16.40	16.39
9th decile	19.86	20.52	20.79	20.99	19.47	20.43	20.76	21.75
10th decile	38.91	39.16	40.72	41.63	31.79	33.72	35.42	37.79
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Top 1%	11.63	10.93	11.97	12.31	6.55	7.42	7.80	8.34
Top 0.1%	4.42	4.04	4.63	4.80	1.62	1.94	1.99	2.10
Top 0.01%	1.71	1.63	1.94	2.01	0.39	0.52	0.54	0.56
Top 0.001%	0.57	0.62	0.76	0.78	0.08	0.18	0.14	0.16
Top 0.0001%	0.16	0.20	0.25	0.24	.	.	.	.

1) Income from business activity, wage income, capital income, exclusive public and private pensions; measured at the individual level.- 2) Deflated by consumer price index.- 3) Difference of ln(mean) and ln(median).- 4) Not including cases with zero or negative income.- 5) GE(0) is the mean logarithmic deviation, GE(1) is the Theil index, and GE(2) is half the square of the coefficient of variation.
Source: ITR-SOEP data base.

Table 4 shows some noteworthy developments: First, we observe that in East Germany both the mean and the median of real market income have declined relative to its 1992 level. The extreme drop in me-

dian market income by more than a third was largely driven by the dramatic decline in the level of employment and the substantial increase in unemployment. 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 56%. This is also reflected by the larger relative change in the top-sensitive entropy measure in East Germany relative to the West, whereas changes in the other two summary inequality measures differ little between the two regions. Third, regarding regional differences in the distribution of market incomes across deciles, in East Germany a much larger income share accrues to the middle deciles (3rd to 6th decile) than in West Germany, and a smaller share is absorbed by the top decile. Similarly to the development in West Germany, the share of income which goes to the middle deciles has fallen during the observation period and the income share accruing to the top decile has markedly increased.

Regional differences in the evolution of the income distribution mirror convergence along two dimensions. First, the wage structure was much more compressed in the former GDR than in 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 has increased their share of market income. In line with this fact, the income share accruing to the top percentile in East Germany increased from 6.5% in 1992 to 8.3% in 2001. However, the top percentile in the East still receives a significantly smaller share of regional income than it does in the West.

5 The Evolution and Composition of Top Incomes

As described in the previous section, the overall increase in the inequality in the distribution of market income in Germany over the decade following reunification was mainly driven by income gains accruing to the top income decile, and the economic elite in particular. We have also shown that this development basically holds for both East and West Germany, although the economic elite in the East still only absorbs a relatively small share of regional income, and there has been little change in this respect since the mid-1990s. In this Section, we offer a detailed analysis of the evolution of top incomes for Germany as a whole. Since the integrated data base contains information on the components of market income, we also analyze the contribution of changes in the composition of top incomes to increased income inequality.

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, 1992-2001

Gross market income[1], capital gains excluded	1992	1995	1998	2001	1995	1998	2001
	1 000 Euro at 2000 prices[2]				1992 = 100		
Mean income	20.0	19.8	19.8	20.0	98.6	98.8	99.9
Median income	12.9	11.8	10.6	9.8	91.1	82.2	75.8
Average income							
Top 10%	77.7	77.1	80.3	83.4	99.2	103.3	107.3
Top 1%	224.5	210.4	229.7	239.9	93.7	102.3	106.8
Top 0.1%	837.5	761.7	868.1	914.1	90.9	103.7	109.1
Top 0.01%	3 252.0	3 066.6	3 617.8	3 810.9	94.3	111.2	117.2
Top 0.001%	11 082.6	11 721.4	14 280.4	14 981.1	105.8	128.9	135.2
Top 0.0001%	31 437.7	39 051.4	47 230.3	48 151.9	124.2	150.2	153.2
Lowest income							
Top 10%	46.5	47.2	48.3	49.8	101.4	103.8	107.1
Top 1%	103.7	101.6	107.5	111.6	97.9	103.6	107.6
Top 0.1%	341.4	312.3	338.8	351.9	91.5	99.3	103.1
Top 0.01%	1 401.1	1 211.3	1 385.0	1 471.3	86.5	98.9	105.0
Top 0.001%	5 510.0	5 257.7	6 178.6	6 482.0	95.4	112.1	117.6
Top 0.0001%	18 360.4	19 696.6	25 456.4	26 255.5	107.3	138.6	143.0

1) Income from business activity, wage income, capital income, exclusive public and private pensions; measured at the individual level.- 2) Deflated by consumer price index.
Source: ITR-SOEP data base.

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 about 50,000 Euro (in 2000 prices), the average income in the top decile amounted to 83,400 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 about 112,000 Euro. In that year, members of this group had an average income of roughly 240,000 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 about 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 approximately 1,500 times the median income. Perhaps more tellingly, in this year the average income in this group was more than 300 times the lowest income in the top decile, and almost 180 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 individuals at the very top, with an average income of almost 50 million in the year 2001. The income of those 65 persons together amounted to more than 3 billion Euro.

Table 5 also reveals that market incomes have evolved quite differently within the top percentile. Whereas average market income in this percentile increased by some 7% between 1992 and 2001, for the economic elite it increased by more than a third (35.2%) in this period, and for the super-rich by more than 50%. Recall that we have excluded capital gains from our definition of market income, so that these very high incomes are not affected by realization proceeds of (parts of) an enterprise or shareholdings.

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 composition of market income for various fractiles. We report findings for the top percentile, up to the 0.001% percentile. The income composition of the 0.0001% group cannot be reported because of provisions to protect privacy. For comparison, we also report the composition of mean market incomes in the top decile of the income distribution. To save space, we only report results for the years 1992 and 2001 here.

In 2001, wage income represents more than 80% of mean market income, the remainder being made up of income from business activity (11%) and capital income. While the top decile still receives more than 70% of market income in form of wages and salaries, for the top percentile this share drops to about 40%. Correspondingly, the share of capital income is about a sixth of overall market income in the top percentile, compared to less than 7% in the top decile. 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 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.

Compared to France and the US, the share of wage income at the top is quite small in Germany. In the US, in 1998 about 45% of all income accruing to the top 0.01% consisted of wage income; for the corresponding group in France the share was about 22% (see Piketty and Saez, 2003, Piketty, 2003).[5]

[5] 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).

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 shows 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.

Table 6 Composition of top market incomes by income component (in %), 1992 and 2001

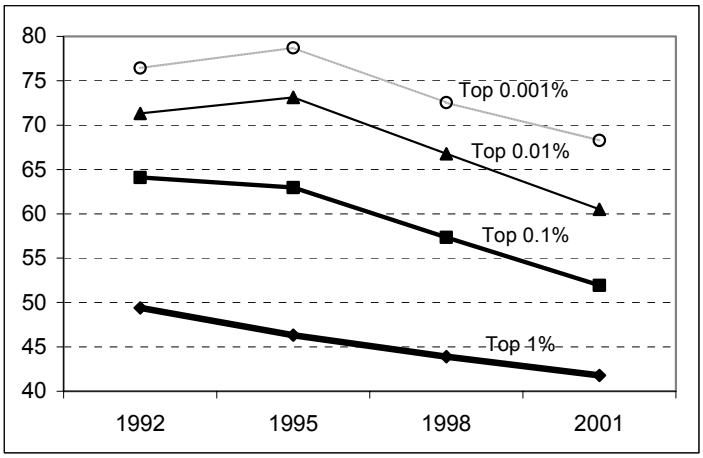
Gross market income[1], capital gains excluded	Gross market income[1] less capital gains	Income from business activity less capital gains			Wage income[2]	Capital income less capital gains		
		Total	business enterprise	profess. services		Total	Interest, dividends	Renting and leasing
				2001				
Mean income	100.0	11.4	7.0	4.4	83.1	5.5	4.2	1.4
Top 10%	100.0	19.7	11.5	8.2	73.3	6.9	5.3	1.6
Top 1%	100.0	41.8	24.3	17.5	42.1	16.1	13.0	3.1
Top 0.1%	100.0	52.0	40.3	11.7	22.9	25.2	22.1	3.0
Top 0.01%	100.0	60.5	57.0	3.5	11.6	27.9	26.1	1.8
Top 0.001%	100.0	68.3	67.3	1.0	5.2	26.6	25.8	0.7
Top 0.0001%	.	.	.	.	.	.	.	.
				1992				
Mean income	100.0	11.3	7.4	3.8	84.2	4.6	3.4	1.2
Top 10%	100.0	21.3	13.3	8.0	72.7	6.0	4.6	1.4
Top 1%	100.0	49.4	31.2	18.2	36.6	14.0	11.2	2.9
Top 0.1%	100.0	64.1	50.1	14.0	15.0	20.9	18.2	2.8
Top 0.01%	100.0	71.3	67.1	4.2	5.8	22.8	21.0	1.9
Top 0.001%	100.0	76.4	75.6	0.8	1.9	21.7	20.8	0.8
Top 0.0001%	.	.	.	.	.	.	.	.

1) Income from business activity, wage income, capital income, exclusive public and private pensions; measured at the individual level.-
2) Including employers' social security contributions and imputed social security contributions for civil servants.
Source: ITR-SOEP data base.

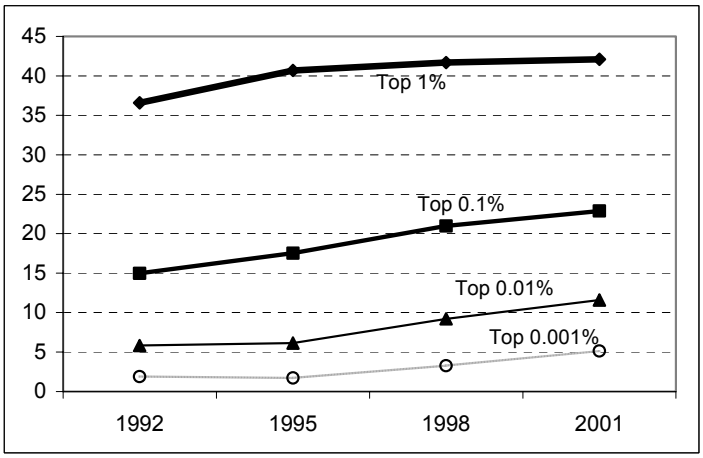
In the period 1992 to 2001, the share of salary and wages in mean market income in the whole population declined by 1.1 percentage points. While there was little change in the top decile, the wage share of the top percentile increased from about 37% to 42%, and that of the economic elite from 1.9% to 5.2%. 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 was largely driven by an increasing share of wage income in the top percentile of the income distribution (see Kopczuk and Saez, 2004, and Dew-Becker and Gordon, 2005).

Figure 1 Share of income components in top market incomes in Germany, 1992-2001

Income from business activity



Wage income



Capital income

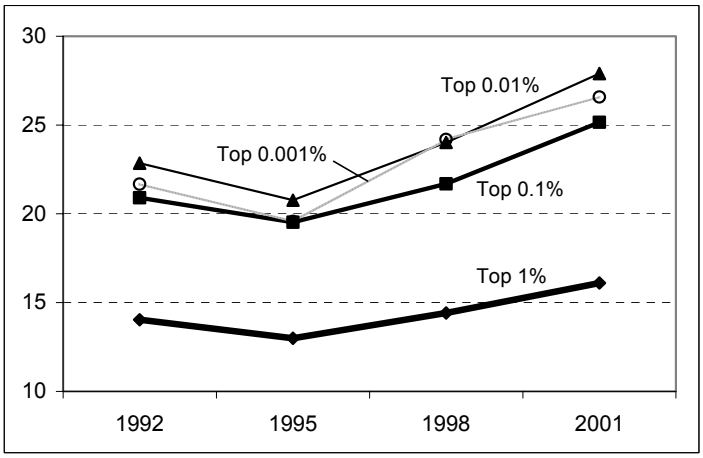


Figure 1 also reveals that the share of business income in the top percentile declined significantly between 1992 and 2001, from about 50% to 42%, whereas for this group the share of income from capital increased by about 2 percentage points. For the economic elite, the respective shares moved in the 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 more than 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. Almost 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 3% 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 about 3 percentage points, while the second group shrank by the same percentage.

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 54.6% and a portion of rentiers equal to 16.8%. 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.

Hence, although the fraction of managers in the German economic elite has increased since the early 1990s, the German elite remains mainly populated by 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 may be part of the answer. Second, various factors may explain the relatively low remuneration of German CEOs as compared to their US counterparts: the larger size of US firms, their widespread usage of stock options, and the presence in the supervisory boards of German firms of trade union members that are also engaged in wage bargaining.

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, where 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. Moreover, the very rich families in Germany might cumulate parts of their capital incomes in private foundations or holdings, thus reporting only the distributed income on the income tax return.

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[1)]	Top 1%			Top 0.001%		
	Persons by share of			Persons by share of		
	Wage income[2)]	Income fr. business activity	Capital income less capital gains	Wage income[2)]	Income fr. business activity	Capital income less capital gains
from ... to ...	% of total			% of total		
	2001					
0 - 10 %	35.9	55.6	78.4	90.4	24.9	62.0
10 - 20 %	1.8	2.7	6.3	2.0	1.1	8.2
20 - 30 %	2.0	2.1	3.3	0.9	1.1	2.8
30 - 40 %	2.3	1.9	2.5		1.3	1.7
40 - 50 %	2.6	1.7	1.8		1.3	2.4
50 - 60 %	2.9	1.6	1.5	1.7	1.1	0.9
60 - 70 %	3.3	1.7	1.2		1.9	1.4
70 - 80 %	3.5	1.9	1.0		2.8	1.7
80 - 90 %	4.6	3.1	0.8	0.9	10.0	2.0
90 - 100 %	41.1	27.6	3.3	4.1	54.6	16.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
	1992					
0 - 10 %	40.0	50.4	78.0	94.4	13.7	58.1
10 - 20 %	1.9	2.7	7.6	3.5	1.1	15.5
20 - 30 %	2.0	2.2	3.5	1.0		6.6
30 - 40 %	2.3	2.0	2.4		1.1	2.6
40 - 50 %	2.4	1.8	1.7		1.1	1.3
50 - 60 %	2.8	1.8	1.3		0.8	1.1
60 - 70 %	3.1	2.0	1.0	1.1	3.2	1.1
70 - 80 %	3.4	2.4	0.8		8.1	1.0
80 - 90 %	4.9	4.2	0.6		17.2	2.1
90 - 100 %	37.2	30.4	3.0		53.6	10.6
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; measured at the individual level. -2) Including employers' social security contributions and imputed social security contributions for civil servants.
Source: ITR-SOEP data base.

6 Conclusion

The current paper has provided an empirical analysis of the evolution of the distribution of market incomes in Germany on the basis of an integrated micro database representing the entire adult population. Whereas previous research 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, we have employed an integrated ITR-SOEP data base that allows one to jointly analyze the upper and the lower tail of the income distribution. In particular, all taxpayers that belong to the top percentile of the income distribution are included in our integrated data base, so that sampling errors are completely avoided for that group. Exploiting this feature, 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 coefficient, moderately increased in the period from 1992 to 2001. This finding is consistent with those reported in previous studies, that failed to incorporate both tails of the income distribution. However, we have found that standard summary measures of inequality disguise important changes in the distribution of market incomes. On the one hand, a third of the German population receives almost no market income, and the share of market income going to the middle deciles sharply declined since the early 1990s. Consequently, median market income declined substantially, both in absolute terms and relative to mean income. Inequality of market incomes in East Germany increased much more than in the West and the decline in median market income was especially severe in the East. This is a likely consequence of the marked decline in full-time employment and increase in unemployment in East Germany. Demographic factors and economic forces, such as skill-biased technological change and globalization, seem in Germany to affect the distribution of market incomes more by increasing unemployment and reducing working hours than by increasing earnings differentials of full-time workers at the bottom and the middle of the distribution (see, e.g., Steiner and Wagner, 1998).

On the other hand, average income of the top decile significantly increased in Germany, relative to overall mean income. In 2001, more than 40% of market income accrued to the top decile, and this share has increased since the early 1990s. Within the top decile, the economic elite is the group that displays the largest relative gain. In 2001, this group was formed by about 650 individuals, with an average income of roughly 15 million Euro. Thus, an average member of the German economic elite earned as much as 1,500 individuals with median income. Also within the elite, income is very unequally distributed: 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 few people at the very top (65 persons) had an average income of almost 50 million Euro in that year. Average real income of the economic elite increased by roughly a third between 1992 and 2001. The super-rich did even better, as they could increase their market income by more than 50% in real terms.

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. While wage income is by far the quantitatively most important income source for the vast majority of income earners, only 5% of the members of the German economic elite may 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 France. However, the rapid increase of the share of wage income in German top income groups suggests that a convergence process might have started.

Our results confirm that, even in contemporary 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, the last year for which individual tax returns data are currently available, Germany has experienced a strong increase in unemployment and a significant drop of labor's share in national income, while entrepreneurial and property income have boomed. We therefore expect the rise of income inequality revealed by our analysis to have continued up to the present day, possibly in an even more accentuated form. Recent data from the German Socio-Economic panel do suggest that the distribution of market incomes has become more unequal since 2001 (see Appendix 3), although these data alone cannot provide a complete picture because they fail to represent top incomes. Unfortunately, it will only be possible to provide a more complete picture of recent developments in the market income distribution when income tax return data for the year 2005 will become available.

References

Atkinson, Anthony B. and Wiemer Salverda (2005): Top incomes in the Netherlands and the United Kingdom over the 20th century. Journal of the European Economic Association 3 (4), 883-913.

Autor, David, Lawrence Katz and Melissa S. Kearsey (2005): Trends in U.S. inequality: re-assessing the revisionists. NBER Working Paper No. 11627, Cambridge, Mass.

Bach, Stefan, Giacomo Corneo and Viktor Steiner (2005): Top Incomes and Top Taxes in Germany, DIW Discussion Paper No. 532, Berlin. *http://www.diw.de/deutsch/produkte/publikationen/diskussionspapiere/docs/papers/dp532.pdf*

Becker, Irene and Richard Hauser (2004): Verteilung der Einkommen 1999 – 2003. Bericht zur Studie im Auftrag des Bundesministeriums für Gesundheit und Soziale Sicherung. *http://www.bmas.bund.de/BMAS/Redaktion/Pdf/Publikationen/verteilung-der-einkommen-1999-2003.pdf*

Burda, Michael and Jennifer Hunt (2001): From Reunification to Economic Integration: Productivity and the Labor Market in Eastern Germany. Brookings Papers on Economic Activity 2/2001, 1-71.

Corneo, Giacomo (2005): The Rise and Likely Fall of the German Income Tax, 1958-2005. CESifo Economic Studies 51, 159-186.

Corneo, Giacomo (2006): Media Capture in a Democracy: The Role of Wealth Concentration. Journal of Public Economics 90, 37-58.

Cowell, Frank A. (2000): Measuring Inequality (3rd ed.). LSE Economics Series, Oxford University Press. *http://darp.lse.ac.uk/papersdb/Cowell_measuringinequality3.pdf*

Dell, Fabien (2005): Top Income in Germany and Switzerland over the Twentieth Century. Journal of the European Economic Association 3, 1-10.

Dew-Becker, Ian and Robert J. Gordon (2005): Where did the productivity growth go? Inflation dynamics and the distribution of income. Brookings Papers on Economic Activity 2/2005.

Franz, Wolfgang and Viktor Steiner (2000): Wages in the East German Transition Process – Facts and Explanations. German Economic Review 1(2), 241–270.

Gustafsson, Björn and Birgitta Jansson (2007): Top Incomes in Sweden during Three-Quarters of a Century: A Micro Data Approach. IZA Discussion Papers 2672. Bonn.

Gottschalk, Peter and Sheldon Danzinger (2005): Inequality of wage rates, earnings, and family income in the United States, 1975-2002. Review of Income and Wealth 51, 231-255.

Haisken-DeNew, John P. and Joachim R. Frick (2005): DTC Desktop Companion to the German Socio-Economic Panel (SOEP). Version 8.0 - Dec 2005, Updated to Wave 21 (U). *http://www.diw.de/deutsch/sop/service/dtc/dtc.pdf*

Hauser, Richard (2003): The development of the distribution of income and wealth in Germany – an overview. In: Richard Hauser and Irene Becker (eds.), Reporting on Income Distribution and Poverty. Perspectives from a German and European Point of View. Berlin and Heidelberg, 7-28.

Hauser, Richard and Irene Becker (2000): Changes in the distribution of pre-government and post-government income in Germany 1973-1993. In: Richard Hauser and Irene Becker (eds.), The Personal Distribution of Income in an International Perspective. Berlin and Heidelberg, 72-98.

Kopczuk, Wojciech and Emmanuel Saez (2004): Top Wealth Shares in the United States, 1916-2000: Evidence from Estate Tax Returns. National Tax Journal, 445-487.

O'Hare, J. F. (2000): Impute or Match? Strategies for Microsimulation Modeling. In: A. Gupta und V. Kapur (Hrsg.), Microsimulation in Government Policy and Forecasting. North-Holland.

Piketty, Thomas (2003): Income Inequality in France 1901-1998. Journal of Political Economy 111, 1004-43.

Piketty, Thomas and Emmanuel Saez (2003): Income Inequality in the United States, 1913-1998. Quarterly Journal of Economics 118, 1-39.

Piketty, Thomas and Emmanuel Saez (2006): The evolution of top incomes: a historical and international perspective. American Economic Review, Papers and Proceedings 96 (2), 200-205.

Sachverstaendigenrat (German Council of Economic Advisors) (2006): Widerstreitende Interessen - Ungenutzte Chancen. Jahresgutachten: 2006/07. *http://www.sachverstaendigenrat-wirtschaft.de/download/gutachten/ga06_ges.pdf*

Saez, Emmanual and Michael R. Veall (2005): The evolution of high incomes in Northern America: Lessons from Canadian Evidence. American Economic Review 95(3), 831-49.

Steiner, Viktor and Kerten Wagner (1998): Relative Earnings and the Demand for Unskilled Labor in West German Manufacturing. In: S. Black (ed.), Globalization, Technological Change, and the Welfare State. Kluwer Academic Publishers.

Zwick, Markus (2001): Individual tax statistics data and their evaluation possibilities for the scientific community. Schmollers Jahrbuch 121, 639-649.

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, the 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 offset 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.[6]

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:

$$\min \sum_{i=1}^{n_A}\sum_{j=1}^{n_B} d_{ij} w_{ij}$$

$$s.t. \quad \sum_{j=1}^{n_B} w_{ij} = w_i, \ \forall i, \quad \sum_{i=1}^{n_A} w_{ij} = w_j, \ \forall j, \quad w_{ij} \geq 0, \ \forall i, j$$

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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6 We use the network simplex algorithm performed by CPLEX and implemented in AMPL, provided by www.ilog.com.

Appendix 3 Distribution of market income in Germany, 1992-2004, SOEP data only (sample A-F)

	Gross market income[1], capital gains excluded					1992 = 100			
	1992	1995	1998	2001	2004	1995	1998	2001	2004
Average income at 2000 prices[2]									
Mean income (Euro)	18 389	18 563	18 529	19 018	18 378	100.9	100.8	103.4	99.9
Median income (Euro)	11 628	10 440	9 196	8 735	7 356	89.8	79.1	75.1	63.3
Relative difference[3] (%)	45.8	57.5	70.1	77.8	91.6	125.6	152.8	169.8	199.8
Gini coefficient[4]	0.5659	0.5787	0.5814	0.5910	0.6053	102.3	102.7	104.4	107.0
Generalized entropie measures[4] [5]									
GE(0)	1.4170	1.5126	1.5199	1.5100	1.5878	106.7	107.3	106.6	112.1
GE(1)	0.5915	0.6196	0.6186	0.6365	0.6656	104.8	104.6	107.6	112.5
GE(2)	0.6528	0.6858	0.6394	0.6807	0.7123	105.1	98.0	104.3	109.1
Ratio of percentiles									
90 / 50	3.92	4.49	5.23	5.81	6.87	114.4	133.2	148.2	175.1
95 / 90	1.26	1.30	1.27	1.26	1.27	102.9	100.6	100.1	100.6
99 / 90	1.87	1.86	1.97	1.99	1.94	99.5	105.1	106.5	103.9
99.9 / 90	3.77	4.12	3.00	3.17	3.24	109.1	79.5	84.0	85.8
99.999 / 90	.	.	.	.	.	.	.	.	
Structure in % by income fractiles									
1st decile	- 0.12	- 0.27	- 0.06	- 0.23	- 0.73	229.3	51.0	199.4	620.9
2nd decile	0.05	0.04	0.03	0.03	0.03	74.7	63.3	60.9	57.2
3rd decile	0.18	0.13	0.12	0.12	0.11	76.2	65.9	68.3	62.5
4th decile	1.06	0.81	0.66	0.68	0.63	75.9	61.8	63.6	58.8
5th decile	4.25	3.48	3.02	2.76	2.50	81.8	70.9	64.8	58.7
6th decile	8.63	8.22	7.84	7.13	6.36	95.2	90.8	82.6	73.7
7th decile	12.81	12.83	12.74	12.26	11.73	100.2	99.4	95.7	91.5
8th decile	16.65	16.99	16.89	16.94	17.32	102.0	101.4	101.7	104.0
9th decile	21.28	21.58	22.13	22.64	23.40	101.4	103.9	106.4	109.9
10th decile	35.20	36.20	36.65	37.67	38.66	102.8	104.1	107.0	109.8
Total	100.00	100.00	100.00	100.00	100.00	100.0	100.0	100.0	100.0
Top 1%	21.27	22.01	22.21	22.86	23.37	103.5	104.4	107.5	109.9
Top 0.1%	6.58	6.76	6.30	6.79	6.78	102.8	95.8	103.2	103.1
Top 0.01%	1.51	1.32	1.03	1.09	1.08	87.9	68.2	72.2	71.5
Top 0.001%	.	.	.	.	.	.	.	.	.
Top 0.0001%	.	.	.	.	.	.	.	.	.

1) Income from business activity, wage income, capital income, exclusive public and private pensions; measured at the individual level.- 2) Deflated by consumer price index.- 3) Difference of ln(mean) and ln(median).- 4) Not including cases with zero or negative income.- 5) GE(0) is the mean logarithmic deviation, GE(1) is the Theil index, and GE(2) is half the square of the coefficient of variation.
Source: SOEP, sample A-F (high income sample excluded).