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Effective taxation of top incomes in Germany

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Effective taxation of top incomes in Germany

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School of Business & Economics
Discussion Paper

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Effective Taxation of Top Incomes in Germany

by

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

Abstract: We exploit an exhaustive administrative dataset that includes the individual tax returns of all households in the top percentile of the income distribution in Germany to pin down the effective income taxation of households with very high incomes. Taking tax base erosion into account, we find that the top percentile of the income distribution pays an effective average tax rate of 30.5 percent and contributes more than a quarter of total income tax revenue. Within the top percentile, the effective average tax rate is first increasing and then decreasing with income. Since the 1990s, effective average tax rates for the German super rich have fallen by about a third, with major reductions occurring in the wake of the personal income tax reform of 2001-2005. As a result, the concentration of net incomes at the very top of the distribution has strongly increased in Germany.

Keywords: Personal Income Tax, Taxing the Rich, Effective Progressivity.
JEL Classification: H24, H26, D31

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1 Introduction

Before the recent financial crisis, income concentration was on the rise in many countries. Ordinary incomes stagnated, while top incomes experienced vigorous growth. Meanwhile, public deficits that were incurred to fight the crisis have brought about public debts of unprecedented heights. In such a situation, increasing tax revenues by a heavier taxation of top incomes is an often discussed policy option. This paper aims at informing that discussion by a thorough analysis of the effective taxation of top incomes in Germany.[1]

To appreciate the margins for an enhanced taxation of top incomes, one has to assess the extent to which those incomes are actually taxed, how effective taxation has evolved before the crisis, and how the taxation of very-high income taxpayers compare to the taxation of the rest of the population. Such an analysis faces two main challenges. First, it must cope with the fact that legislated tax rates do not contain sufficient information to determine the effective burden of income taxation. One has namely to take into account the pattern and the size of tax base erosion triggered off by tax exemptions, deductions, and various loopholes in the tax code. Furthermore, one has to take into account how the liabilities of the personal income tax (PIT) interact with those of other taxes, notably those affecting companies. Second, a meaningful analysis of the taxation of households with very high incomes must contrast it with the taxation of the remaining population. Only by comparing effective average tax rates across income groups over time, one can assess the extent of true progressivity and appreciate the extent to which the distributional impact of income taxation has evolved. Ideally, a dataset is needed that covers the entire household population, from the very poor to the very rich.

This paper addresses both challenges mentioned above. On the basis of a very rich integrated dataset and detailed micro-simulations we conduct an in-depth assessment of taxation of top incomes in Germany during the period 1992-2005. This period covers a few major reforms in income taxation that entailed substantial reductions of top marginal tax rates. The focus of our analysis is on the taxation of households in the top percentile of the income distribution. As our dataset includes *all* taxpayers in that top percentile, we can determine the effective taxation of top fractiles as small as the top 0.0001 percentile, i.e., the forty-six income-richest households in Germany.

Our main results on the taxation of the households in the top percentile of the German income distribution are as follows. First, the estimated effective average tax rate for that group is equal, in

[1] Atkinson and Piketty (2010) offer an overview about the long-run development of income concentration. The taxation of top incomes has been the object of studies devoted to the US; see e.g. Slemrod (1994), Feenberg and Poterba (2000), and Piketty and Saez (2007).

2005, to only about two thirds of the statutory one. This notwithstanding, the effective average tax rate of the top percentile is markedly higher than the ones affecting the top decile and the lower deciles. Second, and quite surprisingly, effective tax progressivity vanishes within the top percentile of the income distribution. The effective average tax rate peaks at the level of the top 0.1 % group and then gently declines. Third, the top percentile contributes about one quarter of the overall income tax revenue and that share has not changed much during the period 1992-2005. Fourth, in the wake of the major PIT reform of the period 2001-2005 the effective average tax rate of the top percentile decreased, and that decrease was especially pronounced for the richest subgroups within the top percentile. Taxation of top incomes became lighter precisely when pre-tax income concentration was on the rise.[2] This policy change, together with a strong increase of gross incomes in the top percentile, entailed a substantial increase of the concentration of net income. Fifth, the inclusion of the local business tax raises the effective tax rates on top incomes by several percentage points, but does not qualitatively change our results regarding effective tax progressivity and changes of effective tax rates over time.

Effective tax progressivity in Germany has been analyzed by Lang *et al.* (1997) using data from the income and consumption survey of 1983. They estimated the effective marginal tax rate for high incomes to be sixteen percentage points below the legislated one and concluded that much of that difference was due to tax avoidance by interest income and income from real assets. They also found that the effective tax rate increased with income, although the increase of the tax rate was shown to be negligible at high income levels. However, Lang *et al.* (1997) is mute about the taxation of top incomes, as the employed survey data do not include households within the two-percent richest group of the population. German top incomes are instead included in the analysis of Bach *et al.* (2009). In contrast to the current paper, that article focuses on the distribution of market incomes at the individual level. It shows that inequality in individual gross market income increased in Germany in the period 1992-2003; that increase was mainly driven by growing income concentration at the very top of the distribution.[3]

In the next section we provide some background information on the taxation of household income in Germany. Section 3 describes our tax return data and the method we apply to account for non-filers. Section 4 describes how gross income is measured from tax returns data. Section 5 is the core of the paper, where our main results are presented and discussed. Section 6 concludes.

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2 That finding is in line with cross-country studies on the progressivity of the PIT. See OECD (1990), Wagstaff *et al.* (1999), Wagstaff and van Doorslaer (2001), and Verbist (2004). For a recent comparative analysis of trends in national personal income tax systems across a large number of countries, see Sabirianova Peter et al. (2010).

3 Dell (2005) investigated top incomes in Germany in historical perspective.

2 Institutional Background

Personal Income Taxation

In Germany, a taxpayer's personal income tax (PIT) is computed as a function of her or his nominal taxable income in the corresponding year. Paid withholding taxes, such as the monthly wage tax or taxes on interest and dividends, are offset against the PIT liability. The tax schedule is progressive and includes a basic allowance. Incomes that exceed the basic allowance are subject to a marginal tax rate that linearly increases with income up to a threshold. For incomes larger than that threshold, the marginal tax rate stays constant. Thus, the statutory average tax rate converges towards the top marginal tax rate with increasing taxable income. Single taxpayers are taxed according to the tax schedule for individuals. Married couples are taxed jointly under full income splitting. In 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.

Figure 1 displays the statutory marginal and average tax rates for single persons between 1992 and 2005.[4] Top statutory marginal tax rates have been reduced from 53 percent to 42 percent.[5] The lowest marginal tax rate was increased from 19 percent in 1992 to 25.9 percent in 1998 and subsequently reduced to 15 percent in 2005. This was accompanied by successive increases in the basic allowance, in particular a doubling of the basic allowance in 1996. In 1991-92 a '*solidarity surcharge*' tax amounting to 3.75 percent of the PIT amount was introduced, briefly suspended in 1993, subsequently re-introduced at the rate of 7.5 percent in 1995, and reduced in 1998 to the current level of 5.5 percent of the PIT liability.

The evolution of the effective taxation of top personal incomes is significantly affected by changes in the realm of company taxation. In Germany, owners of unincorporated companies are subject to the PIT, in contrast to corporations, which are subject to a flat corporate income tax. Along with tax cuts for corporations, the German parliament also reduced the tax burden of unincorporated companies by means of various tax rate limitations for income from business enterprise ("*Tarifbegrenzung für gewerbliche Einkuenfte"*). The Location Preservation Act ("*Standortsicherungsgesetz"*), which became effective as of 1994, reduced the corporate tax rate for retained profits from 50 percent to 45 percent. By the same Act, the general top marginal PIT rate of

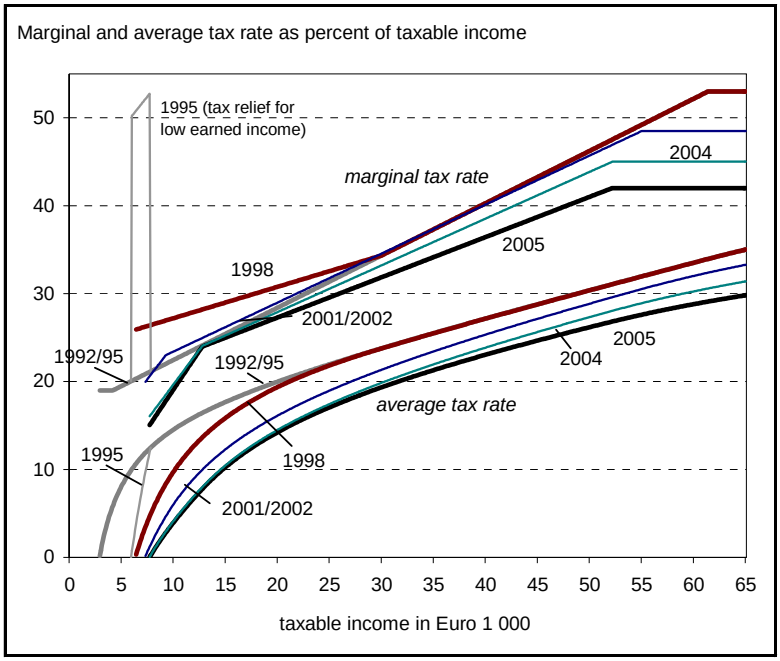
4 For an account of the evolution of the PIT in West Germany since the 1950s, see Corneo (2005).

5 The major 2000 reform of the PIT was implemented in three steps: the first step became effective in 2001, the second step in 2004, and the third step in 2005. In the second (third) step, the top marginal tax rate was reduced to 45 percent (42 percent).

53 percent was reduced to 47 percent for earnings from business enterprise above about Euro 50,000.

The Tax Relief Act 1999/2000/2002 ("*Steuerentlastungsgesetz*") further reduced the corporate tax rate on retained profits to 40 percent and limited the top marginal personal income tax rate for incomes from business enterprise to 45 percent in 1999 and to 43 percent in 2000. The general top marginal tax rate for all other personal incomes was left unchanged at 53 percent in 1999. The top marginal income tax rate was reduced to 51 percent in 2000, to 48.5 percent in 2001, and to 42 percent in 2005.[6] The reform also replaced the limitation of the top marginal PIT rate for tradesmen referred to above with a partial credit against the local business tax deductible from the PIT. The Corporation Tax Reform Act 2000 ("*Steuersenkungsgesetz*") reduced the corporate tax rate on both retained and distributed profits to 25 percent. By the same Act, the previous full imputation system[7] was demised in favour of a classical system with shareholder relief. Since then, distributed and retained profits are taxed at the same rate of 25 percent, with the former being taxed at the personal level at half the shareholder's personal income tax rate. The half-income system was also applied to the taxation of capital gains.

Figure 1: Statutory marginal and average tax rates as percent of taxable income, 1992-2005



6 The Tax Relief Act introduced some complementary measures to partly compensate the reduction of tax rates. Those measures included restrictions for high loss offsets between incomes from different sources, more restrictive rules for the assessment of certain provisions, especially in the insurance and nuclear energy industries, and restrictions for current-value depreciations. Furthermore, the so-called co-entrepreneurship decree was temporarily abolished, which facilitated tax-neutral transfers of individual assets between partners and their partnerships.

7 Under this system distributed corporate profits in the form of dividends are taxed at the same rate as retained profits and dividends are taxed at the shareholder's PIT rate with an allowance for the tax paid at the corporate rate.

Local Business Tax

In Germany, firms are subject to a local business tax ("Gewerbesteuer"). That tax is meant to compensate local jurisdictions for the infrastructure they make available to firms. The revenues from that tax constitute a major source of finance for local governments (for details, see e.g. Fossen and Bach, 2008). The local business tax was formerly levied on a broader base of the firm's value added and equity, but has over the years evolved into a tax on business income. Today, the main item of the tax base is the operating profit attributed to the local jurisdiction. It is augmented by parts of the financing expenses, which represent the remainder of the former comprehensive business income taxation. Income from agriculture and forestry as well as from professional services is not part of the tax base. Unincorporated firms benefit from an allowance of Euro 24,500 and reduced basic federal tax rates up to a taxable income of Euro 72,500. The local municipalities apply their own tax rate to the firms' local tax base. In 2005, the marginal tax rates on taxable income ranged from nine to almost twenty percent; the nationwide average was about 16.5 percent. Since 2001, sole proprietors and partners of non-incorporated firms can credit parts of the local business tax against their PIT liability. Notice that dividend income distributed by domestic corporations is also burdened with local business tax at the company level.

Tax Expenditures

Effective taxation of top incomes is also influenced by various tax expenditures. Especially during the first couple of years after German re-unification, special depreciation allowances, tax reliefs and generous accounting rules for investments in real estate and business capital formation in East Germany, in combination with tax-free capital gains that could be offset against income from other sources, created vast tax savings opportunities. Between 1992 and 1998, most forms of capital gains from business income were taxed at half the rate of the then prevailing PIT rate. Other capital gains from capital investment were taxable only if realized within certain time periods defined by the tax law. Reducing those massive tax expenditures so as to broaden the tax base has been advertised as a prominent aim of the subsequent tax reforms introduced since the late 1990s.

3 Data

Our empirical investigation is based on official income tax returns (ITR) data for re-unified Germany in the years 1992, 1995, 1998, 2001, 2004, and 2005, the last year for which individual tax returns are presently available.[8] For each of those cross sections, the ITR data include a representative sample of about 3 million tax returns, i.e., roughly ten percent of the entire taxpayer population. Samples for each of the first four of these cross-sections 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. In particular, tax return samples include all taxpayers with high incomes or high income losses. A crucial data issue that we deal with is the need to adjust for differences in the sampling scheme, especially for the substantially larger number of non-filers in the 2004 data due to a change in data collection. Before 2004 there was no electronic data transfer of the wage-tax returns from employers to the fiscal authorities, and wage-tax returns of non-filers were incompletely included in the German income tax statistics. Computations for 2004, the first year when the electronic data transfer was fully implemented, reveal the existence of about six million non-filing taxpayers that generated additional wage-tax revenue by about Euro 14.5 billion (including the solidarity surcharge tax). The 2005 data does not include those wage-tax returns of non-filers since it is provided by the fiscal authorities directly to the Federal Statistical Office. The data integration strategy that we employ to solve this issue will be described shortly.

The original data set includes all assessed taxpayers, i.e., single persons or married couples who file a tax return in a given year. Slightly more than 50 percent of all tax returns are joint files of married couples. Assuming that one taxpayer corresponds to one household, about three households out of four file an income tax return in Germany. Whilst the ITR data represent the upper range of the income distribution very accurately, they do not portray well the lower tail of the income distribution and also miss a non-negligible share of taxpayers in its middle part. In particular, households living on social assistance or income replacement benefits usually do not file unless they have other taxable income. Furthermore, households receiving only wage income 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.

[8] This delay is due to long-lasting assessment procedures, the triennial interval between subsequent income tax statistics (until 2005), and the way the data are transmitted from the fiscal authorities to the Federal Statistical Office, and finally to the Federal Ministry of Finance.

A possible approach to account for those omissions in tax return data was suggested by Piketty and Saez (2003). Their approach is to identify the fractiles of the income distribution on the basis of the total number of *potential* tax units.[9] That approach assumes that all non-filers can be placed at the lower tail of the gross income distribution. As mentioned above, this assumption is not palatable for Germany because of the relatively large number of non-filers with labor income only. Furthermore, the regulations concerning the provisions for filing tax returns were changed by the tax reform of 1996, a reform that did not only affect people at the bottom of the income distribution. Therefore, we follow a more systematic approach: we statistically match the ITR data with data from the German Socio-Economic Panel (SOEP) for the same years so as to account for non-filers. As a consequence, a comprehensive picture of the entire income distribution is obtained, from the very poor to the very rich.

The SOEP is an annual survey of households living in Germany that offers detailed information on incomes, both at the individual and household level.[10] 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 2005 about 11,400 households were interviewed. Nevertheless, the SOEP represents a larger share of the population than the ITR since it also includes people who do not file tax returns. The SOEP represents the German income distribution very accurately if one disregards the top percentile.[11] This group is instead completely represented in the ITR data.

Our matching approach selects for each person in the SOEP a number of similar persons in the ITR data base, the number being determined by the relation of the respective weighting factors in the two data sets. The similarity is defined by a distance function using several personal characteristics observed in both datasets.[12] Since the ITR data contain a smaller subset of the population than the SOEP, not all individuals contained in the SOEP can be matched to the appropriate number of their '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 and sort into the respective income percentile to get the integrated ITR-SOEP data set. Thereby, not only individuals who have no or little income, and

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9 This approach was also applied by Dell (2005) using German tax return data.

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

11 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 20 percent of the gross income distribution, only very few would make it to the top 1 percent. Thus, even taking advantage of the high-income sample, the SOEP is not representative of the population of individuals in the top percentile of the income distribution.

12 Details of the procedure are described in the Appendix 2 of Bach *et al*. (2009).

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.[13] Detailed income information about these individuals is available in the SOEP, from which the individual PIT is calculated using a microsimulation model (see Schwarze, 1995). As reported in Table A1 of the Appendix, between 1992 and 2001 the number of assessed taxpayers remained fairly constant at about 29 millions. Then, it jumped to 35 millions in 2004 and subsequently decreased to less than 27 millions in the year after. The matching approach we use adjusts for those large changes in the number of non-filers.

The amount of local business tax assessed at the company level is not observed in the ITR data for the years before 2001 and we have to simulate it. Our simulation is based on the observed incomes from business enterprise as well as on dividend incomes. We impute interest expenses on long-term debt as well as other deductions and additions stipulated by the tax code using data from the local business tax statistics. For partnerships, we estimate the profit of the firm by imputing the average number of shareholders to account for the allowance and the tax progression that only applies to the entire firm. Starting with 2001, the local business tax base is reported in the ITR data because of the tax credit. A comparison of reported and simulated average values of the tax base for these years shows only small differences. Since there is no reliable information on the regional distribution of shareholders, we estimate the assessed amount of local business tax for each shareholder by applying the average multiplier rate. The amount of local business tax levied on distributed dividend income at the corporate level is estimated by applying the implied average local business tax rate to business income before taxes.

4 Measuring Gross Income

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 relief create a substantial gap between taxable income and gross income. In order to obtain a measure of economic income, we adjust taxable income by adding all tax-exempted incomes and tax reliefs as well as by accounting for various tax avoidance strategies that can be identified in our data.

In the subsequent analysis, we distinguish between the following income components:

wage income consists of wages and salaries, including employers' social security contributions, calculated before deduction of allowable expenses;

[13] 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. 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.

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;

capital gains as realized from sale of an enterprise, parts of an enterprise, or shares of investors with substantial shareholdings, or if classified as '*speculation gains*';

transfer income includes unemployment compensation, social assistance, housing benefits, the child benefit, pensions derived from former employment, the taxable share of life annuity funds (pure interest portion of the annuity payment), and alimonies between separated or divorced spouses.

German tax returns data record '*adjusted gross income*' ('*Summe der Einkünfte*') by adding positive incomes from all mentioned sources and deducting losses.[14] Income from business activity and capital income are defined net of various related expenses. From this income measure, we derive (economic) gross income by adding all tax-exempted incomes as well as tax reliefs that can be identified in our integrated data base, as described in more detail in the Appendix. Of special importance is the adjustment of incomes from dividends required by the change from the full-imputation to the classical corporation income tax with half-income taxation of dividends at the shareholder level in subsequent years. Until 2001, distributed gross dividends are recorded in our data, whereas dividends for the year 2002 are recorded net of the corporate income tax of 25 percent. Hence, we adjust dividend income in that year by multiplying recorded net dividends by the factor 4/3.[15] Moreover, we disregard losses from renting and leasing exceeding some thresholds since most of these losses are likely to arise from tax avoidance.

As a result of our adjustments, a gross income measure obtains, which is fairly close to '*pre tax, post transfer*' household income. As shown in Table A1 in the Appendix, in 2005 aggregate gross income recorded in our integrated data base was about Euro 1.8 trillion. Excluding capital gains and transfer income, it totaled Euro 1.3 trillion, which represents 82 percent of total primary income of households as documented by the national accounts statistics. There is very little difference in total wage income between our integrated data base and the national accounts; the

[14] For the years 1999-2003, the offsetting of current losses between separate income sources was restricted to Euro 51,500 (Euro 103,000 in the case of jointly assessed married couples) plus half of the remaining total of positive income (see Federal Ministry of Finance, 2002). Since 2004, these current loss-offset restrictions have been replaced by a restriction on the use of loss carry-forwards for taxable income exceeding Euro 1 million (Euro 2 million in the case of jointly assessed married couples), from which only a share of 60 percent allows for loss deduction.

[15] There is another issue concerning dividend income that relates to the corporate tax reform of 2001. Taxpayers who received distributed retained earnings from previous years which were taxed at the then prevailing higher corporate rate could claim tax returns amounting to the difference to the new 25 percent rate over a transition period of 15 years. Although this effect may bias upward our calculation of gross income, since we only measure an increase in dividend income but not the corresponding decrease in shareholders' wealth, it should not affect our calculation of the effective tax rate, the main focus of the present study.

discrepancy between gross income and income from national accounts is mainly due to incomes from business and capital.[16] Information on the gross income levels of households in various quantiles of the income distribution is also relegated to the Appendix, see Table A2. The top percentile begins at an income level of roughly Euro 150,000. In that Table we break down the top percentile into smaller groups so as to show its heterogeneity. In the sequel, we refer to the top 0.001 % group as to the German *economic elite*. Households in that group received a gross income of at least Euro 11 million in 2005. The term *super-rich* is reserved for the top 0.0001 % group, consisting of about 46 households that made at least Euro 58 million in 2005. Table A3 in the Appendix reports the distribution of gross income by income components.

5 Effective Income Taxation

5.1 Tax base erosion

Several provisions in the tax code contribute to tax base erosion, i.e., taxable income falling short of gross income. Taxable income is derived by subtracting income-specific expenses, income-specific allowances, special personal expenses, and extraordinary financial burdens from adjusted gross income. Special personal expenses are those not related to a specific income source, such as the allowances for contributions to public or private health or pension insurance funds, educational expenses for own children, alimonies, the church tax and charitable contributions up to certain amounts. Extraordinary financial burdens include distinctive expenses for health care, disability, and child care.[17] Furthermore, we deduct child allowances from taxable income.[18]

Table 1 illustrates the evolution of the ratio of, respectively, adjusted gross income and taxable income to gross income. In 2005, adjusted gross income amounted to about 66 percent of gross income, on average. This share has declined modestly during the observation period, from a level of 70 percent in 1992. A similar decline occurred for the ratio of taxable income, if at significantly lower levels. In 2005 this share was just 51 percent, i.e., 15 percentage points below the share of adjusted gross income.

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16 National accounts determine business income as a residual and offer no differentiated information on business and capital income according to the categories used for the income tax assessment or recorded by the SOEP. Furthermore, non-profit organizations, which often have substantial capital income, are classified as part of households in national accounts. The discrepancy between our estimates and those from the national accounts may also be due to untaxed capital gains and undeclared capital income.

17 See Federal Ministry of Finance (2002) for details.

18 For taxpayers receiving the child benefit instead of the child allowance this is only an approximation. For them, the correct measure would require adding the difference between the child allowance and the pure transfer component of the child benefit. Since this difference would have to be simulated for part of the population, and we focus on top incomes for which this differentiation is irrelevant, we decided to simplify matters slightly here.

As shown by Table 1, in relative terms tax erosion is significantly less important for the top percentile than for the remaining taxpayers. The lowest level of the ratio of taxable to gross income for the top percentile was almost 71 percent and was reached in 1995. In 2005, that ratio was almost 81 percent. The relatively high level of tax erosion for the bottom half of the distribution is mainly due to the relative importance of untaxed social transfers, basic allowance, and child allowances for that part of the population.

Table 1: Share of adjusted gross income and of taxable income as percentage of gross income, 1992-2005

Gross income[1] fractiles	Adjusted gross income as percentage of gross income[1]						Taxable income[2] as percentage of gross income[1]					
	1992	1995	1998	2001	2004	2005	1992	1995	1998	2001	2004	2005
1st - 5th decile	47.7	43.8	42.6	40.5	40.9	40.2	33.8	28.9	25.9	25.5	23.6	22.5
6th - 9th decile	72.2	70.6	69.5	68.8	69.4	66.4	57.2	54.5	53.1	52.1	52.4	50.2
10th decile	81.0	76.8	77.0	79.2	79.6	79.6	70.4	65.3	66.0	68.4	68.3	68.3
Top 1%	87.7	79.5	82.8	86.6	86.4	88.0	79.9	70.5	75.4	79.9	78.6	80.9
Top 0.1%	90.6	82.3	87.9	90.1	88.1	89.7	84.4	74.0	81.9	85.2	82.0	84.9
Top 0.01%	93.7	85.6	91.4	90.7	86.1	87.9	88.3	77.7	85.9	86.4	81.2	84.3
Top 0.001%	93.8	84.9	92.3	87.7	79.5	82.8	89.4	77.3	85.4	84.7	75.6	80.1
Top 0.0001%	92.9	71.3	95.3	80.2	65.8	76.0	85.6	62.5	87.5	79.7	63.4	74.4
Total	70.0	67.1	66.8	66.7	67.4	65.7	56.6	52.7	52.0	52.2	52.2	50.9

1) For the definition of gross income, see Section 4.- 2) Less child allowance.
Source: ITR-SOEP data base.

To get some insights into the determinants of tax erosion, Table 2 shows the ratio of adjusted gross income to gross income for each income component.[19] Table 2 refers to 2005 and Table A4 in the Appendix displays the findings for the years before. In 2005, the share of taxed wage income amounted to 77.6 percent, compared to 97.8 percent for income from business activity and less than 30 percent for transfer income. The share of taxed wage income is much smaller in the lower part of the gross income distribution than at the top. That is partly driven by the inclusion of employers' social security contributions - which remain untaxed - into our measure of gross income. Due to the existence of an upper social security threshold, this has a small effect at the top of the income distribution, where wages tend to be high. The small share of taxed transfer income in the lower part of the distribution is mainly due to the fact that most of those transfers are public pensions. Those pensions were only taxed according to a portion of the annuity payment.

The fraction of taxed income from interest and dividends is strongly increasing in the level of gross income. Whereas in the lower half of the income distribution less than 30 percent of income

[19] Computing the ratio of taxable income to gross income by income source would require ad-hoc assumptions about the division of the second type of tax expenditures mentioned above between the various income components.

from interest and dividends is taxed, this share is almost 90 percent for the top percentile. This is mainly explained by the savers allowance for interest and dividend income that is relatively more important for households with low incomes.

Table 2: Share of adjusted gross income as percentage of gross income by income component, 2005

Gross income[1] fractiles	Gross income[1]	Wage income[2]	Income from business activity[3]	Capital gains[4]	Capital income			Transfer income
					Total	Interest, dividends[5]	Renting and leasing[6]	
1st - 5th decile	40.2	69.6	99.2	.	40.2	29.3	57.9	24.3
6th - 9th decile	66.4	76.5	99.5	56.9	46.4	43.9	51.1	30.8
10th decile	79.6	81.5	97.1	80.9	64.1	80.0	21.6	33.6
Top 1%	88.0	89.1	95.8	83.0	74.1	89.5	25.0	41.7
Top 0.1%	89.7	93.7	93.1	82.2	85.3	93.5	36.3	52.2
Top 0.01%	87.9	92.9	91.2	78.3	89.1	93.6	28.3	62.5
Top 0.001%	82.8	95.1	87.5	72.2	89.7	93.1	- 48.1	57.2
Top 0.0001%	76.0	99.4	80.2	68.1	97.6	98.3	- 62.4	57.5
Total	65.7	77.6	97.8	79.4	55.0	62.5	38.4	28.0

1) For the definition of gross income, see Section 4.- 2) Including employers' social security contributions and imputed social security contributions for civil servants, minus taxable pensions from former employments, plus tax-exempted foreign income and income from tax-exempted "minijobs".- 3) Taxable income from agriculture and forestry, from business enterprise, from self-employed activities (professional services), plus tax reliefs, less capital gains from business activity, plus tax-exempted foreign income.- 4) From business activity and from from private investments (solely speculation gains).- 5) Taxable income from investments (exclusive income from business activities), inclusive receipts below the savers allowance, less capital gains from private investments.- 6) Taxable income from renting and leasing, plus higher losses from renting and leasing.
Source: ITR-SOEP data base.

The major source of tax erosion for the top percentile lies in the realm of incomes from renting and leasing. While in 2005 about 58 percent of income from renting and leasing was taxed in the lower part of the income distribution, only one quarter of incomes from renting and leasing received by the top percentile was subject to taxation. This form of tax erosion is very prominent for the economic elite (top 0.001 %) and even more so for the super rich (top 0.0001 %). For those groups, the ratio of adjusted gross income from renting and leasing to gross income from the same source was actually negative. Thanks to generous tax regulations concerning real estate and loopholes in the tax code, the economic elite could transform positive income from renting and leasing into income losses for tax purposes.[20]

[20] As Table A4 shows, this form of tax erosion was even more prominent in the mid and late 1990s. Generous tax regulations introduced especially for investments in East Germany after re-unification caused substantial negative tax revenues from this income source, the more so for taxpayers with high tax rates.

5.2 Effective tax progressivity

The effective average tax rate is calculated as the ratio of the income tax to gross income. In a first step, the income tax is defined as the sum of the PIT and the solidarity surcharge tax; in a second step, we add the burden from the local business tax. Social security contributions are not taken into account when calculating individual tax liabilities because the German social security system is of the Bismarckian variety, strongly relying on the equivalence principle. In first approximation, social security contributions can be viewed as outlays for insurance against individual risks that the individual would have incurred in the absence of mandatory social insurance, as it is the case for most self-employed people in Germany. As explained in Section 3, we adjust for the change in the taxation of dividend income for the years 2002-2005 by adding taxes paid on dividend income at the personal as well as the corporate level.

Personal income tax and solidarity surcharge

Table 3 exhibits the distribution of the burden caused by the PIT and the solidarity surcharge. In 2005, the top percentile contributed almost 27 percent of total tax revenue. In the previous years, the share of tax revenue contributed by the top percentile oscillated around 25 percent, with the important exception of 1995 when tax erosion boomed and its share of tax revenue fell to less than 22 percent.

As expected, the distribution of the income tax liabilities is highly unequal. In 2005, the tax revenue extracted from the bottom half of the distribution made less than 3 percent of the total tax revenue, while the top decile contributed more than 60 percent. The Gini coefficient of the distribution of the tax burden was almost .81 in 2005, up from .75 in 1992. The already high concentration of the tax burden prevailing in the early nineties has markedly increased since then.

Table 3 also records the levels of income tax paid by the various fractiles of the distribution. On average, households in the top percentile paid about Euro 107,000 in income tax, measured in 2000 prices. The average tax for the economic elite was about Euro 11 million and the average tax paid by the super rich was almost Euro 50 million.

When effective average tax rates are determined, a decision has to be made about how to account for unclaimed losses carried forward or back by the taxpayers (see e.g. Clark, 2004). In many cases, those losses are deducted from the tax base and thus reduce the tax burden of the current year as reported in the tax statistics. Therefore, we use information on the loss claims set-off against taxable income that are available in the microdata of the income tax statistics in order to adjust the business income in the denominator when computing the effective tax rate in the respective year.

Table 3: Assessed income tax liability, 1992-2005 - structure and average tax burden

Gross income[1] fractiles	Assessed income tax liability (including solidarity surcharge)											
	structure in percent						average tax burden in Euro 1 000 at 2000 prices[2]					
	1992	1995	1998	2001	2004	2005	1992	1995	1998	2001	2004	2005
1st - 5th decile	6.0	5.7	3.7	3.2	2.5	2.9	0.5	0.5	0.3	0.3	0.2	0.2
6th - 9th decile	39.8	42.5	39.1	38.1	39.7	36.9	4.3	4.4	4.3	4.1	4.1	3.7
10th decile	54.2	51.9	57.2	58.7	57.8	60.3	23.1	21.3	25.3	25.5	23.7	24.0
Top 1%	25.4	21.6	25.7	25.4	23.4	26.8	108.5	88.8	113.6	110.1	96.1	106.8
Top 0.1%	11.8	9.5	12.6	11.2	9.8	12.5	502.1	390.9	558.0	486.3	400.6	497.4
Top 0.01%	4.8	4.1	5.9	4.7	4.2	6.0	2 062.1	1 672.2	2 622.9	2 059.0	1 731.5	2 386.0
Top 0.001%	1.6	1.5	2.4	1.8	1.7	2.8	6 779.0	6 075.2	10 645.3	7 690.5	7 151.7	11 124.5
Top 0.0001%	0.4	0.4	0.7	0.5	0.6	1.2	17 333.3	15 897.4	33 538.8	21 079.5	25 362.1	49 625.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	4.3	4.1	4.4	4.3	4.1	4.0
Gini coefficient	0.7461	0.7397	0.7801	0.7902	0.7881	0.8080						

1) For the definition of gross income, see Section 4.- 2) Deflated by consumer price index.
Source: ITR-SOEP data base.

Average effective tax rates are presented in the left part of Table 4, in its right part we report tax rates measured against taxable rather than gross income. In 2005, the effective average tax rate for the entire taxpayer population was 11.3 percent and it was 30.5 percent for the top percentile. The average tax rate was less than 2 percent for the households in the bottom half of the distribution, it was almost 9 percent for households in the upper half of the distribution excluding the top decile, and it was about 20 percent for the top decile. The effective average tax rate for the top percentile is about two thirds of the legislated top tax rate.

Table 4: Average income tax rates, 1992-2005

Gross income[1] fractiles	Assessed income tax liability (including solidarity surcharge)											
	in percent of gross income[1] less deducted losses carried forward/back						in percent of taxable income[2]					
	1992	1995	1998	2001	2004	2005	1992	1995	1998	2001	2004	2005
1st - 5th decile	3.6	3.3	2.3	2.0	1.6	1.7	10.7	11.5	9.0	7.7	6.7	7.5
6th - 9th decile	10.0	10.2	10.1	9.6	9.6	8.8	17.4	18.8	19.0	18.3	18.2	17.4
10th decile	21.2	19.8	21.6	22.1	20.8	20.4	30.0	30.1	32.5	32.0	30.2	29.7
Top 1%	34.8	30.8	32.1	34.1	31.1	30.5	42.8	42.7	41.7	41.8	38.8	37.1
Top 0.1%	42.1	37.3	36.8	39.4	34.5	33.7	48.6	48.2	43.5	44.8	40.9	38.7
Top 0.01%	43.4	38.5	37.7	39.8	33.4	32.9	47.9	47.1	42.4	44.6	40.1	38.3
Top 0.001%	42.3	37.1	43.1	38.7	30.7	31.0	46.6	45.7	48.1	44.7	39.8	38.2
Top 0.0001%	43.6	32.8	48.2	35.4	25.2	28.7	49.4	49.6	51.5	44.2	39.3	38.3
Total	12.2	11.8	12.4	12.1	11.7	11.3	21.5	22.4	23.7	23.1	22.4	22.1

1) For the definition of gross income, see Section 4.- 2) Less child allowance.
Source: ITR-SOEP data base.

As shown by Table 4, up to the top 0.1 % group of the income distribution, the German income tax is effectively progressive, i.e., the effective average tax rate increases with gross income. However, tax progression disappears at the top of the income distribution. In 2005, the effective tax rate peaks

for the top 0.1 % group at a level of almost 34 percent. The effective tax rate then decreases with income for higher income levels, reaching a level of about 29 percent for the super rich. The super rich thus face an effective average tax rate that is similar to the one faced by households that fail to belong to the top percentile.

A key question concerning the taxation of top incomes relates to the evolution of average taxation over time. As shown by Table 4, effective average taxation of the top percentile has decreased during the period 1992-2005. Thus, while the top percentile has contributed a modestly increasing share of total tax revenue, its effective average tax rate has declined. This pattern is the more prominent, the higher the income of those in the top percentile. Thus, for the economic elite the effective average tax rate fell by about 27 percent between 1992 and 2005 and for the super rich the decrease was about 34 percent. The marked decline of effective tax rates at the top of the income distribution mainly occurred after 1998. This is related to the 2000 tax reform, which cut top marginal tax rates substantially between 2001 and 2005.[21] Remarkably, average effective tax rates in the top decile of the gross income distribution changed little in this period. Thus, the 2000 tax reform seems to have substantially reduced the effective tax burden at the very top, with little effect on other taxpayers.

Adding the local business tax

As mentioned in Section 2, the local business tax paid by sole proprietors and partners of non-incorporated firms can only partially be credited against the PIT liability, and dividend income distributed by domestic corporations is also burdened with local business tax at the company level. Although formally not an income tax proper, the local business tax burden may be added to the nominator when calculating effective tax rates, so as to gain an insight about the robustness of the patterns identified above. Table 5 reports effective average tax rates that include the local business tax.

For the overall taxpayer population the inclusion of the local business tax has little effect on effective tax rates. However, since the share of business income is strongly increasing in gross income, adding the local business tax burden has a considerable effect at the top of the income distribution. For the top percentile, the inclusion of the local business tax burden raises the effective tax rate from 30.5 to 34 percent in 2005. Although the inclusion of the local business tax raises the effective tax rates of top incomes by several percentage points, the overall picture does not change much. The finding that effective progressivity breaks down within the top percentile holds true also

[21] This result is not driven by the change in the taxation of dividends brought about by the Corporation Tax Reform Act 2000, since we have properly adjusted dividends and taxes reported in the ITR data base, as explained above.

when you take the local business tax into account. The same applies to the strong reduction of effective tax rates at the very top of the income distribution. Including the local business tax, the effective tax rate of the economic elite declined by about 23 percent between 1992 and 2005, and the effective tax rate of the super-rich declined by 35 percent.

Table 5: Average income tax rates including the local business tax burden, 1992-2005

Gross income[1] plus local business tax liability fractiles	Assessed income tax liability (including solidarity surcharge) plus local business tax liability											
	in percent of gross income[1] plus local business tax liability less deducted losses carried forward/back						in percent of taxable income[2] plus local business tax liability					
	1992	1995	1998	2001	2004	2005	1992	1995	1998	2001	2004	2005
1st - 5th decile	3.7	3.4	2.4	2.1	1.6	1.7	10.8	11.7	9.2	8.0	6.9	7.7
6th - 9th decile	10.1	10.3	10.2	9.7	9.7	8.9	17.7	18.9	19.2	18.5	18.4	17.7
10th decile	22.8	21.1	22.8	23.4	22.1	21.9	31.9	31.8	34.0	33.7	31.8	31.6
Top 1%	38.2	34.3	34.8	37.3	34.3	34.0	46.4	46.6	44.6	45.2	42.3	40.9
Top 0.1%	46.6	42.8	40.4	44.3	39.7	38.9	53.0	53.9	47.2	49.8	46.4	44.2
Top 0.01%	48.4	45.0	41.4	45.8	39.9	38.9	52.9	53.7	46.1	50.7	47.1	44.7
Top 0.001%	47.4	43.5	47.1	45.4	37.1	36.7	51.7	52.2	52.0	51.7	47.4	44.6
Top 0.0001%	49.7	40.6	51.7	41.8	31.5	32.3	55.6	57.2	54.9	51.9	47.2	43.1
Total	12.8	12.3	12.8	12.7	12.3	11.9	22.4	23.1	24.4	24.0	23.2	23.1

1) For the definition of gross income, see Section 4.- 2) Less child allowance.
Source: ITR-SOEP data base.

5.3 The concentration of net income

Income taxation is a key determinant of the distribution of net income.[22] As shown by Table 6, the top percentile received in 2005 some 10 percent of total gross income, while its share of total income net of tax was 8 percent. Therefore, income taxation strongly reduced income concentration in Germany. A similar effect can be observed with respect to the higher fractiles within the top percentile.

Over time, however, the concentration of net income has substantially increased. Two simultaneously acting forces have generated that outcome: the growth of the concentration of gross income and the decline of the average taxation of top incomes. This phenomenon is especially prominent at the very top of the distribution. The share of net income received by the economic elite more than doubled between 1992 and 2005, and the super-rich did even better.

[22] For brevity, we neglect the local business tax in what follows.

Table 6: Distribution of gross and net income, 1992-2005

Gross income[1] fractiles	Gross income[1]						Net income[2]					
	structure by income fractiles in percent						structure by income fractiles in percent					
	1992	1995	1998	2001	2004	2005	1992	1995	1998	2001	2004	2005
1st - 5th decile	20.04	19.99	19.49	19.46	18.67	19.20	21.99	21.90	21.71	21.69	20.81	21.27
6th - 9th decile	48.70	48.94	47.66	48.18	48.58	47.41	49.93	49.80	48.86	49.56	49.76	48.75
10th decile	31.26	31.07	32.85	32.36	32.75	33.39	28.07	28.30	29.43	28.75	29.43	29.99
Top 1%	9.05	8.46	10.06	9.17	8.99	10.04	6.78	6.70	7.86	6.95	7.08	7.91
Top 0.1%	3.49	3.14	4.36	3.54	3.41	4.27	2.34	2.29	3.21	2.49	2.57	3.23
Top 0.01%	1.39	1.31	2.01	1.49	1.52	2.09	0.91	0.94	1.46	1.04	1.16	1.59
Top 0.001%	0.46	0.49	0.72	0.56	0.68	1.02	0.31	0.36	0.49	0.40	0.53	0.80
Top 0.0001%	0.11	0.14	0.21	0.17	0.29	0.49	0.07	0.11	0.13	0.12	0.25	0.39
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gini coefficient	0.4437	0.4442	0.4581	0.4549	0.4639	0.4616	0.4148	0.4162	0.4245	0.4158	0.4248	0.4252

1) For the definition of gross income, see Section 4.- 2) Gross income less assessed income tax liability, disregarding other direct taxes on household income or wealth, social security contributions, and other charges levied by public authorities.
Source: ITR-SOEP data base.

6 Conclusion

We have analyzed the taxation of households with very high incomes in Germany during the period 1992-2005. Our analysis is based on an integrated dataset that combines data from administrative individual tax returns with a representative household survey, the German Socioeconomic Panel Study. The distinctive advantage of our dataset is that it allows us to investigate the upper tail of the income distribution on the basis of reliable data for the entire population. Since all taxpayers within the top percentile are represented in the data, we can provide a very fine breakdown of the top of the income distribution in Germany that does not entail any sampling error.

We have found that the effective average tax rate of the top percentile of the German income distribution is 30.5 percent, i.e., about two thirds of the legislated one. This erosion notwithstanding, the distribution of the tax burden is highly concentrated: in 2005, the top percentile contributed more than a quarter of the total income tax revenue. As a result, the income tax significantly contributed to reduce income inequality. Effective tax progression stops however at the top percentile. The effective tax rate is not monotonically increasing in gross income within the top percentile of the income distribution; the super rich are as heavily taxed as some households that fail to belong to the top percentile.

The effective average tax rate has significantly declined at the very top of the income distribution in the wake of the major PIT reform of the period 2001-2005. This policy change together with a strong increase of gross incomes in the top percentile entailed a substantial increase of the concentration of net income. The absolute and relative position of the German economic elite was much better in 2005 than at the beginning of the nineties. While this fact suggests that there

may be some room for a heavier taxation of top incomes in Germany, such a conclusion is premature insofar as the current paper has not attempted to incorporate incentive issues in the analysis. In particular, the lower level of top income taxes in Europe today as compared to the early 1990s is likely to severely limit the domestic fiscal benefits from a national policy of heavier taxation of top incomes.

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Appendix

Table A1: Structure of the ITR-SOEP data base compared to the national accounts, 1992-2005

	unit	1992	1995	1998	2001	2004	2005
Income taxpayers (assessment)	1 000	29 479	29 676	28 673	29 104	35 406	26 625
Single assessment (singles)	1 000	13 961	14 299	13 789	14 595	20 181	13 365
Joint assessment (married couples)[1)]	1 000	15 518	15 377	14 884	14 509	15 225	13 260
Potential tax units total[2)]	1 000	42 990	43 644	44 528	45 160	46 257	46 559
Estimated non-filers	1 000	13 511	13 968	15 856	16 055	10 851	19 935
Private households total[3)]	1 000	35 700	36 938	37 532	38 456	39 122	39 178
Taxpayers as percentage of potential tax units	%	68.6	68.0	64.4	64.4	76.5	57.2
Taxpayers as percentage of private households	%	82.6	80.3	76.4	75.7	90.5	68.0
Gross income[4)] (integrated data base)	Euro mill.	1 296 985	1 430 018	1 566 397	1 655 904	1 721 288	1 786 263
Gross income less capital gains and transfers	Euro mill.	1 072 143	1 157 473	1 224 428	1 291 502	1 340 708	1 311 767
Gross domestic product[5)]	Euro mill.	1 646 620	1 848 450	1 965 380	2 113 160	2 163 800	2 163 800
Primary income of private households[5)]	Euro mill.	1 270 240	1 402 200	1 466 590	1 599 320	1 614 980	1 614 980
Gross income less capital gains and transfers as percentage of primary income private households	%	84.4	82.5	83.5	80.8	83.0	81.2
Wage income[6)] (integrated data base)	Euro mill.	902 408	986 383	1 016 216	1 073 345	1 114 243	1 063 751
Compensation of employees[6)] (national accounts)	Euro mill.	917 170	997 020	1 032 250	1 120 610	1 137 130	1 129 860
Wage income from tax statistics as percentage of compensation of employees from national accounts	%	98.4	98.9	98.4	95.8	98.0	94.1
Income from business activities and capital income[4)] (integrated data base, less capital gains)	Euro mill.	169 928	166 927	208 953	217 521	227 257	248 142
Entrepreneurial and property income of private households (national accounts)	Euro mill.	305 720	341 280	372 010	412 420	406 140	429 980
Entrepreneurial income[7)]	Euro mill.	124 050	133 790	131 770	121 630	123 260	123 260
Received property income[8)]	Euro mill.	181 670	207 490	240 240	290 790	282 880	306 720
Business and capital income from tax statistics as percentage of entrepreneurial and property income from national accounts	%	55.6	48.9	56.2	52.7	56.0	57.7

1) Married couples living together are assesed as one tax payer.- 2) Derived from population census statistics: Entire population of 20 years and older, married couples counted as one tax unit.- 3) Current population survey, may of resp. years.- 4) For the definition of gross income, see Section 4.- 5) At current prices, national accounts.- 6) Including employers' social security contributions and imputed social security contributions for civil servants, minus taxable pensions from former employments, plus tax-exempted foreign income and income from tax-exempted "minijobs".- 7) Less imputed rent of owner-occupied dwellings.- 8) Less primary income of non-profit institutions serving households (NPISHs), less financial intermediation services indirectly measured (FISIM), less attributed property income of insurance policy-holders.
Source: Income tax statistics 1992-2005; ITR-SOEP data base; national accounts.

From Taxable Income to Gross Income

We obtain (economic) gross income by adding all tax-exempted incomes as well as tax reliefs that can be identified in our integrated data base. Specifically, the various income categories are computed as follows:

- Our measure of *wage income* includes employers' social security contributions and is calculated before deduction of allowable expenses. 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. 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.
- 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 in our data, *e.g.*, tax-exempted profits from outbound business investments or tax subsidies explicitly surveyed in tax assessment. Since German income tax statistics do not provide information from financial accounting of firms (tax balance sheet, profit and loss statement), we cannot account for certain tax expenditures, such as depreciations according to the declining balance method or provisions for impending losses or pension reserves. We also cannot quantify the extent to which businessmen avoid taxation by disguising private expenses as operating expenditures or transferring part of their profits abroad via manipulations of transfer price.
- *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 2005, for example, this meant that the time lapse between buying and selling had to be less than 10 years in the case of real estate and less than 1 year in the case of other assets (e.g. securities) for the capital gain to be legally counted as taxable income. Thus, capital gains included here are predominantly capital gains that were realized from transfer of an enterprise, parts of an enterprise, or shareholdings.
- Taxable income from *interest and dividends* 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 DM 6,000 / Euro 3,070 per year (double this amount for married couples). This allowance was reduced to Euro 1,550 in 2001, and to Euro 1,370 since 2004. 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. We impute income from interest and dividends using Tobit regressions estimated on samples of tax return data for observations that are not matched to SOEP data and use the respective information provided in the SOEP for matched observations in our integrated data base.
- Taxable income from *renting and leasing* has been a vast loophole for tax-saving activities in Germany for decades, 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 income from other sources to a large extent. Since most of these activities are likely to be motivated by tax avoidance, we ignore losses exceeding some thresholds. In particular, losses of more than Euro 5,000 from direct investments in real estate and of more than Euro 2,500 from shareholdings (closed property funds, property developer partnerships etc.) are disregarded in calculating gross income. As a sensitivity check, we have alternatively included up to 50 percent of reported losses in gross income, which had very little effect on our calculations of tax erosion by income quantiles and effective tax rates.
- Taxable *transfer income* includes taxable pensions derived from former employments, the taxable share of life annuity funds (pure interest portion of the annuity payment), and alimonies between separated or divorced spouses. We correct for the allowance for taxable pensions from former employment. Furthermore, we add the non-taxable share of life annuity funds, which is estimated as 70 percent of the whole pension up to 2004. Since 2005, the taxable share increased somewhat due to a reform of pension income taxation. The ITR data set also provides the non-taxable replacement amounts from insurances for loss of earned income (e.g., benefits from unemployment or health insurance), as they are relevant for taxation with progression ('*Progressionsvorbehalt*'). Social assistance, housing benefits, and other public transfers not captured by the ITR data are taken from the information contained in the SOEP.

Table A2: Real gross incomes in Germany, 1992-2005

Gross income[1]	1992	1995	1998	2001	2004	2005	1995	1998	2001	2004	2005
	Euro 1 000 at 2000 prices[2]						1992 = 100				
Mean income	35.0	34.9	35.9	35.9	35.0	35.4	99.6	102.4	102.6	100.0	101.1
Median income	27.6	27.1	26.7	26.8	25.2	25.1	98.1	96.7	97.2	91.4	91.1
Average income											
Top 10%	109.5	108.4	117.9	116.3	114.8	118.3	99.0	107.7	106.2	104.8	108.0
Top 1%	317.1	295.1	361.0	329.8	315.1	355.6	93.1	113.8	104.0	99.4	112.2
Top 0.1%	1 223.2	1 095.0	1 566.8	1 274.3	1 195.4	1 512.5	89.5	128.1	104.2	97.7	123.7
Top 0.01%	4 875.6	4 569.4	7 207.2	5 346.5	5 313.2	7 398.6	93.7	147.8	109.7	109.0	151.7
Top 0.001%	16 280.5	17 198.3	25 936.2	20 301.4	23 741.0	36 374.5	105.6	159.3	124.7	145.8	223.4
Top 0.0001%	40 947.6	51 226.3	74 478.6	59 856.4	101 715.1	174 353.9	125.1	181.9	146.2	248.4	425.8
Lowest income											
Top 10%	66.7	68.2	69.2	70.2	70.5	69.6	102.3	103.8	105.3	105.7	104.3
Top 1%	143.5	142.8	151.4	153.7	151.9	154.4	99.5	105.5	107.1	105.8	107.6
Top 0.1%	475.8	428.0	512.1	481.9	445.5	491.9	90.0	107.6	101.3	93.6	103.4
Top 0.01%	2 093.4	1 772.1	2 714.5	2 096.3	1 824.8	2 248.9	84.6	129.7	100.1	87.2	107.4
Top 0.001%	8 627.7	8 197.8	12 068.7	9 483.0	8 633.0	10 951.9	95.0	139.9	109.9	100.1	126.9
Top 0.0001%	26 112.2	27 589.2	47 732.8	33 913.9	34 654.6	57 558.5	105.7	182.8	129.9	132.7	220.4

1) For the definition of gross income, see Section 4.- 2) Deflated by consumer price index.
Source: ITR-SOEP data base.

Table A3: Distribution of gross income by income component, 2005

Gross income[1] fractiles	Gross income[1]	Wage income[2]	Income from business activity[3]			Capital gains[4]	Capital income less capital gains			Transfer income
			Total	Thereof: income from			Total	Interest, dividends[5]	Renting and leasing[6]	
				business enterprise	profess. services					
	by income fractiles, in percent									
1st - 5th decile	19.2	9.6	5.1	5.6	4.3	- 2.8	15.8	14.2	19.4	47.7
6th - 9th decile	47.4	54.9	26.1	30.2	19.0	3.4	30.0	28.5	33.3	42.3
10th decile	33.4	35.5	68.8	64.2	76.7	99.4	54.2	57.3	47.3	10.0
Top 1%	10.0	5.9	44.0	43.6	44.8	93.5	30.6	33.8	23.5	1.2
Top 0.1%	4.3	1.2	22.5	29.7	10.2	80.3	17.7	21.9	8.2	0.2
Top 0.01%	2.1	0.3	11.6	17.6	1.1	63.3	8.0	10.8	1.8	0.0
Top 0.001%	1.0	0.0	5.4	8.4	0.2	45.6	3.1	4.4	0.2	0.0
Top 0.0001%	0.5	0.0	2.2	3.4	0.0	31.0	0.8	1.2	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	by income components, in percent									
1st - 5th decile	100.0	29.8	2.5	1.8	0.8	- 0.1	3.6	2.3	1.4	64.1
6th - 9th decile	100.0	68.9	5.2	3.8	1.4	0.1	2.8	1.8	1.0	23.0
10th decile	100.0	63.3	19.5	11.5	8.0	2.3	7.2	5.2	1.9	7.7
Top 1%	100.0	34.9	41.5	26.1	15.4	7.1	13.5	10.2	3.2	3.1
Top 0.1%	100.0	16.4	50.0	41.7	8.3	14.3	18.3	15.6	2.6	1.1
Top 0.01%	100.0	7.2	52.5	50.7	1.8	23.1	16.9	15.7	1.2	0.3
Top 0.001%	100.0	2.8	49.8	49.3	0.5	33.9	13.4	13.1	0.3	0.1
Top 0.0001%	100.0	2.1	42.1	42.1	0.0	48.4	7.3	7.3	0.0	0.0
Total	100.0	59.6	9.5	6.0	3.5	0.8	4.4	3.0	1.4	25.8

1) For the definition of gross income, see Section 4.- 2) Including employers' social security contributions and imputed social security contributions for civil servants, minus taxable pensions from former employments, plus tax-exempted foreign income and income from tax-exempted "minijobs".- 3) Taxable income from agriculture and forestry, from business enterprise, from self-employed activities (professional services), plus tax reliefs, less capital gains from business activity, plus tax-exempted foreign income.- 4) From business activity and from from private investments (solely speculation gains).- 5) Taxable income from investments (exclusive income from business activities), inclusive receipts below the savers allowance, less capital gains from private investments.- 6) Taxable income from renting and leasing, plus higher losses from renting and leasing.
Source: ITR-SOEP data base.

Table A4: Adjusted gross income as percentage of gross income by income component, 1992-2001

Gross income[1] fractiles	Gross income[1]	Wage income[2]	Income from business activity[3]	Capital gains[4]	Capital income			Transfer income
					Total	Interest, dividends[5]	Renting and leasing[6]	
				2001				
1st - 5th decile	40.5	69.3	94.3	106.7	28.9	26.7	32.9	24.8
6th - 9th decile	68.8	76.2	98.1	28.5	31.4	37.0	17.3	31.7
10th decile	79.2	81.5	95.7	87.4	50.9	77.9	- 48.5	33.0
Top 1%	86.6	89.6	95.1	91.9	65.2	88.7	- 32.1	42.0
Top 0.1%	90.1	93.3	93.6	94.3	80.7	93.6	- 9.9	53.2
Top 0.01%	90.7	94.2	91.5	92.3	87.4	94.7	- 17.0	60.9
Top 0.001%	87.7	91.8	86.7	83.7	91.8	96.7	- 56.7	49.9
Top 0.0001%	80.2	94.0	78.0	58.8	95.6	98.2	- 88.4	73.5
Total	66.7	77.3	96.4	82.7	42.1	60.0	- 10.6	27.9
				1998				
1st - 5th decile	42.6	70.1	98.2	83.4	12.0	11.5	12.8	25.2
6th - 9th decile	69.5	76.2	98.6	61.1	- 1.8	14.4	- 30.2	32.9
10th decile	77.0	81.0	96.4	96.0	5.2	64.9	- 186.5	39.3
Top 1%	82.8	89.5	96.0	98.4	20.5	82.6	- 207.8	39.9
Top 0.1%	87.9	94.2	95.1	99.8	44.7	90.4	- 230.8	44.3
Top 0.01%	91.4	95.7	93.0	100.0	58.7	91.6	- 327.7	38.6
Top 0.001%	92.3	96.9	92.8	100.0	68.8	92.7	- 270.4	35.6
Top 0.0001%	95.3	97.0	95.5	100.0	73.5	83.5	- 129.4	40.9
Total	66.8	77.1	97.2	95.0	4.4	45.0	- 95.4	29.1
				1995				
1st - 5th decile	43.8	71.4	92.5	65.1	11.8	7.1	19.1	23.8
6th - 9th decile	70.6	77.0	98.6	32.9	4.8	15.8	- 17.4	32.8
10th decile	76.8	81.2	97.1	87.9	- 9.4	67.0	- 227.1	43.0
Top 1%	79.5	88.6	96.7	95.0	1.1	87.4	- 254.9	43.6
Top 0.1%	82.3	93.3	96.0	99.6	24.8	96.8	- 293.4	52.2
Top 0.01%	85.6	94.5	93.9	99.8	41.5	99.3	- 394.3	58.7
Top 0.001%	84.9	96.1	88.9	99.7	43.9	99.8	- 589.0	50.4
Top 0.0001%	71.3	92.5	75.2	100.0	14.9	99.9	- 2 247.1	73.7
Total	67.1	77.6	97.5	84.4	- 1.3	42.6	- 101.5	28.2
				1992				
1st - 5th decile	47.7	72.5	99.6	79.2	13.9	11.9	17.9	25.4
6th - 9th decile	72.2	78.0	99.7	65.4	- 4.8	11.3	- 41.0	33.2
10th decile	81.0	82.2	99.0	94.4	33.4	81.8	- 129.8	39.4
Top 1%	87.7	89.7	98.7	97.3	49.1	99.8	- 146.9	44.1
Top 0.1%	90.6	94.0	98.3	99.7	63.2	100.0	- 166.3	51.2
Top 0.01%	93.7	93.8	97.8	100.0	75.8	100.0	- 193.6	59.3
Top 0.001%	93.8	95.0	96.8	100.0	73.1	100.0	- 496.9	60.3
Top 0.0001%	92.9	92.4	96.7	100.0	75.5	100.0	- 439.6	76.3
Total	70.0	78.6	99.2	92.6	19.9	53.0	- 69.3	29.0

1) For the definition of gross income, see Section 4.- 2) Including employers' social security contributions and imputed social security contributions for civil servants, minus taxable pensions from former employments, plus tax-exempted foreign income and income from tax-exempted "minijobs".- 3) Taxable income from agriculture and forestry, from business enterprise, from self-employed activities (professional services), plus tax reliefs, less capital gains from business activity, plus tax-exempted foreign income.- 4) From business activity and from from private investments (solely speculation gains).- 5) Taxable income from investments (exclusive income from business activities), inclusive receipts below the savers allowance, less capital gains from private investments.- 6) Taxable income from renting and leasing, plus higher losses from renting and leasing.
Source: ITR-SOEP data base.

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