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Peter Haan
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A Behavioral Microsimulation Analysis

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DIW Berlin

German Institute
for Economic Research

Königin-Luise-Str. 5
14195 Berlin,
Germany

Phone +49-30-897 89-0
Fax +49-30-897 89-200

www.diw.de

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Distributional and Fiscal Effects of the German Tax Reform 2000

A Behavioral Microsimulation Analysis

Peter Haan [*)]
Viktor Steiner [**)]

[*)] **DIW Berlin**
[**)] **Free University of Berlin and DIW Berlin**

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Abstract: In the year 2000, the German government passed the most ambitious tax reform in postwar German history aiming at a significant tax relief for households. Drawing on data of the GSOEP, we analyze the distributional and fiscal effects of the tax reform. Our analysis employs microsimulation techniques. Furthermore, we estimate behavioral effects of the tax reform using a discrete choice labor supply model. We find that the tax reform leads to a significant increase of net household income. The relative gains increase with taxable income, thus income inequality is rising. We also find that behavioral effects reduce the revenue loss.

Keywords: tax reform, behavioral effects, distribution and fiscal effects

JEL Classification: H24, H31, J22

Correspondence to:
Peter Haan
DIW Berlin
Köngin-Luise-Straße 5
14195 Berlin
e-mail: phaan@diw.de

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1 Introduction

In the year 2000, the German government passed the most ambitious tax reform in postwar German history. The tax reform aims at reducing the burden and distortions of taxation for both companies and private households. The change in the tax system leads to a significant tax relief for households; marginal tax rates are to be decreased and the base tax allowance is to be increased. According to estimates of the Federal Ministry of Finance (*Bundesfinanzministerium*), the tax reform will reduce the tax burden in total by about 57 billion €, of which about 32 billion € is due to the reduction of personal income taxes, and the rest to reduction in the taxation of corporations and entrepreneurs. When the tax reform had been initiated at the end of the 1990's, the prevailing view among economists and policy makers was that an important part of the tax reform would be self-financing by increasing employment and economic growth. In contrast to this widely held optimistic view, the opinions about the distributional effects of the tax reform have been more diverse.

There are currently only two published empirical studies on the economic effects of the German tax reform 2000. Using microsimulation techniques, Merz and Zwick (2002) analyze the distributional effects of the tax reform on the basis of the German Tax Statistic 1995, which is currently the latest available wave of this data set. The authors conclude that due to the tax reform income inequality between households will increase. As the analysis of Merz and Zwick is based on unadjusted data of the year 1995 and does not account for any behavioral adjustment of households following the tax reform, the results can only be seen as indicative of the distributional effects of the tax reform. Wagenhals (2000a) also takes into account potential labor supply effects of married women and concludes that the tax reform will lead to increasing inequality in the distribution of net household incomes, but will also result in an increase of married women's labor supply

The purpose of our paper is to provide a more detailed analysis of the distribution and fiscal effects of the tax reform on the basis of a behavioral microsimulation model, whereby we focus on the personal income tax reform. This allows us to simulate the effects of the tax reform 2000 which will only be fully implemented by the year 2005. To account for behavioral adjustment at the household level, we estimate labor supply elasticities both with respect to labor force participation and hours worked on the basis of a household labor supply model. The microsimulation model is based on the latest wave of the German Socio-Economic Panel (GSOEP), which includes a disproportionately large subsample of high-income households. Given that a very large share of the income tax is borne by the upper

income decile, the representation of this group is of great importance for the analysis of the distributional and fiscal effects of the tax reform. In our empirical analysis we also control for bracket creeping, which has been neglected in previous studies of the distributional effects of tax reforms. Bracket creeping measures the real increase of household's tax payment due to a purely inflation related increase of the taxable income. As we will demonstrate, this effect reduces the cash gain of the tax reform significantly.

We find that the cumulated impact of the tax reform 2000 amounts to a real average increase of yearly net household income by about 850 €. This implies a relative increase of the net household income on average by 3.29%. Our results indicate an increasing inequality due to the tax reform that results form higher relative gains of households in the upper deciles of the income distribution. We find that the increase in labor supply induced by the tax reform reduces the loss in tax revenues by about 2 billion €. Our simulation results show that the total loss of personal income tax revenue amounts to approximately 33 billion €.

In the next section we briefly describe the German tax reform 2000. In section 3 we present the simulation methodology employed in this paper to estimate the distributional and fiscal effects of the tax reform. Section 4 contains the simulation results of the distributional and fiscal effects of the tax reform, where we also discuss differences between simulations with and without behavioral adjustment. The final section summarizes the main results of the paper and contains some conclusions.

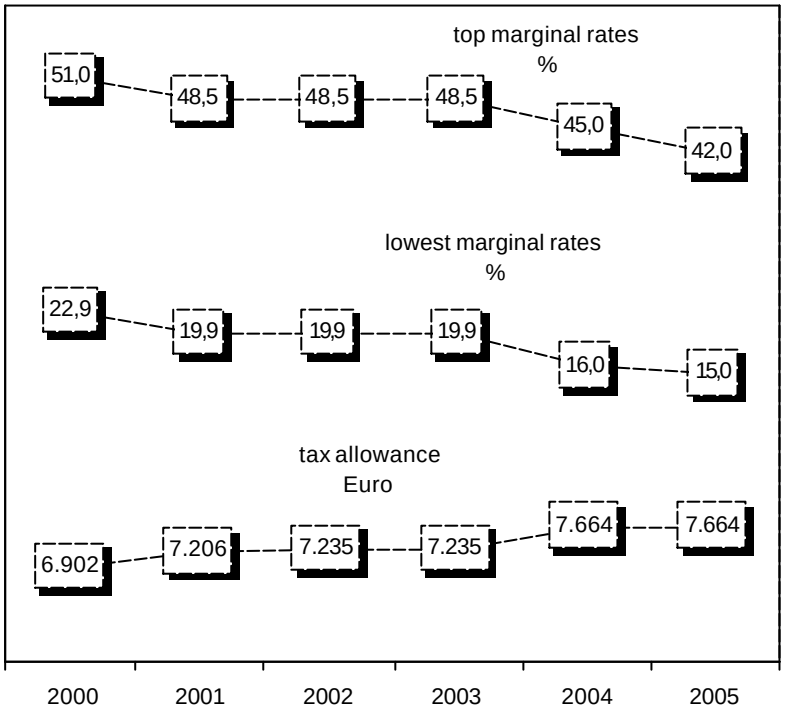
2 The German Personal Income Tax Reform 2000

On July 6th 2000, the German government passed the law to implement the German personal income tax reform 2000. The central purpose of this reform is to stimulate private consumption and investment to foster economic growth and thus to increase employment (*Bundesfinanzministerium* 2003). In addition, it is the goal to reduce the distortional effects of high marginal tax rates on labor supply. According to calculations of the Federal Ministry of Finance the personal income tax reform will result in a total tax relief of households by approximately 32 billion €. In addition, due to changes in the taxation of corporations and entrepreneurs tax revenues are reduced by approximately 25 billion €. A large share of the overall tax reduction is expected to be compensated by a broadening of the tax base,

especially by reducing certain tax allowances for firms. In this paper, we are only concerned with changes in the taxation of personal income.[1]

The tax reform 2000 was implemented in three steps. By 2005, the top marginal tax rate is to be reduced to 42%, compared to 51% in 2000. In the same period, the lowest marginal tax rate decreases by 7.9 percentage points from 22.9% to 15%, while the basic tax allowance is increased from 6902 € to 7664 € amounting to an increase of 762 €. The development of marginal tax rates at the top and the bottom of the income distribution as well as the basic tax allowance over this period is documented in the following figure.

Figure 1: Changes in the personal income tax 2000 – 2005



The political process of implementing the three steps of the tax reform has turned out to be quite cumbersome. As planned, the first step was implemented on January 1st in 2001. However, the second step, scheduled for the beginning of 2003 was postponed by one year, to compensate unexpected state expenditures that resulted from a massive flood catastrophe in summer 2002. Furthermore, in order to stimulate the economy the government intended to combine the second and third step of the tax reform and to implement this combined step jointly at January 1st in 2004. However, the opposition holding the majority in the upper house of parliament (*Bundesrat*) rejected this intention and eventually a compromise, a

[1] A detailed descriptions of the German tax reform 2000 is contained in Bundesfinanzministerium (2003); for a critical review see, e.g., Homburg (2000).

mixture between the initially planned second and third step of the reform, was introduced in 2004, while the last step will become effective at the beginning of 2005.

3 Simulation Methodology

In the empirical public finance literature one major focus of interest has been on labor supply decisions resulting from changes in tax reforms (Eissa 1996, Moffitt and Wilhelm 2000). Feldstein (1995), however, suggested instead analyzing changes in the taxable income, as taxable income measures all relevant decisions of individuals. Employing this broader measure of behavioral adjustment, he finds significantly larger behavioral effects due to changes in the tax function than previous studies only focusing on labor supply effects. Following Feldstein, an important literature emerged, known as the new tax responsiveness literature (Goolsbee 2000). Drawing on this literature, it would seem more appropriate to focus on changes in taxable income, as this adjustment captures the total behavioral impact of the German tax reform. However, at this stage, we only concentrate on the impact of the tax reform on labor supply. The reason for this more limited analysis is the lack of sufficient information on potential sources influencing the taxable income in the employed data set. Hence, our estimates of the behavioral adjustment of households have to be considered as lower bound results of the effect of the analyzed tax reform as far as behavioral responses affect the distribution of incomes and tax receipts.

It is important to stress that the analysis of changes in the tax function has to be based on an ex ante evaluation approach since the 2000 tax reform will only be fully phased in by the year 2005. Since this reform differs substantially from previous tax reforms in Germany in terms of both, the size of the tax cuts across the income distribution, as well as the macroeconomic situation, empirical estimates of the effects of previous reforms (see, e.g., van Essen, Kaiser and Spahn 1988, Kaiser, Spahn and van Essen 1992, Wagenhals 2000b) are of little use for an evaluation of the reform analyzed here. We therefore employ a behavioral microsimulation model, which combines a detailed tax-benefit simulation model with an econometrically estimated household labor supply model on the basis of household data for Germany, as described below.

Data and Sample Design

The tax-benefit microsimulation model for Germany employed in our analysis is based on micro data of the latest wave of the German Socio Economic Panel (GSOEP). The GSOEP is a representative sample of private households living in Germany with detailed information on

household incomes, hours worked and household structure.[2] The dataset includes detailed information about the socio-economic situation of over 11,000 households that represent 38.8 million households living in Germany.[3] The latest available wave of the GSOEP is for 2002, which, for the first time, contains a disproportionately large sample of high-income households.[4] This so-called *high-income sample* consists of over 1,200 households with monthly net incomes of at least 3,750 €. Given that the highest decile of taxable income contributes roughly 40% to the overall collected amount of personal income tax (table 8), the inclusion of this group in the analysis is of greatest importance. The overrepresentation of this group in our sample is accounted for by adjusting estimation results by appropriate weighting factors available in the GSOEP. A detailed description of the structure of the high-income sample and the weighting factors is provided by Schupp et al. (2003).

Tax Benefit Simulation Model

In theory, the German income tax is based on the principle of comprehensive income taxation. That is, the sum of a household's incomes from all sources is taxed at a single rate after several deductions have been applied to arrive at the tax base. In practice, there are various exceptions to this rule, however, especially regarding the taxation of capital income and pensions. Another distinguishing feature of the German tax system is the principle of joint taxation of households, whereby the income tax of a married couple is calculated by applying the tax function to half of the sum of the spouses' incomes; this amount is then doubled to determine the tax amount of the couple.

Our tax-benefit simulation model (STMS) includes all relevant components of the German tax and transfer system.[5] For the majority of households the most important income component is earnings from dependent employment. For employed people, information on gross monthly earnings in the month before the interview is collected in the GSOEP. This information together with the information on weekly hours worked is used to calculate gross hourly wages. Hypothetical yearly earnings for each of the hours categories defined below are calculated by multiplying gross hourly earnings by the respective average number of working hours in each category used in our household labor supply model. For employed persons, it is

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2 A description of the GSOEP can be downloaded from www.diw.de/soep; see also Haisken-DeNew and Frick (2001).

3 For more information about the weighting, see Haisken-DeNew and Frick (2001).

4 Although we use data from the year 2002, simulations are undertaken for the year 2001. The reason is that most income variables we use are retrospective variables that refer to the year 2001.

5 A detailed description of the tax-benefit simulation model may be obtained by the authors upon request.

assumed that the individual gross hourly wage in their actual hours category would be the same in each hours category. For persons not employed in the month preceding the interview, gross hourly wages are estimated by applying a two-stage estimation with a Heckman sample selection correction.[6] Due to item non-response wages are also missing for a non-negligible share of employed persons, for whom hourly wages are also imputed on the basis of these wage equations.

Gross income of households is calculated by adding all income components of the household members. Taxable income is derived by deducting certain expenses from gross household income. The income tax is computed by applying the income tax function to taxable income of each person in the household or of the spouses' joint income, depending on marital status. Income tax and employee's social security contribution rates are deducted from gross income, and social transfers are added to derive net household income. Social transfers include child benefits, child-rearing benefits, education benefits for students, unemployment compensation, housing benefits and social assistance. The base year for the following analysis is the year 2000 as this is the last year before the tax reform.[7] Drawing on these data, we simulate tax payments and net household incomes on the basis of the tax legislation in 2000. This information serves as the basis for the analysis. Furthermore, we simulate counterfactual incomes and tax payments, which differ solely due to the changes in the tax function. The difference in the net household income between the counterfactuals and the base simulation measures the tax relief that is related to the different steps of the tax reform.

Household Labor Supply Model

To simulate the labor supply effects induced by the tax reform, we employ a discrete choice labor supply model. The main advantage of the discrete choice approach compared to continuous specifications derives from the possibility to model nonlinearities in budget constraints (see van Soest 1995, Duncan and MacCrae 1999). We model the labor supply decision of couple households under the assumption that both spouses jointly maximize a utility function in the arguments leisure of both spouses and net household income. It is assumed that the labor supply decisions of the household's head and spouse can be separated

6 In order to increase the variance of the predicted wages, we adjust the predicted wages by adding the normalized error term distribution of the regression of the observed wages. Estimation results for the wage equations are available from the authors upon request.

7 In order to include the high-income sample we employ the data of the latest wave of the GSOEP and adjust it to 2000 prices.

from the labor supply decision of all other household members. The labor supply decision of single persons can be derived as a special case of the couple's labor supply decision.

Following van Soest (1995), we specify a household utility function depending on the leisure time of the household members and net household income. We assume that the household's utility index for a particular hours category k can be modeled by the following translog function:

$$(1) \qquad U_k(x_k) = x_k' A x_k + b' x_k + e_k$$

where $x = (y, lm, lf)'$. The components of x are the natural logs of net household income (y), leisure of the husband (l_m) and leisure of the wife (l_f). These components enter the utility function in linear, quadratic and cross terms. The matrix A, with elements a_{ij}, $i,j = (1,2,3)$, contains the coefficient of the quadratic and the cross terms, the vector b_j, $j = (1,2,3)$, the coefficients of the linear terms. e_k is a stochastic error term accounting for unobserved factors that affect household utility. Given the assumption of joint maximization of household utility, the household will choose hours category k if, in probability terms, the associated utility index, U_k, exceeds the utility index in any other possible alternative l, i.e.:

$$(2) \qquad P(U_k > U_l) = P\left[\left(x_k' A x_k + b' x_k\right) - \left(x_l' A x_l + b' x_l\right) > e_l - e_k\right].$$

Assuming that e_k is distributed identically across all hours categories according to an extreme-value distribution, the difference of the utility index between any two hours categories follows a logistic distribution.[8] Under this distributional assumption the probability of choosing alternative k relative to alternative l can be described by a conditional logit model introduced by McFadden (1973):

$$(3) \qquad P(U_k > U_l) = \frac{\exp(x_k' A x_k + b' x_k)}{\sum_m \exp(x_m' A x_m + b' x_m)}, \forall l \neq k,$$

where the summation sign is defined over all possible alternatives, i.e. hours categories. We control for observed heterogeneity in household preferences by including as control variables age and health status of both spouses, number and age of children in the household, region of

[8] The assumption that the error terms following an extreme value distribution is rather restrictive and results in the property of the independence of irrelevant alternatives (IIA). Random coefficient models, in contrast to the conditional logit model used here, allow for unobserved heterogeneity and, therefore, circumvent the restrictive IIA property. Haan (2004), estimating several labor supply models with the same data set we employ, shows that the results (in terms of wage elasticities) from a random coefficient model do not differ significantly from the results obtained from a conditional logit model. Thus, for computational reasons, he suggests to employ the conditional logit model.

residence (east or west Germany), and nationality. Because variables with no variation across alternatives drop out of the estimation in the conditional logit model, the household-specific variables are interacted with the leisure terms in the utilitiy function (1).

The specification of the econometric model is based on the assumption that each household compares the expected utility obtained from net income and the two spouses' (or, in the case of singles, the person's) leisure associated with the choice of a particular hours category. The definition of the hours categories is motivated by both, economic considerations and the actual distribution of hours in the sample. Because of the small number of men working part-time, only three categories could be specified for them, namely non-employment (unemployment and non-participation in the labor force), 1-40 hours and more than 40 hours (overtime). For women we specify five hours categories: non-employment, two part-time categories, full time and overtime (for a more detailed discussion see Steiner and Wrohlich 2003).

4 Simulation Results

Our discussion of the simulation results on the distributional and fiscal effects of the tax reform proceeds as follows. In the next section we present the distributional effects of the reform in terms of cash gains without accounting for adjustments in labor supply, where we present results with and without taking into account pure inflation effects, i.e. bracket creeping. In section 4.2 we present simulation results also accounting for labor supply effects, and section 4.3 contains our simulation results on the fiscal effects of the tax reform.

4.1 Distributional Effects – Without Labor Supply Adjustment

We analyze the distributional effects of the German tax reform 2000 by calculating changes in net household income that result from changes in the tax function. The tax relief affects households differently depending on their taxable income. Without accounting for bracket creeping and labor supply adjustment, the yearly increase in the net household income on average amounts to approximately 966 €, which corresponds to a relative increase of 3.74% of the net household income (Table 1).

The cash gains of the tax reform are strictly increasing in taxable income, both in absolute and in relative terms, and differ substantially by taxable income deciles. Not surprisingly, households in the three lowest deciles do not gain from the tax reform at all since these households were tax-exempted already before the reform. Their main sources of net household income are old-age pensions or social transfers, such as unemployment

compensation and social assistance. For the top income decile the difference amounts to over 6300 € per year, or to a real increase of 8.61%, mainly due to the reduction of the top marginal rate from 51% to 42%. As a consequence of the relative higher gains for the upper deciles, the Gini coefficient is increasing by 0.01 points to 0.353.

So far, our results correspond, at least qualitatively, to those reported by Merz and Zwick (2002) and Wagenhals (2000a). However, the cash gains on the left-hand side of Table 1 do not represent the reduction of the real burden of taxation on private households. The German tax system is defined in nominal rather than in real terms. That implies a nominal increase of the taxable income leads to higher marginal tax rates, although in real terms, the income of the household remains unchanged. This phenomenon is known as bracket creeping in the public finance literature: given progressive income taxation, inflation increases tax revenues, on the one side, and reduces net household income on the other side even without any change in real income. In order to make the households not worse off solely due to inflation, the government has to adjust the tax function over the years, either by reducing the marginal tax rates or increasing the amount of the basic tax allowance.

As the cumulated inflation rate between 2000 and 2005 amounts to approximately 8.6%, this effect is certainly not negligible.[9] To calculate the real gains from the tax reform, we subtract the tax relief necessary to reimburse the households for the additional tax payments due to bracket creeping from the nominal gains attributable to the tax reform. Technically, we calculate the effect of bracket creeping by simulating the tax payments of households with inflated prices for the years 2001, 2004 and 2005, implicitly assuming no increase in real wages, i.e. productivity. The real increase in tax payments due to the inflated taxable income measures the effect of bracket creeping.

Our simulation results show that the relative additional tax payments over the period 2001-2005 due to bracket creeping amount to 6.8%. Appendix I documents for single years the real additional tax increase attributable to bracket creeping. To offset the cumulated negative effect of bracket creeping over the whole period, the government would have to reimburse households on average by 242 €. Hence, the real gain of the tax reform for the average household is reduced by this amount. In absolute terms, the additional tax payments due to bracket creeping increase over the deciles of taxable income. As expected, the relative effect of bracket creeping is highest for the households whose taxable income is close to the basic tax allowance and decreases with taxable income.

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[9] The (cumulated) effect of inflation measured by the consumer price deflator (*Verbraucherpreisindex*) amounts to 2.5% for 2001, to 6.9% for 2004, and to 8.6% for 2005 (see DIW, 2004).

Table 1: Cumulated impact on household income (by income deciles)

income decile	no adjustment for bracket kreeping				with adjustment for bracket kreeping			
	net income (2000)	net income (2005)	Δ (in €)	Δ (%)	net income (2000)	net income (2005)	Δ (in €)	Δ (%)
1	10,090	10,090	0	0.00	10,090	10,090	0	0.00
2	13,526	13,526	0	0.00	13,526	13,526	0	0.00
3	19,479	19,479	0	0.00	19,479	19,479	0	0.00
4	22,751	22,899	148	0.65	22,751	22,824	73	0.32
5	22,155	22,830	675	3.05	22,155	22,601	446	2.01
6	26,630	27,639	1,009	3.79	26,630	27,353	724	2.72
7	28,712	29,940	1,228	4.28	28,712	29,600	888	3.09
8	34,298	35,888	1,590	4.64	34,298	35,445	1,147	3.34
9	43,124	45,360	2,237	5.19	43,124	44,739	1,615	3.75
10	73,779	80,128	6,349	8.61	73,779	79,023	5,244	7.11
Mean	25,823	26,790	966	3.74	25,823	26,548	725	2.8
Gini	0.343	0.353			0.343	0.351		

Notes: Yearly net household income in €, income deciles refer to taxable income; year of analysis: 2000; N=38,8 million households.

Source: GSOEP, wave S (2002), own calculations.

Accounting for bracket creeping, the real effects of changes in the tax function disaggregated by deciles of taxable income are summarized in the right-hand part of Table 1. The average increase of yearly net household income amounts to 725 €. This implies a relative increase of 2.8%. By deciles, the distribution of relative gains is similar to the results derived from the previous analysis. The relative gains are increasing in the taxable incomes. Yet, it is important to stress that for all households with a taxable income above the tax allowance, bracket creeping effect reduces the absolute and relative increase. Controlling for bracket creeping, the inequality in the income distribution is slightly reduced, as the Gini coefficient indicates. This does not surprise since the lowest deciles are not affect by the impact of bracket creeping.

4.2 Distributional Effects – Accounting for Labor Supply Adjustment

One purpose of the tax reform is to increase work incentives by reducing tax distortions imbedded in the German tax system. Since changes in employment may have important effects on the income distribution, it is of great importance for our distributional analysis whether the tax reform leads in fact to an increase of labor supply and, if so, for which groups of households.

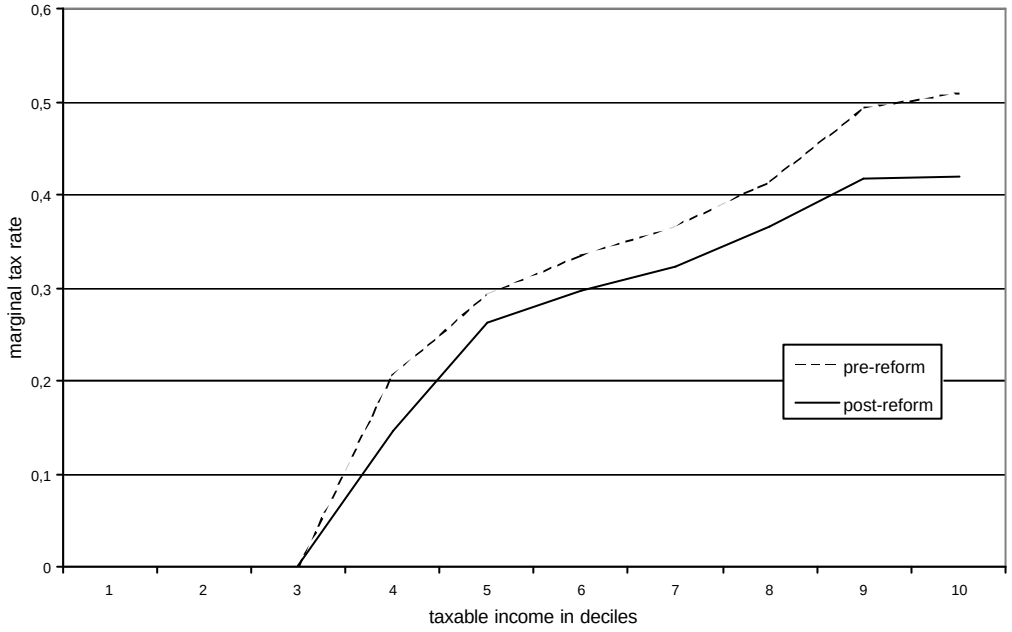
For the estimation of the labor supply model we restrict our sample to household members who are not pensioners and not in any sort of schooling, training or university. Also self-employed people and civil servants are excluded since these groups might differ in their labor supply behavior.[10] We run separate estimations for couple households, single men and single women. For technical reasons, we further divide couple households in three groups, those where both spouses are assumed to be flexible regarding their labor supply behavior (i.e. both spouses are neither pensioners, nor students, nor in maternity leave, nor civil servants or self-employed), those where only the husband is assumed to be flexible and those where only the wife is assumed to be flexible. In total we estimate labor supply responses for 7,494 households. Due to the above-mentioned restrictions 3,570 households are assumed to have an inelastic labor supply.

On average, estimated elasticities of working hours with respect to a 1% change in the real wage derived from our labor supply model described in section 3 above are about 0.3 for

[10] It is certainly problematic to exclude self-employed when estimating the impact of the tax reform on labor supply. This group might be seen as the most flexible with respect to labor supply. However the used data provide not sufficient information about the self-employed. Including behavioural effects of this group remains for future work.

women and 0.2 for men (see Appendix 2).[11] These estimates are in the range of typical cross-section estimates from studies for other OECD countries (see e.g. Fuchs, Krueger and Porterba 1998, Blundell and MaCurdy 1999). Although these average elasticities are not very large, the effect of the tax reform on labor supply may be substantial given the relative large reductions in marginal tax rates and its effect on net household incomes documented above. As the following figure illustrates, changes in the marginal tax burden, which indicate the increasing work incentive due to the tax reform, differ by income deciles. The work incentive effect is particularly strong for higher income groups as the top marginal tax rate is reduced by 9 percentage points to 42%.

Figure 2: Marginal tax burden for single households



Source: GSOEP, wave S (2002), own calculations.

Labor Supply Adjustment

Before analyzing the distributional impact of changes in households labor supply, we provide detailed information about the labor supply effects implied by the tax reform. The quantitative implications of the tax reform can best be described by deriving hours and participation elasticities with respect to changes in the tax function. Although a closed-form expression of elasticities is not available for the utility function estimated in our specification of the household labor supply model, elasticities can be calculated from the simulated changes in

[11] Estimation results for the household utility model are available form the authors upon request. For further methodological discussion related to the estimation of these elasticities see Haan (2004).

estimated hours and participation rates induced by changes in the tax function. The expected number of hours worked as well as the labor force participation rates are calculated for each sample observation both on the basis of the tax function in 2000 and using the changed tax functions. The difference of these numbers provides the estimated effects of the tax reform in terms of elasticities of both participation rates and working hours. These elasticities combine the effects of both the change in net household incomes of a particular group resulting from the tax reform and the size of the labor supply response of a particular household type to a given percentage change of net household income.

Table 3 summarizes simulated labor supply elasticities resulting from the cumulated effect of the tax reform, i.e. over the period 2000 - 2005. Elasticities derived from the first and the second steps of the reform are documented in Appendix III and IV.

Table 3: Cumulated labor supply elasticities by gender, household type, and region

	couples, both spouses flexible		couples, only one spouse flexible		singles	
	women	men	women	men	women	men
	change in the participation rate (in percentage points)					
all couples/all singles	0.50 (0.47-0.60)	0.53 (0.48-0.59)	0.44 (0.28-0.60)	0.54 (0.35-0.75)	0.21 (0.05-0.36)	0.52 (0.24-0.81)
West Germany	0.54 (0.52-0.66)	0.55 (0.50-0.62)	0.45 (0.29-0.62)	0.53 (0.33-0.74)	0.21 (0.05-0.38)	0.48 (0.21-0.77)
East Germany	0.38 (0.27-0.46)	0.45 (0.34-0.56)	0.39 (0.24-0.53)	0.59 (0.35-0.83)	0.18 (0.04-0.32)	0.64 (0.31-0.97)
	change in total hours worked (in percent)					
all couples/all singles	1.3 (0.99-1.62)	0.82 (0.69-0.96)	1.28 (0.79-1.76)	0.87 (0.55-1.20)	0.55 (0.11-0.98)	0.91 (0.45-1.37)
West Germany	1.4 (1.06-1.80)	0.86 (0.72-1.01)	1.35 (0.82-1.87)	0.85 (0.52-1.18)	0.57 (0.11-1.03)	0.85 (0.41-1.28)
East Germany	0.89 (0.52-1.25)	0.7 (0.43-0.96)	0.92 (0.48-0.59)	0.94 (0.55-1.33)	0.43 (0.08-0.79)	1.1 (0.55-1.66)

Note: Numbers in parentheses refer to 95-percent bootstrap confidence intervals (1000 repetitions).
Source: GSOEP, wave S (2002), own calculations.

Estimated elasticities are all positive and statistically significant.[12] Elasticities vary between the groups, yet, according to the bootstrapped confidence intervals, the differences are statistically not significant in most cases. The reason that the average participation elasticity for men is higher than for women is related to larger changes in their net income due to the

[12] For about 90% of the sample the first derivatives with respect to income and both leisure terms are positive, i.e. the theoretical restrictions of a well-behaved utility function are fulfilled in the great majority of cases.

tax reform. In general, taxable income of men is above the average and, therefore, men benefit more from the tax reform than women. As shown in Table 3, labor supply elasticities resulting from the tax reform differ little between east and West Germany, which may be related to various factors. First, since household income in west Germany is on average still substantially higher than in the east, west Germans benefit more from the reduction in marginal tax rates. However, this effect is reduced by the indirect effects resulting from the system of income splitting of married couples in Germany. A reduction in marginal tax rates reduces the advantage of income splitting. As Steiner and Wrohlich (2003) show, west German couples benefit much more from the system of income splitting. Second, as the labor supply elasticities derived from a 1% in wages indicate (see Appendix II), labor supply is more elastic in west Germany.

Population-weighted estimates of the effects of the tax reform on labor force participation and on hours of work for Germany as a whole are summarized in Table 4.

Table 4: Labor supply effects – aggregate numbers in 1000

		number of persons additionally participating after the reform	total hours effect (per week)	hours effect due to additional participation (per week)	conditional hours effect (per week)	number of full time equivalents due to the tax reform
		(1)	(2)	(3)	(4)	(5)
couples	women	72 (58-86)	3,272 (2,560 -3,984)	1,860 (1,528-2,191)	1,413 (836-1,990)	48 (40-52)
	men	64 (54-73)	3,405 (2,912-3,899)	2,677 (2,323-3,030)	728 (550-908)	70 (60-79)
singles	women	11 (3-19)	616 (117-1,115)	356 (85-627)	260 (21-499)	9 (2-16)
	men	20 (9-31)	1,122 (565-1,680)	829 (363-1,295)	293 (159-429)	22 (9-11)
total		166 (100-232)	8,416 (5,017-11,815)	5,772 (3,972-7,471)	2,695 (1,250-4,139)	149 (103-194)

Note: Numbers in parentheses refer to 95-percent bootstrap confidence intervals (1000 repetitions). The confidence intervals of the sums were computed by calculating a weighted average of the percentage deviation of the bounds of the confidence intervals from the mean.

Source: GSOEP, wave S (2002), own calculations.

Although bootstrapped confidence bands are unfortunately quite large, simulated aggregate labor supply elasticities are significantly positive for all groups shown in Table 4. Hence, the tax reform will unambiguously lead to an increase of labor supply. In total, the participation effect amounts to about 160,000 people, where women and men provide contribute roughly equally. The additional supply of working hours amounts to approximately 8 million additional hours. Since part-time employment is common among women while the majority

of men works full-time or even overtime, a larger share of this additional hours effect is accounted for by men.

Following the method suggested by McDonald and Moffit (1980), the total hours effect can be decomposed into a conditional hours effect and a participation effect. As the decomposition in Table 4 (columns 3 and 4) shows, the participation effect is much larger than the conditional hours effect. About two thirds of the additional hours are supplied by persons who have not been participating in the labor market before the tax reform. The participation effect predominates for all groups. For the reason given above, it is relatively large for men.

The last column of Table 4 presents the additional full time equivalents resulting from the participation effect. Dividing the number of hours due to additional participation by 38.5 hours, we calculate that the tax reform results in additional labor supply of 150,000 full time equivalents. The number of full time equivalents exceeds the total participation effect in column (1) for women, whereas for men the reverse holds. These gender differences result from differences in average working hours between men and women already referred to above.

The estimated labor supply effects induced by the tax reform are derived under the assumption that the market wage stays constant. Assuming a downward-sloping labor demand curve, an increase in labor supply will lead to a lower market wage, reducing the labor supply effect. By the same token, if wages are inflexible only parts of the additional supply will result in additional employment. Both effects reduce household incomes and thus the positive labor supply effects of the tax reform derived in this section. Depending on the size of the labor supply effect, this so called third-round effect of a tax reform would have to be considered to estimate the overall effect of the policy reform (e.g., Duncan and Creedy 2001), but for the time being we ignore this third-round effect.

The Impact of Behavioral Adjustment on the Income Distribution

Using our simulation results from the previous subsection we can now analyze the distributional effects of the tax reform also accounting for the labor supply effects induced by the reform, which are known as second-round effects in the microsimulation literature (see e.g. Duncan and Creedy 2001). Simulation results for this second-round analysis are summarized in Tables 5 and 6. Appendix V documents the results of the distributional analysis for the first and second step of the reform.

As household's labor supply is increasing, the new simulated net household income on basis of the tax function 2005 exceeds the net household income assuming inelastic labor supply.[13] On average, the increase in labor supply results in an increase in the net household income by 126 €. In general, the analysis of the distributional effects including second round effects supports the conclusion derived above. Absolute and relative gains due to the tax reform are increasing in taxable income: in the 10th decile the increase amounts to over 5,300 € per year (7.2%), compared to about 1% in the lower deciles.

Table 5: Real cumulated impact on net household incomes – second round effects

taxable income	net income (2000)	net income (2005)	Δ (in €)	Δ (%)
1	10,090	10,231	140	1.39
2	13,526	13,647	122	0.90
3	19,479	19,610	131	0.67
4	22,751	22,950	199	0.87
5	22,155	22,724	569	2.57
6	26,630	27,486	857	3.22
7	28,712	29,734	1,021	3.56
8	34,298	35,578	1,280	3.73
9	43,124	44,853	1,730	4.01
10	73,779	79,091	5,312	7.20
Mean	25,823	26,674	851	3.29
Gini	0.343	0.350		

Notes: Yearly net household income in €, income deciles refer to taxable income; year of analysis: 2000; N=38,8 million households.

Source: GSOEP, wave S (2002), own calculations.

Taking into account labor supply adjustment thus increases net household income in the highest decile by about 70 € in comparison to the analysis without any behavioral adjustment. More important, however, is the impact of increased labor supply in the lower deciles of the income distribution.[14] As shown in Table 1, not accounting for behavioral adjustments these groups' net household incomes were not affected by the tax reform because they did not pay taxes already before the reform. However, these households additional labor supply induced by the tax reform will result in higher net household incomes. This effect is particularly strong for the households in the lowest income decile, as the increase in gross

[13] It is important to stress that the comparison is based on analyses both accounting for the effect of bracket creeping.

[14] The calculation assumes that means tested benefits for these households remain constant.

earnings will not shift them above the basic tax allowance. Thus, for these households additional earnings will remain untaxed.

The behavioral change of the households in the lower deciles affects overall income inequality, although only modestly. In comparison to the pre-tax reform distribution, the Gini coefficient increases by 0.07 points. Taking into account labor supply responses the Gini coefficient slightly declines from 0.351 to 0.350. The increase in net household income in the lower deciles thus implies a marginally more equal income distribution.

Impact of the Tax Reform on the Income Distribution of Different Groups

Differences in cash gains of the tax reform, accounting for bracket creeping and labor supply effects, are summarized in Table 6, where we distinguish by region, marital status, and the number of children living in a household.

Differentiated by marital status, the increase in household incomes for singles is lower than for couples. That is related to differences in taxable income, as people with higher incomes are more likely to be non-singles. The higher effect for non-married couples compared to married couples is related to the income splitting in the German tax system. As non-married couples do not benefit from the income splitting the reduction of marginal taxes has a higher effect for their net incomes than if they were married (Steiner and Wrohlich 2003).

Differences in cash gains between east and west Germany are also important. Whereas west German households gain on average 3.47% of their net households, the income for households in the eastern part increases only by 2.29%. Again, this is due to the still important income difference between the eastern and western part of Germany.

The effects of the tax reform also differ by the number of children living in a household. However, as the results indicate there is no clear relationship between the number of children and the cash gains of the reform. The largest relative increase in net incomes occurs in households with two children, both in east and west Germany. In contrast, cash gains are relatively small for households with three or more children. This is not surprising since the tax reform was not intended to support large families. To improve the situation of households with children the government has launched an additional law to increase child benefits. However, this reform is not directly linked to the changes in the tax function and is thus not attributable to the German tax reform 2000 and, therefore, not explicitly taken into account in our calculation of the distributional effects of the tax reform.

Table 6: Real cumulated impact on net household incomes – second round effects by region, marital status and number of children

	net income (2000)	net income (2005)	Δ (in €)	Δ (%)
Germany	25,823	26,674	851	3.29
single	16,804	17,384	581	3.46
non married couple	31,534	32,678	1,144	3.63
married couple	34,000	35,079	1,080	3.18
no children	22,703	23,449	746	3.29
1 child	28,904	29,830	926	3.21
2 children	37,425	38,766	1,341	3.58
3 or more children	37,002	38,042	1,040	2.81
West Germany	26,868	27,802	934	3.47
single	17,546	18,200	653	3.72
non married couple	33,824	35,143	1,319	3.90
married couple	35,176	36,340	1,164	3.31
no children	23,750	24,585	835	3.52
1 child	29,951	30,955	1,004	3.35
2 children	38,291	39,689	1,398	3.65
3 or more children	37,824	38,928	1,104	2.92
East Germany	21,264	21,751	487	2.29
single	13,555	13,818	263	1.94
non married couple	24,799	25,429	630	2.54
married couple	28,572	29,264	693	2.42
no children	18,066	18,418	352	1.95
1 child	25,223	25,877	653	2.59
2 children	33,403	34,478	1,075	3.22
3 or more children	30,608	31,151	543	1.77

Notes: Yearly net household income in €, income deciles refer to taxable income; year of analysis: 2000; N=38,8 million households.

Source: GSOEP, wave S (2002), own calculations.

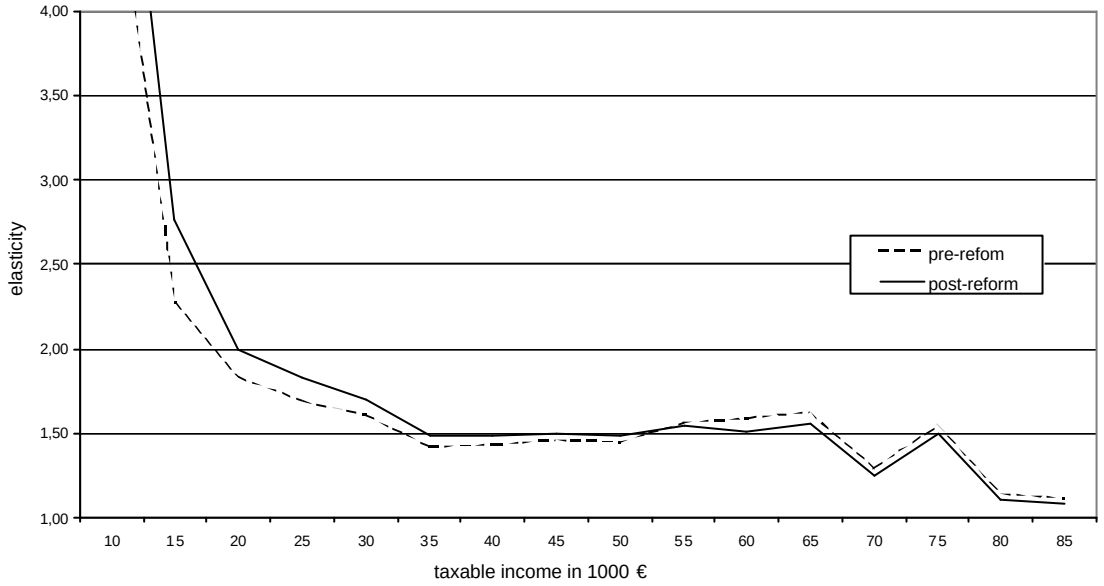
Although the impact of the tax reform varies substantially by region, marital status and number of children, the effect of the variation within these groups on the change in overall inequality is much greater than the effect of the between-group variation. This is revealed by a decomposition of the Theil index, which is a decomposable measure of inequality (see, e.g., Cowell 1995). Accounting for bracket creeping and labor supply effects, our simulations show an increase in the Theil index from 0.209 before the tax function to 0.222 after the reform indicating an increase in inequality associated with the tax reform. Our decomposition analysis shows that the major share of the increase in the Theil index is due to an increase in inequality *within* groups, irrespective of whether the decomposition is based on region,

marital status or the number of children, whereas only a negligible share of the increase in inequality is attributable to changes in inequality *between* groups. [15]

4.3 Fiscal Effects

An important indicator for the analysis of fiscal effects is the elasticity of taxation. This elasticity measures the relative increase in tax revenues to a one percent change in taxable income and is given as the ratio of the marginal to the average income tax rate. Both, the size of this elasticity and its change induced by the tax reform varies markedly with taxable income, as illustrated by the following figure.

Figure 3: Elasticity of taxation – before and after the tax reform



Source: GSOEP, wave S (2002), own calculations

Overall, the elasticity of taxation is increasing due to the tax reform. Assuming the tax function of the year 2000, we estimate an elasticity of 1,55 (median) and of 1,65 (median) for 2005. This positive change results from the reduction of the average tax rate associated with the higher basic tax allowance. Therefore, for lower income groups the elasticity of taxation is increasing. In contrast, for households with taxable incomes above 55,000 € the tax reform reduces the elasticity of taxation because the reduction of the highest marginal tax rate outweighs the higher basic tax allowance. This has a large effect on total tax revenues, given high-incomes households pay the major share of income taxes. It seems likely that these

[15] Detailed results of this decomposition analysis may be obtained form the authors on request.

losses in tax revenues will only partially be compensated by additional tax revenues resulting form the positive labor supply effects of the tax reform described in the previous section.

In Table 7 we summarize our simulation results of the fiscal effects of the tax reform taking into account labor supply effects but *not* adjusting tax revenues for bracket creeping because the focus here is on the impact of the tax reform on public budgets. Following microsimulation terminology, we will refer to the simulated fiscal effects without adjustment for labor supply adjustment as "static", and to those accounting for labor supply adjustment as "behavioral".

Table 7: Tax revenue estimates – with and without accounting for labor supply effects

	2000	2001		2004		2005	
		static	behavioural	static	behavioral	static	behavioral
1	0	0	152	0	269	0	371
2	0	0	117	0	195	0	263
3	0	0	113	0	196	0	255
4	1,690	1,410	1,520	1,090	1,260	1,050	1,300
5	9,670	8,490	8,590	7,210	7,380	7,060	7,280
6	16,600	15,000	15,100	13,200	13,400	12,900	13,100
7	25,000	23,000	23,100	21,000	21,200	20,500	20,800
8	34,200	31,800	31,900	29,500	29,700	28,800	29,100
9	43,000	40,300	40,400	37,800	37,900	36,700	36,900
10	83,500	79,500	79,500	74,700	74,700	71,000	71,100
mean	213,660	199,500	200,492	184,500	186,200	178,010	180,469

Notes: Tax revenue in million €, income deciles refer to taxable income; year of analysis: 2000; N=38,8 million households.

Source: GSOEP, wave S (2002), own calculations.

Based on the tax function of the year 2000, we simulate an overall tax revenue of the personal income tax of nearly 214 billion €. The distribution of the tax revenue over the households stresses the necessity of considering the high-income households when discussing changes in the tax legislation. Households in the highest decile provide nearly 40% of the total tax revenue. On the opposite, the lower 50% of the income distribution contribute only 5% of the revenue of the personal income tax. Assuming no behavioral effects due to the tax reform, we calculate a total loss of tax revenue of about 35,7 billion €. Both, the first and the second step reduce the total amount of tax each by about 14 billion €. The last step has only a minor impact of about 6 billion €.

Comparing the tax revenues derived by simulation with and without adjusted labor supply, the additional tax revenues due to increasing economic activity can be calculated. As labor supply measures only parts of economic activity this difference must be interpreted as

lower bound estimate.[16] The total loss in tax revenue is reduced to 33 billion € when accounting for the additional tax income that results from increasing labor supply. That implies the financial loss is by more than 2 billon € lower assuming the estimated labor supply effects can be realized. The relative increase in tax revenue is highest for the lower deciles as these households have been exempted from taxation before the behavioral adjustment. The additional tax revenues of the lower three deciles amounts to about 900 million €.

5 Summary and Conclusions

It was the purpose of our study to provide empirical evidence about the distributional and fiscal effects of the personal income tax reform in Germany. As the tax reform will not be fully implemented before the year 2005, we employ an ex ante analysis based on a behavioral microsimulation model. The major advantage of our data base (GSOEP) is that it includes for the first time a disproportionately large high-income sample of German households. As we demonstrate, this group contributes the major share of the income tax and is therefore essential when analyzing the impact of changes in the tax function. In contrast to previous studies on the tax reform, we control for bracket creeping and include behavioral adjustment of households by estimating a household labor supply model.

Our simulation results show that the total effect of the tax reform on the net households income amounts on average to 850 €, which implies a relative increase of 3.29%. Cash gains of the tax reform are strictly increasing, both in absolute and in relative terms, in the level of taxable income implying an increase in income inequality as a consequence of the tax reform. Disaggregated by region, family status and number of children, we find that households living in west Germany, couple households and households with two children benefit most from the tax reform. However, most of the increase in inequality is related to changes in inequality within rather than between these groups. The mentioned total effect of the tax reform on the distribution of incomes takes into account bracket creeping and labor supply effects. Controlling for bracket creeping reduces the real value of cash gains markedly, and also slightly reduces inequality since households in the lowest part of the income distribution are not affected by bracket creeping. Accounting for positive labor supply effects induced by the tax reform increases cash gains of the tax reform and reduces income

[16] In addition, economic activity has a positive impact not only on the personal income tax but as well on other taxes such as the consumption tax.

inequality since behavioral effects are relatively strong for households in the lower part of the income distribution.

Regarding the fiscal effects of the reform, we estimate the tax reform induces a total loss in personal income tax revenue by about 33 billion €. As the labor supply estimation indicates, additional participation and hours of work reduce the revenue loss by approximately 2 billion €. Thus, the optimistic view that the tax reform is to a large part "self-financing" by increased work incentives seems largely unwarranted. However, we may underestimate the positive budgetary effects of the tax reform since we could not take into account several other potential behavioral effects of the reform due to lack of sufficient information. As stressed by Feldstein (1995) and the "new tax responsiveness" literature, labor supply effect of cuts in tax rates may only account for a relatively small part of the overall effect on taxable income, especially for people in the upper part of the income distribution who contribute a large share of the income tax. This is likely to be of particular relevance for the self-employed for whom we could not estimate any behavioral effects due to data restrictions.

On the other hand, our estimated labor supply effects might be seen as an upper bound since we have not considered third-round effects of the tax reform resulting from either a wage reduction required to absorb the increased labor supply or, in case of rigid wages, a lower employment effects than we have estimated.

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Appendix I: Impact of Bracket Creeping

Additional tax payments due to bracket creeping (by income deciles)

	2001		2004		2005	
	Δ (in €)	Δ (in %)	Δ (in €)	Δ (in %)	Δ (in €)	Δ (in %)
1	0	0.00	0	0.00	0	0.00
2	0	0.00	0	0.00	0	0.00
3	0	0.00	0	0.00	0	0.00
4	22	5.10	61	14.19	74	17.33
5	74	2.89	192	7.53	229	8.99
6	92	2.00	239	5.22	285	6.24
7	109	1.58	284	4.12	340	4.94
8	140	1.40	369	3.68	443	4.42
9	197	1.29	518	3.40	621	4.08
10	353	0.83	921	2.17	1.105	2.60
mean	77	2.2	202	5.6	242	6.8

Notes: Additional tax payments in €, income deciles refer to taxable income; year of analysis: 2000; N=38.8 million households.

Source: GSOEP, wave S (2002), own calculations.

Appendix II: Labor Supply Elasticities

Labor supply effects of a 1% increase in gross wages (2000)

	couples. both spouses flexible		couples. only one spouse flexible		singles	
	women	men	women	men	women	men
	change in the participation rate (in percentage points)					
all couples/all singles	0.07 (0.06-0.08)	0.11 (0.10-0.12)	0.15 (0.10-0.20)	0.14 (0.08-0.19)	0.05 (0.01-0.09)	0.12 (0.06-0.19)
west Germany	0.08 (0.07-0.09)	0.12 (0.11-0.13)	0.15 (0.10-0.20)	0.12 (0.07-0.17)	0.05 (0.01-0.09)	0.09 (0.04-0.15)
east Germany	0.05 (0.04-0.07)	0.09 (0.07-0.12)	0.14 (0.09-0.18)	0.19 (0.10-0.26)	0.06 (0.01-0.10)	0.18 (0.09-0.28)
	change in total hours worked (in percent)					
all couples/all singles	0.26 (0.21-0.30)	0.17 (0.14-0.20)	0.39 (0.25-0.52)	0.21 (0.12-0.31)	0.13 (0.02-0.24)	0.18 (0.09-0.28)
west Germany	0.29 (0.24-0.34)	0.19 (0.15-0.22)	0.41 (0.27-0.56)	0.18 (0.10-0.26)	0.13 (0.02-0.24)	0.20 (0.9-0.31)
east Germany	0.14 (0.08-0.21)	0.14 (0.08-0.20)	0.28 (0.17-0.39)	0.30 (0.14-0.46)	0.13 (0.02-0.24)	0.43 (0.08-0.25)

Note: Numbers in parentheses refer to 95-percent bootstrap confidence intervals (1000 repetitions).

Source: GSOEP, wave S (2002), own calculations.

Appendix III: Elasticities resulting form tax function 2001

Labor Supply Elasticities

	couples. both spouses flexible		couples. only one spouse flexible		singles	
	women	men	women	men	women	men
	change in the participation rate (in percentage points)					
all couples/all singles	0.25 (0.22-0.28)	0.26 (0.23-0.29)	0.18 (0.12-0.27)	0.27 (0.17-0.37)	0.10 (0.03-0.18)	0.26 (0.12-0.401)
West Germany	0.28 (0.24-0.31)	0.27 (0.25-0.30)	0.20 (0.12-0.27)	0.26 (0.16-0.36)	0.11 (0.03-0.18)	0.24 (0.10-0.37)
East Germany	0.17 (0.13-0.22)	0.23 (0.17-0.28)	0.19 (0.12-0.26)	0.31 (0.18-0.43)	0.09 (0.02-0.16)	0.33 (0.16-0.50)
	Change in total hours worked (in percent)					
all couples/all singles	0.59 (0.44-0.74)	0.40 (0.33-0.46)	0.55 (0.33-0.77)	0.41 (0.26-0.56)	0.27 (0.05-0.48)	0.43 (0.22-0.65)
West Germany	0.64 (0.47-0.81)	0.41 (0.34-0.48)	0.58 (0.35-0.81)	0.39 (0.24-0.54)	0.28 (0.06-0.50)	0.39 (0.19-0.58)
East Germany	0.43 (0.25-0.61)	0.35 (0.21-0.48)	0.44 (0.26-0.61)	0.47 (0.28-0.67)	0.22 (0.04-0.47)	0.56 (0.28-0.85)

Note: Numbers in parentheses refer to 95-percent bootstrap confidence intervals (500 repetitions).

Source: GSOEP, wave S (2002), own calculations.

Labor Supply Effects: Aggregate Numbers in 1000

		number of persons additionally participating after the reform	total hours effect (per week)	hours effect due to additional participation (per week)	conditional hours effect (per week)	number of full time equivalents due to the tax reform
couples	women	31	1,532	888	644	23
	men	32	1,653	1,334	318	35
singles	women	5	291	174	117	5
	men	10	526	408	117	11
sums		78	4,002	2,804	1,196	73

Source: GSOEP, wave S (2002), own calculations.

Appendix IV: Elasticities resulting form tax function 2004

Labor Supply Elasticities

	couples. both spouses flexible		couples. only one spouse flexible		singles	
	women	men	women	men	women	men
	change in the participation rate (in percentage points)					
all couples/all singles	0.45 (0.40-0.51)	0.49 (0.44-0.55)	0.35 (0.22-0.49)	0.50 (0.31-0.67)	0.19 (0.05-0.33)	0.47 (0.22-0.72)
West Germany	0.49 (0.43-0.55)	0.52 (0.46-0.57)	0.36 (0.22-0.50)	0.47 (0.29-0.65)	0.20 (0.05-0.34)	0.42 (0.18-0.66)
East Germany	0.33 (0.24-0.42)	0.43 (0.32-0.54)	0.34 (0.21-0.47)	0.56 (0.33-0.79)	0.17 (0.04-0.30)	0.61 (0.30-0.92)
	Change in total hours worked (in percent)					
all couples/all singles	1.03 (0.76-1.30)	0.74 (0.61-0.87)	1.02 (0.61-1.42)	0.76 (0.48-1.03)	0.49 (0.10-0.89)	0.79 (0.40-1.18)
West Germany	1.01 (0.79-1.41)	0.77 (0.63-0.90)	1.06 (0.63-1.50)	0.72 (0.44-0.99)	0.51 (0.10-0.92)	0.79 (0.40-1.18)
East Germany	0.80 (0.47-1.13)	0.65 (0.40-0.90)	0.80 (0.48-1.12)	0.86 (0.51-1.24)	0.41 (0.08-0.74)	0.70 (0.34-1.06)

Note: Numbers in parentheses refer to 95-percent bootstrap confidence intervals (500 repetitions).
Source: GSOEP, wave S (2002), own calculations.

Labor Supply Effects: Aggregate Numbers in 1000

		number of persons additionally participating after the reform	total hours effect (per week)	hours effect due to additional participation (per week)	conditional hours effect (per week)	number of full time equivalents due to the tax reform
couples	women	54	2,686	1,592	1,094	41
	men	60	3,071	2,502	568	65
singles	women	10	536	323	213	8
	men	18	949	735	214	19
sums		142	7,242	5,152	2,089	134

Source: GSOEP, wave S (2002), own calculations.

Appendix V: Distributional Effects of the First and Second Step

Real Impact on Household Income First Step– Second Round Effects

taxable income	net income (2000)	net income (2001)	Δ (in €)	Δ (%)
1	10,090	10,146	56	0.55%
2	13,526	13,578	52	0.38%
3	19,479	19,534	56	0.29%
4	22,751	22,846	94	0.41%
5	22,155	22,438	283	1.28%
6	26,630	27,034	404	1.52%
7	28,712	29,209	497	1.73%
8	34,298	34,925	626	1.83%
9	43,124	43,932	809	1.88%
10	73,779	75,515	1,736	2.35%
Mean	25,823	26,185	362	1.40 %
Gini	0.343	0.345		

Notes: Yearly net household income in €, income deciles refer to taxable income; year of analysis: 2000; N=38,8 million households.

Source: GSOEP, wave S (2002), own calculations.

Real Impact on Household Income Second Step– Second Round Effects

taxable income	net income (2000)	net income (2004)	Δ (in €)	Δ (%)
1	10,090	10,178	87	0.87%
2	13,526	13,620	95	0.70%
3	19,479	19,576	98	0.50%
4	22,751	22,933	182	0.80%
5	22,155	22,693	539	2.43%
6	26,630	27,427	797	2.99%
7	28,712	29,630	918	3.20%
8	34,298	35,421	1,122	3.27%
9	43,124	44,556	1,433	3.32%
10	73,779	77,430	3,651	4.95%
Mean	25,823	26,513	690	2.67 %
Gini	0.343	0.348		

Notes: Yearly net household income in €, income deciles refer to taxable income; year of analysis: 2000; N=38,8 million households.

Source: GSOEP, wave S (2002), own calculations.